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Yeşim Gökçe Kutsal





## REVIEW

# CONTROVERSIAL ISSUES RELATED TO DRUG TREATMENT IN OLDER ADULTS

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■ F. Yeşim GÖKÇE KUTSAL<sup>1</sup> 

## ABSTRACT

Drug therapy in older adults continues to pose problems and cause controversy with its different aspects. Polypharmacy and inappropriate medication, appears to be the major problem worldwide in terms of both geriatric health and healthcare. Also increases the risk of geriatric syndrome and affects the morbidity/mortality rates negatively. A definition for inappropriate medication is “any drug in which the risks outweigh the benefits or where these do not align with goals of care”, since it encompasses both ineffective or unnecessary treatment and those treatments with high risk. A range of assessment tools have been developed to identify and measure inappropriate prescribing. The most commonly recommended criteria for the use of drugs in older adults are the Beers criteria by American Geriatrics Society. The “Screening Tool of Older People Prescriptions (STOPP)” and the “Screening Tool to Alert doctors to Right Treatment (START)” are other frequently recommended screening approaches. It seems suitable also to establish consideration of deprescribing within the continuum of treatment recommendations in clinical guidelines. Deprescribing is defined as “the planned, supervised process of medication discontinuation, addressing unnecessary polypharmacy which continues to be a problem among older adults”. Evidence-based deprescribing guidelines could be a useful component in the effort to address the global problem of polypharmacy. However, it is important to keep in mind that it is essential to consider the ethical and legal dimensions in all these approaches. Another issue is the herbal products and since the general knowledge about food/beverage-drug interactions are found to be poor, there seems a need to enhance the community awareness of these interactions especially for older adults.

## CORRESPONDANCE

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**Keywords:** Geriatrics; Drug Therapy; Inappropriate Prescribing; Polypharmacy; Deprescriptions.

## INTRODUCTION

Geriatric syndromes are difficult to understand due to the complexity of the multiple factors and the synergistic effects of the various risks. These situations are called syndromes to emphasize that the combined manifestations are related to a large number of factors (1). One of these is polypharmacy, which appears to be a major problem worldwide in terms of both geriatric health and healthcare. Also increases the risk of geriatric syndrome and negatively affects the morbidity/mortality rates.

Concomitant medications were found to be related to a 13% increased risk of a serious adverse event (2). And inadequate or incomplete information about the drug treatment increases the risks of drug interactions and side effects. Adverse drug reactions associated with inappropriate use of drugs lead to many problems and it is stated that, polypharmacy appears as one of the significant reasons for hospitalization (3).

## POLYPHARMACY

Although it has been emphasized that polypharmacy must be addressed carefully, the desired awareness cannot be achieved in daily clinical practice. A review of the literature shows that there are still many question marks about polypharmacy. One of the top issues dealt with recently seems to be the relationship between polypharmacy and functional capacity. It is a fact that both of these are associated with mortality and morbidity, and this increases the importance of the issue.

Unfortunately polypharmacy is common in older adults with the highest number of drugs taken by those residing in nursing homes. Nearly 50% of older adults take one or more medications that are not medically necessary. It has clearly been established that there is a strong relationship between polypharmacy and negative clinical consequences. As clearly stated by Maher et al, although there is considerable data on those living in nursing homes,

the factors affecting the relationship between polypharmacy and functional capacity in the elderly living in communities have not been fully identified yet (4). Literature shows that, polypharmacy in older persons also complicates therapy, increases cost, and is a challenge for healthcare agencies.

The incidence of drug interactions and adverse reactions increases exponentially with the increase in polypharmacy. In a study evaluating 1430 older persons in different geographical regions of Turkey showed that, polypharmacy was correlated with various factors including age, sex, marital status, number of children, status of retirement, and presence of chronic medical conditions but not educational status (5). Being one of the leading causes of hospitalization, polypharmacy seems to be associated with some important parameters in terms of elderly health, such as frailty, increased incidence of falls, prolonged hospital stay, increased rate of recurrent hospitalizations, and greater economic burden (6-10).

A recent study included 675 people aged over 65 years from 8 centers in various geographical regions of Turkey. The polypharmacy status was categorized as non-polypharmacy (0-4 drugs) and polypharmacy ( $\geq 5$  drugs). The subjects' physical function was assessed based on their "physical activity levels, Holden ambulation scores, gait speeds, and hand grip strengths". Their nutritional status based on the "Mini Nutritional Assessment"; and their psychological status based on the "Center for Epidemiologic Studies Depression Scale ". The Charlson Comorbidity Index was used for the evaluation of comorbid conditions. The presence of polypharmacy in this population was found to be 30%. A statistically significant difference was found between the groups on the level of physical activity, Holden ambulation score, and nutrition status. There was a statistically significant difference between the groups also on hand grip strength, Mini Nutritional Assessment score and Charlson score. On the light of this study, the authors concluded that, polyphar-



macy was found to have a significant association with physical function, nutrition, and depression in the elderly aged 65 and over. The relationships between these clinical conditions, each of which is defined as a geriatric syndrome, should be considered in our clinical practice with particular attention on reducing the rates of morbidity and mortality (11).

The incidence of drug interactions and adverse reactions increases exponentially with increases in the number of medications consumed. A study was conducted to investigate drug consumption, in particular nonsteroidal anti-inflammatory drugs, and to assess the relationship between drug consumption and cognitive function and disability in a group of older people residing in a nursing home. Two hundred residents (108 women, 92 men, mean age 77.2  $\pm$  8.7 years) of a nursing home were evaluated. Mini-Mental State Examination and Functional Independence Measure were used to assess the cognitive and functional status. The majority (94.4% of men and 80.4% of women) were prescribed at least one drug, with a mean of 3.59 prescriptions prescribed to women 2.39 to men. The mean number of self-prescribed drugs used by the elderly was higher than found in previous studies. The drugs self prescribed most commonly were nonsteroidal anti-inflammatory drugs, with a rate of 72.5%. Authors found a significant positive correlation between nonprescribed drug use and the scores of Mini-Mental State Examination and Functional Independence Measure. The high drug consumption was correlated with poor cognitive and functional status in elderly residents of this nursing home (12).

Also a wide multicentric study, aiming to evaluate the prevalence of chronic illnesses and the characteristics of drug use in a population of nursing home residents aged 60 and older in 23 cities in Turkey, self-reported adverse drug reactions and their relationship to number of medications used were evaluated. One thousand nine hundred forty-four subjects (1,196 male, 748 female) were enrolled in the study. The mean age  $\pm$  standard deviation was

74.3  $\pm$  7.7 for men and 77.1  $\pm$  8.7 for women. Hypertension was the most prevalent chronic disease seen in the study population (30.7%), followed by osteoarthritis, heart failure, diabetes mellitus, and coronary artery disease. Age and number of medications were not correlated. The usage of analgesic and nonsteroidal antiinflammatory drugs was more common in women than men. There was a correlation between polypharmacy and adverse reactions. Subjects using nonprescribed drugs reported more adverse reactions. The most common adverse reactions reported by the subjects were gastrointestinal side effects, followed by dizziness, sleep disorders, itching, diarrhea or constipation, dry mouth, and swelling of the legs (13).

Not only the polypharmacy but safety of drug use, which is defined by the maximum efficacy, safety of drug and its convenience for the patient and cost-benefit relation, is significant for all age groups as well. However, this is much more so for geriatrics. Therefore, the physicians and the other health professionals working in this chain should pay great attention for safe use of drugs in the older group. It was clearly stated that, studies were needed to find the most effective way to reduce polypharmacy, especially in the frail elder population, and to quantify the real advantages of simplifying their drug regimens in terms of improved quality of life (14).

### INAPPROPRIATE MEDICATION USE

Potentially inappropriate prescribing polypharmacy has been identified as one of the most common risk factors for deterioration of physical and instrumental daily life activities in older people (15). A definition for inappropriate medication is "any drug in which the risks outweigh the benefits or where these do not align with goals of care", since it encompasses both ineffective or unnecessary treatment and those treatments which are high risk. According to Reeve et al, the term "inappropriate" is imperfect due to its own variations in definition and the exclusion of "dose reduction and substitution" and "ta-

pering" from the definition may be questioned by some, although the justifications for these decisions are provided (16).

Factors that set the stage for the use of multidrugs in the elderly are various. The patients are increasingly receiving a large number of prescriptions from different physicians, there is a fact that physicians tend to prescribe a large number of drugs, the patients' expectations of a large number of medication, the use of drugs for symptoms rather than diagnosis in the elderly. Also there is the tendency of physicians to cut off the old drug and start a new one, automatic rewriting of drugs used as a patient's or physician's choice, sale of a large number of over-the-counter drugs, as well as elderly patients tending to take medication from family members or friends. In addition, having been hospitalized in the last six months, being a woman, being depressed, low level of education are risks for multiple and inappropriate drug use in the older age group (17).

In the last years research on prescribing quality in older adults is rapidly expanding and a range of assessment tools have been developed to identify and measure inappropriate prescribing (18). It is stated that, there is no gold standard on how to ensure high quality of prescribing for older adults. Regarding the daily practice the question remains if the interventions also result in improved clinical outcomes. In spite of increasing awareness, such tools can never replace good clinical judgement (19).

## RECOMMENDED CRITERIA

The most commonly recommended criteria for the use of drugs in the elderly are the Beers criteria by American Geriatrics Society. Beers is a list of drugs that have a high risk of side/undesirable effects in elderly people. It is a fairly extensive list. However, it is necessary to take into account some of its features and these are; Beers criteria do not take into account the patient's medical diagnosis, psy-

chosocial status, daily life activities, availability of the drug, whether it has Food and Drug Administration Federal agency (FDA) or European Medicines Agency (EMA) approval (20). The American Geriatrics Society Beers Criteria is defined as an explicit list of potentially inappropriate medications that are typically best avoided by older adults in most circumstances or under specific situations, such as in certain diseases or conditions. Considering some of the negative aspects that have already been identified, American Geriatrics Society has been updating the criteria since 2011 and carries out these updates on a 3-year cycle. In the light of the evidence published since 2015, the last update was made by a group of experts from different disciplines. New criteria were determined by updating for 2019 for clinicians, educators, researchers, and regulators that are widely used by health care managers (21).

The "Screening Tool of Older People Prescriptions (STOPP)" and the "Screening Tool to Alert doctors to Right Treatment (START)" are other frequently recommended screening approaches; STOPP consists of 65 rules related to potentially inappropriate prescribing. START, on the other hand, directs physicians to the right treatment (22, 23). Especially in multimorbid elderly, minimizing inappropriate prescribing is necessary. Prescriber education in terms of geriatric pharmacotherapy, close consultation between clinical pharmacists and clinicians, considering screening tool for older people's prescriptions/ screening tool to alert to right treatment (STOPP/START) criteria and electronic prescribing would be of benefit (24).

In a multicenter study, prospective data were collected from 900 consecutive older patients admitted to six university teaching hospitals (150 patients per centre) in Geneva (Switzerland), Madrid (Spain), Oostende (Belgium), Perugia (Italy), Prague (Czech Republic) and Cork (Ireland). STOPP and Beers' criteria were applied to detect potentially inappropriate medicines. START criteria were applied to detect potentially inappropriate prescribing





omissions. And the results of this study showed that potentially inappropriate drug prescribing and the omission of beneficial drugs are highly prevalent in acutely ill hospitalized older people in six European centres (25).

## RATIONALE MEDICATION MANAGEMENT

For rationale medication management through a case-based format, there are some questions to be asked: Does each drug used match a known medical problem? (Is there inadequacy/overlap?), What are the categories of drugs and their mechanisms of action?, What is the patient's creatinine clearance level?, Are the doses for each drug appropriate for the patient's kidney, liver functions and age?, Are there any problems in terms of potential drug-drug, drug-disease interactions and drug complications?, What are the patient's current complaints (onset, duration)?, Can a drug be responsible for these complaints?, Are there any new drugs added or removed?, Is there a relationship between the complaints and the start date of the drug?, Can the medication regimen be simplified? (17, 26, 27).

It is clearly stated that, drug treatment is essential in both treatment and prevention of diseases among older adults and unfortunately this is of concern (28). Reasons are: 1-Most evidence regarding medication efficacy and safety is derived from small samples of younger and healthier populations (29). 2-Older people are extra vulnerable to adverse effects of drug use due to age- and disease related changes, multimorbidity, and complex drug regimens. There are initiatives to develop deprescribing guidelines (30).

The guidelines that came to the fore in clinical practice were often based on expert opinions and did not provide flexibility for the personal characteristics of patients. The principles on which the guidelines are based, are developed in such a way that best evidence, clinical experience and patient preferences can be used together to support opti-

mal treatment decisions. It seems suitable time to establish consideration of deprescribing within the continuum of treatment recommendations in clinical guidelines as the rule rather than the exception. According to Moriarty et al, this aim is an important opportunity to improve patient care that those who wish to enhance evidence-based clinical practice should endeavour to support. It should be taken into account that, reducing use of medications which may no longer be of benefit or may be causing harm is logical (31).

## DEPRESCRIBING

It seems important to determine which definitions have been made and to create a definition that can combine them. A systematic literature review aiming this purpose was performed on the basis of MEDLINE, Embase, CINAHL, Informat, Scopus and Google Scholar. The findings of this study indicate that there is no complete consensus on the definition of deprescribing, and the authors proposed a definition as; "Deprescribing is the process of withdrawal of an inappropriate medication, supervised by a health care professional with the goal of managing polypharmacy and improving outcomes". They also added that this proposed definition has not yet been confirmed or validated and has not been accepted internationally (16).

A recent article states that, deprescribing is planned, supervised process of medication discontinuation, addressing unnecessary polypharmacy which continues to be a problem among older adults (32). Tools have also been proposed to support the decision-making around deprescribing (33). Adopting a common deprescribing language in terms of terminology and definitions could be used consistently with healthcare professionals, families and patients. Improving collaboration within and across disciplines would be of value in the enhancement of deprescribing (34). Implementing evidence-based deprescribing guidelines can also increase physicians' self-efficacy in developing

deprescribing plans for certain drug classes (35).

Evidence-Based Deprescribing Guideline Symposium was held in 2018, with an interactive discussion activity allowing the 107 participants to share experiences and ideas concerning the barriers and facilitators that arise when moving deprescribing guidelines into frontline practice. According to Conklin et al, the results of that symposium indicated that participants were committed to deprescribing and were moving forward with efforts to bring about change. Participants recognized that the implementation of deprescribing is best conceived of as a comprehensive systems change, and that patients and the public need to be involved in deprescribing processes and activities (34). Although deprescribing is the term used to describe the process of withdrawal of an inappropriate medication supervised by a clinician, it seems useful to share the 10 factors proposed by the symposium participants (34).

- 1- Educating patients and caregivers, including them in the process,
- 2- Training health care providers to increase awareness and skills in deprescribing,
- 3- Supporting and promoting advocacy movements led by health care providers,
- 4- Improving collaboration and communication within and across practice disciplines,
- 5- Inspiring initiatives to promote deprescribing at different levels,
- 6- Since deprescribing is a viable and appealing corporate practice, improving financial or business-related incentives are important,
- 7- Supporting initiatives to expand the evidence base for deprescribing,
- 8- Creating a culture of deprescribing within the related organizations,
- 9- Implementing a patient-centred approach to health care provision,
- 10-Focusing on the current momentum to expand the existing description.

## MEDICATION ADHERENCE

One of the major challenges in healthcare services worldwide is ensuring patients to fully comply with their treatments. Medication adherence for patients with chronic diseases is complex, involving motivators which would fluctuate the impact on individuals at different points along the disease progression. It is perceived as a balance between the willingness and preference to take medications with the alternative being toleration of symptoms. Most methods used for increasing medical adherence require combinations of behavioral interventions and reinforcements in addition to increasing the convenience of care, providing educational information about the patient's condition and the treatment, and other forms of supervision or attention (36).

In order to ensure optimal outcome Betancourt et al recommend regular monitoring of clinical/laboratory parameters, educating the patient and caregiver and involving them in deciding treatment goals/plan (37). Patients are mainly concerned about potency and risk of therapy, and have also a desire to participate in the treatment decision process. There has been an advancing interest in assessing patients' preferences for healthcare treatments. This approach is defined as "preference-sensitive" (38).

Since seniors are suffering from several non-fatal and chronic diseases, their treatment can be easily adapted to the preference sensitive therapeutic approach. Insights into the preferences of patients would be useful to optimize policy and clinical decision making through healthcare decision making that better reflects patients' preferences. However, it should be taken account that, there may be a gap between satisfaction of the patient and the deemed appropriate prescription at this point, and disagreement between preferences of patients and physicians becomes more important (39).

Currently, clinicians are encouraged to practice evidence-based medicine, as well as patient-centered medicine. Deprescribing could also be im-



proved by implementing a patient-centered approach to healthcare provision. This approach includes the identification of patient goals/values as well as treating the individual as a whole person instead of a sum of disease states (34, 40).

Thompson and Reeve state that, there is a need in deprescribing research to shift focus to developing ways to address known barriers and harness knowledge of facilitators. That is, translating existing knowledge into strategies and tools that can impact clinical practice and lead to practical and sustained deprescribing efforts (32).

Improving collaboration and communication within and across professional and practice disciplines would enhance deprescribing. Creating a culture of collaboration where trusting relationships can be cultivated should cover not only the family physicians, specialists, pharmacists, nurses, occupational therapists, personal support workers, but family members on the care team as well. It is stated that, professional roles and responsibilities must be clear, and techniques such as huddle conversations may help to identify candidates for deprescribing (34).

## HERBAL PRODUCTS

Another issue is herbal medicine and a study was conducted to evaluate the prevalence and documentation of the use of herbal remedies by individuals aged  $\geq 65$  years and to evaluate possible adverse reactions and herb drug interactions. Data were collected from 1418 participants (age range 65-95 years) via interview-based questionnaires. The prevalence of herbal use among older adults was 30%. As much as 64% used more than one prescription medication, and polypharmacy was reported by 47.5 % of participants. Some participants used herbal products that are known to interfere with conventional drugs which are used to treat chronic diseases, such as cardiac glycosides, diuretics, anticoagulants, antidiabetics, anticonvulsants, and

monoamine oxidase inhibitors. According to the authors, to ensure good patient care, healthcare professionals should be aware of possible health complications associated with the concomitant use of herbs and medications (41).

The majority of the herbal products used by the seniors are usually suggested by neighbors or elderly relatives and not recommended or prescribed by a physician. Another important issue is, seniors don't know that these products can interact with the prescribed drugs they have to use for their chronic diseases. When they are admitted to an hospital, they do not need to tell their doctors because they are not aware of the importance of using such supplements, thinking that these products are always harmless. Although physicians should be aware of the widespread and easily accessible information about these products, they also neglect to ask or do not consider this subject as a priority.

It is a fact that, the consumers use internet as a source of information on dietary supplements. Using the 5 most commonly used search engines Morris et al entered the names of the 8 most widely used herbal supplements (ginkgo biloba, St John's wort, echinacea, ginseng, garlic, saw palmetto, kava kava, and valerian root) and they found that, among 443 Web sites, 338 (76%) were retail sites either selling product or directly linked to a vendor. According to the authors, consumers may be misled by vendors' claims that herbal products can treat, prevent, diagnose, or cure specific diseases, despite regulations prohibiting such statements. They stated that, regarding the elderly health, more effective regulations are required to put this class of therapeutics on the same evidence-based footing as other medicinal products (42).

Nutritional supplements are also widely used alone and together with prescription and over-the-counter drugs in older adults. A study investigating the simultaneous use of prescription and decongestant drugs and products in older adults living in the community aged 62 to 85 years consisted

of 2351 participants in 2005-2006 and 2206 participants in 2010-2011. The average age was 70.9 years in 2005-2006 and 71.4 years in 2010-2011. The use of at least one prescription drug increased from 84.1% to 87.7% in 2005-2006, and the simultaneous use of at least 5 prescription drugs increased from 30.6% to 35.8% in 2010-2011. The authors reported that the use of over-the-counter drugs decreased from 44.4% to 37.9%, while the use of dietary supplements increased from 51.8% to 63.7%. They also found clinically significant increases in the use of statins, antiplatelet drugs and omega-3 fish oils. According to the authors; in 2010-2011, about 15.1% of older adults were at risk of a potential major drug-drug interaction compared to a drug. In 2005-2006, this was an estimated 8.4%. Most of these interactive regimens included medications, and dietary supplements were increasingly used in 2010-2011. The results showed that the use of prescription drugs and the simultaneous use of dietary supplements and interactive drugs has increased since 2005, and 15% of older adults are at risk of a potentially large drug-drug interaction (43).

Agbabiaka et al mentioned that, concurrent use of herbal medicinal products and dietary supplements with warfarin, statins, and anti-inflammatory drugs is common among UK older adults. A cross-sectional survey was conducted on a purposive sample of community dwelling older adults using self-administered questionnaires and results showed that, one in three concurrent users is at risk of a potential herb-drug or supplement-drug interaction. According to the authors; a majority of the identified interactions involved potential alterations in the concentration or effect of the prescription drugs, including calcium channel blockers, statins, and aspirin (44). A systematic review about concurrent use of prescription drugs and herbal medicinal products in older adults included twenty-two studies and showed that, prevalence of concurrent use by older adults varied widely between 5.3 and 88.3%. The most commonly used herbal medicinal

products are found to be Ginkgo biloba, garlic, ginseng, St John's wort, Echinacea, saw palmetto, evening primrose oil and ginger. The list of prescription medicines identified used in combination with herbal medicinal products was: antihypertensive drugs,  $\beta$ -blockers, diuretics, antihyperlipidemic agents, anticoagulants, analgesics, antihistamines, antidiabetics, antidepressants and statins. As is known, the potential bleeding risks associated with the use of aspirin or warfarin, as well as Ginkgo biloba, garlic, or ginseng, are the most commonly reported herb-drug interactions. The authors added that, they found some data suggesting being female, and having a lower household income and less than a high-school education were associated with concurrent use (45).

A very recent article documented that some populations still have a positive perception towards herbs and their ability to treat diseases. Since the general knowledge about food/beverage-drug interactions was found to be poor, there seems a need to enhance the community awareness of food/beverage/herb-drug interactions (46).

## FINAL WORDS

The implementation of evidence-based deprescribing guidelines appeared to increase clinician perceived self-efficacy in both developing and implementing a deprescribing plan for specific drug classes. If this is correct, then evidence-based deprescribing guidelines could be a useful component in the effort to address the global problem of polypharmacy (35).

One can say that, "patient-centered" approach is vital to allow for shared decision-making on pharmacotherapy. Deprescribing longstanding treatment can be interpreted by the patient and family as "giving up hope". Good communication with the patient, family and carer is therefore crucial, but in many cases this is a challenge to realize, especially in patients with dementia (28).



Evidence-based medicine can be defined as the formal practice of making decisions regarding the best treatment of patients based on the systematic and detailed approach of current best research evidence. This approach is not only about taking account the external evidence to design tailor-made treatment plans; it also encourages a dialogue between patients and clinicians. Thus, patients can share their opinions and express their values and preferences at the decision-making stage. The main benefit of this approach is that clinicians listen to patients' concerns about treatment and take them into account to determine the appropriate treatment plan.

Regarding deprescribing, important ethical implications such as how to deal with autonomy of patients are very important to overcome barriers in implementing deprescribing in practice. According to Reeve et al, cessation of inappropriate medication use has a large financial benefit to the individual and the community. However, the principle of justice also dictates equal rights to treatment regardless of age (47).

Polypharmacy and inappropriate medication use has been discussed in various media for many years. Although there are rules for rationale medication management and recommended criteria, it cannot be said that any definite success has been achieved in these matters.

Deprescribing is relatively a new approach which also needs to be discussed in many dimensions. It is important to keep in mind that it is essential to consider the ethical dimension in these approaches. The concept of "deprescribing", which has been developed for the prevention of polypharmacy, may be reflected in clinical practice after careful analysis of the positive and negative aspects; not only in terms of medical, but also in terms of ethical and legal rights as well. One of the most important concepts that should be considered, especially in people with chronic diseases at an advanced age, is medication adherence. During all these careful evaluation approaches, herbal product use should be constantly taken into account. Educational programs aimed at raising awareness of these issues, both in health professionals and in society, have an indisputable benefit.

It must be remembered that tailor-made treatment plans should be brought to the forefront, since there are no diseases, there are patients, and our tradition from Hippocrates is primarily adhering to the principle of "Primum non nocere".

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## RESEARCH

# A RETROSPECTIVE ANALYSIS OF THE CAUSES OF SEVERE HYPONATREMIA IN THE PATIENTS AGED OVER 65 ADMITTED TO THE EMERGENCY DEPARTMENT

## ABSTRACT

**Introduction:** This study aimed to retrospectively analyze the data of patients older than 65 years and diagnosed with severe hyponatremia in the emergency department.

**Method:** Patients  $\geq 65$  years and with severe hyponatremia (serum sodium levels  $\leq 125$  mEq/L) were included in the analyses.

**Results:** Fifty-five patients were hypovolemic, 22 were normovolemic, and 23 were hypervolemic. 65.5% (n = 36), 59.1% (n = 13) and 60.9% (n = 14) of the groups were females (p > 0.05), and regarding comorbidities, 27.3%, 9.1%, and 4.3% of the groups were diagnosed with a malignancy, respectively (p = 0.031).

**Conclusions:** Early diagnosis and treatment in the emergency department are critical considering the severity and prognosis of hyponatremia.

**Keywords:** Emergency Medicine; Geriatrics; Hyponatremia.

## INTRODUCTION

Hyponatremia is a sodium (Na) blood level lower than 135 mEq/L. It is the most common electrolyte disorder. Serum Na level (biochemically) and the development course determine the clinical diagnosis. The serum Na levels between 130–135 mEq/L, 125–129 mEq/L, and < 125 mEq/L are categorized as mild, moderate, and severe hyponatremia. It is acute if it develops in less than 48 hours and chronic if it takes longer (1). Elderly individuals are more prone to hyponatremia because of age-related factors (2). Moreover, medications, comorbidities, and body-fluid disorders may trigger hyponatremia in geriatric patients over 65 years (3).

Volume status, classified as hypovolemic, hypervolemic, or euvolemic, is critical in the etiology of hyponatremia (4). There is a water and an even more significant Na loss in hypovolemic hyponatremia, whereas both water and Na are elevated in hypervolemic hyponatremia (5, 6). Despite the increased body water, euvolemic hyponatremia has normal Na levels and no hypervolemia (7). Although euvolemic hyponatremia is most frequently seen with inappropriate ADH secretion, it may also occur due to hypothyroidism and drugs. Patients with hyponatremia should be evaluated according to their volume status and treated according to the underlying cause. Considering that the severity of hyponatremia increases with age (8), immediate evaluation and treatment after admission are essential. Severe hyponatremia increases in-hospital mortality in elderly individuals (9).

Based on this background, this study aimed to retrospectively analyze the data of patients older than 65 years and diagnosed with severe hyponatremia in the emergency department.

## METHOD

### Study design

Patients older than 65 and admitted to the emergency department of the Health, Practice, and Re-

search Hospital between 01.07.2020 and 30.09.2020 with severe hyponatremia (Na level  $\leq$  125 mEq/L) were included in the study. The records, including demographic characteristics, comorbidities, medications, symptoms, serum biochemical markers, hyponatremia volume status, and outcomes, were retrospectively analyzed. Patients younger than 65 years, incomplete data, and admitted due to trauma were excluded. The local ethics committee approved the study protocol (01.07.2020, 2020-09).

### Laboratory

The creatinine, albumin, and glucose were analyzed using the colorimetric method in the Roche Cobas 6000 device e501 module. The creatinine measurement determined each patient's glomerular filtration rate (GFR) with the CKD-EPI formula. Potassium analyses were done with the Roche Cobas 6000 device and the indirect ion-selective electrode (ISE) method in the e501 module. The c-reactive protein (CRP) analyses were conducted using a turbidimetric method on the Cobas 6000 device e501 module. All these tests were performed in the biochemistry laboratory of the hospital.

### Statistical Analysis

The data were analyzed using SPSS 20.0. Descriptive statistics were presented using frequency, percent, mean, standard deviation, median, minimum, and maximum values. The Kolmogorov–Smirnov test and the Shapiro–Wilk test evaluated normal distribution. The categorical and continuous variables were compared using the chi-square test and one-way ANOVA or Kruskal–Wallis tests based on the normal distribution, respectively. The Dunn–Bonferroni adjustment was applied for pairwise comparisons, and  $p < 0.05$  indicated statistical significance.

## RESULTS

Fifty-five patients were hypovolemic, 22 were normovolemic, and 23 were hypervolemic. Women constituted 65.5% ( $n = 36$ ) Of the hypovolemic



group, 59.1% (n = 13) of the hypovolemic group and 60.9% (n = 14) of the hypervolemic group (p = 0.853). The mean ( $\pm$ SD) ages were  $76.8 \pm 9.1$ ,  $79.9 \pm 8.9$ , and  $77.1 \pm 8.9$  years, respectively (p = 0.357). Proportions of patients living in nursery were 45.5% (n = 25), 18.2% (n = 4), and 34.8% (n = 8), respectively (p = 0.079).

Comparisons of comorbidities, including hypertension, diabetes mellitus, coronary artery disease (CAD), congestive heart failure (CHF), cerebrovascular disease (CVD), atrial fibrillation (AF), peripheral artery disease (PAD), hypopituitarism, hypoalbuminemia, chronic renal failure (CRF), hypo-

thyroidism, Alzheimer's disease, dementia, bipolar disorder, or malignancy, revealed no significant difference (p > 0.05). However, the hypovolemic group had significantly higher malignancy rates (27.3% vs. 9.1% in the normovolemic group, and 4.3% in the hypervolemic group; p = 0.031), and the hypervolemic group had significantly higher congestive heart failure rates (34.8% vs. 9.1% in the hypovolemic group, and 13.6% in the normovolemic group; p = 0.030) (Table 1).

The median GFR was higher (p = 0.031), and the median creatinine was lower in the hypovolemic group than in the hypervolemic group (p = 0.012),

**Table 1.** Distribution of chronic diseases by groups

	Hypovolemic	Normovolemic	Hypervolemic	p
	(n=55) n (%)	(n=22) n (%)	(n=23) n (%)	
Hypertension	39 (70,9)	17 (77,3)	18 (78,3)	0,736
Diabetes Mellitus	15 (27,3)	5 (22,7)	12 (52,2)	0,057
CAD	7 (12,7)	3 (13,6)	7 (30,4)	0,191
CHF	5 (9,1)	3 (13,6)	8 (34,8)	<b>0,030</b>
CVD	6 (10,9)	2 (9,1)	2 (8,7)	1,000
AF	6 (10,9)	3 (13,6)	6 (26,1)	0,234
PAD	1 (1,8)	-	1 (4,3)	0,700
Hypopituitarism	2 (3,6)	-	-	1,000
Hypoalbuminemia	17 (30,9)	4 (18,2)	3 (13,0)	0,186
CRF	6 (10,9)	2 (9,1)	5 (21,7)	0,356
Hypothyroidis	2 (3,6)	-	2 (8,7)	0,324
Alzheimer	5 (9,1)	-	2 (8,7)	0,441
Dementia	1 (1,8)	2 (9,1)	-	0,166
Bipolarity	1 (1,8)	-	1 (4,3)	0,700
Malignity	15 (27,3)	2 (9,1)	1 (4,3)	<b>0,031</b>

%; Column Percentage, p: Chi-Square Test

and the median CRP was higher in the hypovolemic group than in the normovolemic group ( $p = 0.021$ ). The glucose ( $p = 0.710$ ), potassium ( $p = 0.188$ ), and albumin ( $p = 0.060$ ) were similar between the groups (Table 2).

The proportion of patients taking insulin ( $p = 0.045$ ), clopidogrel ( $p = 0.009$ ), and diuretic ( $p = 0.004$ ) was significantly higher in the hypervolemic group (Table 3). Regarding outcomes, hospitalization was higher in the normovolemic group ( $p = 0.001$ ), discharge was higher in the hypovolemic group ( $p = 0.008$ ), and mortality was higher in the hypovolemic group ( $p = 0.009$ ) (Table 4). And for comorbidities, patients aged 85 years and over had significantly more HT ( $p = 0.016$ ), and CHF ( $p = 0.019$ ) (Table 5).

## DISCUSSION

Hyponatremia is classified as hypovolemic, normovolemic, and hypervolemic according to volume status (10). Studies revealed that hypovolemic hy-

ponatremia is more common (11). Hyponatremia is the most common electrolyte disorder in patients with malignancy, with a prevalence of 4–47% (12). Therefore, target treatment is of great importance. Biological treatment methods used in cancer patients increase the hyponatremia risk (13). At the same time, hyponatremia is negatively correlated with the prognosis in cancer patients. In our study, hypovolemic hyponatremia was frequently observed in patients with malignancies. In geriatric patients, inadequate oral intake following drug use in treatment and subsequent nausea and vomiting may cause this. Although the Na and water increase in hypervolemic hyponatremia, water increase is more prominent (14). This condition is seen in cases of cirrhosis, nephrotic syndrome, acute and chronic kidney failure, and congestive heart failure. In our study, the most common cause of hypervolemic hyponatremia was congestive heart failure, in accordance with the literature.

The glomerular filtration rate (GFR) is a renal mechanism that regulates sodium in the body, and

**Table 2.** Comparison of laboratory values by groups

	Hypovolemic		Normovolemic		Hypervolemic		p
	mean±sd	median (min-max)	mean±sd	median (min-max)	mean±sd	median (min-max)	
CRP	5.54 ± 7.62	1.27 (0.305 - 9.14)	3.21 ± 6.32	0.260 (0.100 - 1.89)	2.81 ± 3.86	0.820 (0.740 - 2.99)	<b>0,026</b>
Albumin	3.58 ± 1.08	3.53 (2.90 - 4.01)	3.92 ± 0.769	4.01 (3.54 - 4.29)	3.64 ± 0.342	3.60 (3.43 - 3.89)	0,060
Creatinine	1.14 ± 0.853	0.940 (0.670 - 1.21)	1.91 ± 1.34	0.955 (0.850 - 1.27)	1.91 ± 1.34	1.29 (0.955 - 2.55)	<b>0,012</b>
K	4.03 ± 0.786	3.87 (3.53 - 4.51)	4.28 ± 0.700	4.32 (3.66 - 4.79)	4.44 ± 1.36	4.20 (3.40 - 5.32)	0,188*
Glucose	141 ± 51.1	129 (108 - 174)	132 ± 56.0	126 (104 - 160)	162 ± 97.7	155 (107 - 178)	0,710
GFR	69.9 ± 31.5	67.5 (50.3 - 90.0)	69.5 ± 22.6	76.4 (55.8 - 90.0)	51.2 ± 29.9	41.3 (24.8 - 79.5)	<b>0,029</b>

mean±sd: mean±standard deviation, p: Kruskal Wallis Test, p\*: One-way ANOVA Test



**Table 3.** Comparison of drug groups between groups

	Hypovolemic	Normovolemic	Hypervolemic	p
	(n=55) n (%)	(n=22) n (%)	(n=23) n (%)	
Ca channel blocker	10 (18.2)	2 (9.1)	4 (17.4)	0,710
β blocker	16 (29.1)	5 (22.7)	8 (34.8)	0,672
ACE	20 (36.4)	9 (40.9)	10 (43.5)	0,824
RAAS	15 (27.3)	7 (31.8)	9 (39.1)	0,584
PPI	13 (23.6)	5 (22.7)	7 (30.4)	0,788
Antipsychotic	3 (5.5)	-	-	0,415
Insulin	5 (9.1)	-	5 (21.7)	<b>0,045</b>
OAD	9 (16.4)	5 (22.7)	7 (30.4)	0,362
Antidepressant	19 (34.5)	6 (27.3)	3 (13.0)	0,155
ASA	7 (12.7)	5 (22.7)	7 (30.4)	0,165
Clopidogrel	4 (7.3)	3 (13.6)	8 (34.8)	<b>0,009</b>
Diuretics	9 (16.4)	5 (22.7)	12 (52.2)	<b>0,004</b>

%; Column Percentage, p: Chi-Square Test

it determines the amount of Na filtered. In the geriatric patient group, there was a decrease in GFR. Thus, fluid absorption from the proximal tubule increases, and the amount of water reaching the distal tubule decreases. In this case, the kidney removes less water. As seen in the development of hyponatremia, urine concentrating capacity decreases with age, and as a result, hypovolemia was observed in geriatric patients. In our study, the median GFR was higher in the hypovolemic hyponatremia group compared to the hypervolemic hyponatremia group. This result correlates with the literature about geriatric patients. In the case of hypervolemic hyponatremia, extracellular water volume increased. Heart failure is observed in nephrotic syndrome, cirrhosis, and acute and chronic renal failure (15). Creatinine helps the anamnesis and physical examination of patients with hyponatremia. In our study, the me-

dian creatinine, an indicator of renal function, was higher in the geriatric patient group than in the hypovolemic hyponatremia group. Koçyigit and Aydın analyzed the factors associated with hyponatremia in the elderly, and found that the CRP level was higher in patients with hyponatremia compared to patients with normonatremia (16). Similarly, in our study, the median CRP was found to be higher in the hypovolemic hyponatremia group compared to the normovolemic hyponatremia group.

Drugs are one of the most common causes of hyponatremia in geriatric patients. The use of multiple drugs increases the susceptibility to hyponatremia in this age group (17). Many studies have shown that the risk of hyponatremia increases in patients who use drugs, such as diuretics, with varying physiology and multiple comorbidities depending

**Table 4.** Comparison of prognoses between groups

	Hypovolemic	Normovolemic	Hypervolemic	
	(n=55) n (%)	(n=22) n (%)	(n=23) n (%)	p
<b>Mortality</b>	10 (18,2)	-	-	<b>0,009</b>
<b>Service</b>	43 (78,2)	9 (40,9)	20 (87,0)	<b>0,001</b>
<b>Intensive Care</b>	7 (12,7)	-	-	0,061
<b>Discharge</b>	41 (74,5)	22 (100)	21 (91,3)	<b>0,008</b>
<b>Referral</b>	3 (5,5)	-	2 (8,7)	0,405

%; Column percentage, p: Chi-square Test

**Table 5.** Distribution of chronic diseases by groups

	65-74	75-84	85+	
	(n=43) n (%)	(n=34) n (%)	(n=23) n (%)	p
<b>Hypertension</b>	31 (72,1)	21 (61,8)	22 (95,7)	<b>0,016</b>
<b>Diabetes Mellitus</b>	16 (37,2)	7 (20,6)	9 (39,1)	0,211
<b>CAD</b>	9 (20,9)	5 (14,7)	3 (13,0)	0,653
<b>CHF</b>	4 (9,3)	4 (11,8)	8 (34,8)	<b>0,019</b>
<b>CVD</b>	2 (4,7)	7 (20,6)	1 (4,3)	0,060
<b>AF</b>	6 (14)	14,7 (34)	4 (17,4)	0,931
<b>PAD</b>	1 (2,3)	-	1(4,3)	0,705
<b>Hypopituitarism</b>	2 (4,7)	-	-	0,505
<b>Hypoalbuminemia</b>	9 (20,9)	8(23,5)	7 (30,4)	0,688
<b>CRF</b>	8 (18,6)	3 (8,8)	2 (8,7)	0,470
<b>Hypothyroidis</b>	3 (7,0)	1 (2,9)	-	0,549
<b>Alzheimer</b>	2 (4,7)	3 (8,8)	2 (8,7)	0,685
<b>Dementia</b>	1 (2,3)	1 (2,9)	1 (4,3)	1,000
<b>Bipolarity</b>	1 (2,3)	1 (2,9)	-	1,000
<b>Malignity</b>	11 (25,6)	3 (8,8)	4 (17,4)	0,164

%; Column percentage, p: Chi-square Test



on their age (18). Singh et al. stated that the risk of hyponatremia increased in the geriatric age group using diuretics compared to the adult age group. In addition, in the univariate analysis performed in this study, hyponatremia was found to be higher in geriatric patients with hypervolemic conditions who used diuretics (19). In our study, the incidence of hyponatremia was found to be significantly different in geriatric patients in the hypervolemic group who used diuretics. In addition, insulin and clopidogrel, which are drugs used for underlying diseases, were significant in terms of hyponatremia in geriatric patients with hypervolemia.

Al Mawed et al. found that mortality related to hyponatremia was significantly higher in the geriatric age group compared to the younger age groups (20). Hyponatremia has been directly or indirectly associated with an increased risk of death. Studies conducted concurrently indicated that hyponatremia alone did not cause mortality, but it may play a role in underlying diseases (21). Akin et al. found a greater incidence of mortality in the normovolemic group than in the hypervolemic and hypovolemic groups (22). However, in our study, it was observed that hypovolemic hyponatremia caused more mortality in the geriatric patient group, and hypovolemic hyponatremia was found to be significant in terms of discharge. Since high mortality is known, we can attribute this situation to good clinical follow-up and treatment. This situation plays an important role in the practices of geriatric patients.

Another remarkable point in our study was that admission to internal medicine services was significant in the normovolemic hyponatremia group. It is known that normovolemic hyponatremia is often related to inappropriately increased antidiuretic hormone release. Hypothyroidism, physical or emotional stress, and medications are among the causes. In a recent study, the in-hospital mortality related to hyponatremia, but not due to inappropriate ADH release, was 10% higher. In the case of

inappropriate ADH release, mortality was reduced, so it had a protective effect (23).

In our study, we divided the patients into three age groups: 65–74 years old, 75–84, and 85 years old and older. We found that hypertension and heart failure were significant in the formation of severe hyponatremia in terms of underlying diseases, but the use of  $\beta$ -blocker medication in the 65–74 age group was more significant. In their study, Uyar et al. found hypertension to be the most important accompanying systemic disease in elderly patients (average of 75.28 years), followed by hyponatremia and then heart failure in the third rank (9). In another study, proton pump inhibitors, loop diuretics, angiotensin-converting enzyme inhibitors, and angiotensin receptor blockers were among the drugs associated with hyponatremia in the patient group with an average age of 85 years and over (23).

This study also has some limitations. First, the data presented are from a single center, and the number of patients is relatively low when the burden of the condition is considered. Moreover, analyzing whether the hyponatremia resulted from existing comorbidities or the medications was not possible. Nevertheless, the study provided valuable data for the clinical practices in the emergency department.

In conclusion, even patients over the age of 65 who were diagnosed with severe hyponatremia in the emergency department are analyzed by volume status or detailed anamnesis, appropriate treatment after physical examination plays an important role. Another point is that differential diagnosis is the cornerstone of hyponatremia management in the emergency department. However, hyponatremia is a common electrolyte disorder in the geriatric age group and is a severe health problem. Considering the severity and prognosis of hyponatremia, we should know that early diagnosis and treatment in the emergency department can decrease mortality and morbidity.

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## RESEARCH

# COMPARATIVE EVALUATION OF POTENTIAL INAPPROPRIATE DRUG USE IN ELDERLY OUTPATIENTS USING THE BEERS 2019 AND TIME CRITERIA

## ABSTRACT

**Introduction:** The potentially inappropriate medication list was established to reduce potentially inappropriate medications (PIMs), potential prescribing omissions (PPOs) and polypharmacy in elderly individuals. This study analyzed the drug use of geriatric patients in Turkey using the American 2019 Beers criteria and the Turkish Inappropriate Medication Use in the Elderly (TIME) criteria.

**Materials and Methods:** This cross-sectional descriptive survey study was conducted using 385 randomized patients aged over 65 years who were treated at the Kütahya Health Sciences University's Evliya Çelebi Training and Research Hospital Internal Medicine outpatient clinic. The patients included in the study were evaluated for PIMs according to the TIME and Beers criteria.

**Results:** While 73.2% of the 385 patients included in the study were in the 65–74 age range, 26.8% were aged  $\geq 75$  years; 67.8% were female and 32.2% were male. The prevalence of PIMs determined by the TIME based criteria was 33%, which was almost 3-fold than detected using the Beers criteria (Beers: 10.9%, TIME-to-STOP: 33%). The mean number of PIMs according to the TIME-to-STOP criteria was significantly higher than that according to the Beers criteria ( $p=0.01$ ). The rate of cases with PIMs according to the TIME based criteria was significantly higher than that according to the Beers criteria ( $p<0.05$ ). A significant association was found between polypharmacy and PIMs for both the TIME-based and Beers criteria ( $p<0.05$ ).

**Conclusion:** The TIME-based criteria were more successful in evaluating PIMs among the elderly in Turkey. In addition, PIMs was significantly higher in polypharmacy patients.

**Keyword:** Geriatrics; Potentially Inappropriate Medication List; Inappropriate Prescribing; Polypharmacy.



## INTRODUCTION

The number of elderly people is increasing worldwide, with 841 million people over 60 years old in 2013, and is expected to reach more than 2 billion by 2050 (1). As society ages, the health problems and social expectations of the elderly come to the forefront (2). The frequency of chronic diseases and drug use increases with age (3). Excessive drug use is an independent risk factor for drug-side effects and PIMs (4).

Polypharmacy can be defined as the concomitant use of five or more drugs, the use of at least one nonessential drug, or the use of more drugs than is clinically necessary. The frequency of polypharmacy among the elderly has been reported to be 23–39% (3, 5). Although the prevalence and disadvantages of PIMs, PPOs, and polypharmacy among the elderly have been known for many years, these problems persist. Drug side effects are 2–3 times more common among the elderly than in young people (6). In one study, it was determined that 6.5% of hospital admissions were due to drug-related complications; 80% of these were due to drug side effects (7).

The Beers and STOPP/START (Screening Tool of Older Person's Prescriptions/Screening Tool to Alert to Right Treatment) criteria were developed to prevent PIMs. The Beers criteria, which were last updated in 2019, are among the most preferred criteria for examining patient-related results and PIMs (8).

Turkish inappropriate medication use in the elderly (TIME) has been established (9). The TIME criteria were created based on the original STOPP and START criteria, taking into account the prescribing habits and the drug use attitude in our country and the ease of use in the clinic. The criteria have two types: criteria for preventing drugs that are not suitable for use in the elderly and misused in clinical practice (TIME-to-STOP) and criteria for drugs that are useful in the elderly but are not frequently used in clinical practice (TIME-to-START) (9).

In order to determine the amount of PIMs in patients aged 65 years and over in Turkey, this study

examined the drugs that geriatric patients were using at the time of admission to the Internal Diseases outpatient clinic and evaluated them according to the recommendations of the American Geriatrics Society Beers 2019 and the TIME criteria created by the Academic Geriatrics Society of Turkey. Our study aimed to determine the prevalence of PIMs according to the TIME criteria and compare it to the results from the Beers 2019 criteria.

## METHODS

### Study design and data collection

This descriptive cross-sectional prospective survey study randomized 385 patients aged 65 years and over who were treated at the Kütahya Health Sciences University's Evliya Çelebi Training and Research Hospital Internal Medicine outpatient clinic for routine control between February 25, 2020 and December 31, 2020. The sample size was calculated as 385 with a significance level of 0.05 (95% confidence) for an infinite population of 50% prevalence. A simple random sampling method was used to select the study subjects. Out of the 2752 patients that visited the Internal medicine outpatient clinic during the dates of the study, 385 were randomized (patients assessed for eligibility n: 2752, Not meeting inclusion criteria n: 2110, randomly assigned n: 385). Only the first visit examinations of the patients between the dates of the study were evaluated, and the follow-up examinations were not taken into consideration. Of the first seven patients whose age was over 65 years, volunteers who met the study criteria and wanted to participate in the study were included in the study. Selection was carried out separately for the morning group and the afternoon group.

### Inclusion and exclusion criteria

Individuals over 65 years of age were included in this study. Patients under 65 years of age and patients who were uncooperative with the doctor during the examination were excluded from the study.

### Permits and approvals

Prior to the study, approval was obtained from the Kütahya Health Sciences University Non-Interventional Clinical Research Ethics Committee (2020/04-15). The volunteers included in the study were verbally informed about the study and their signatures were obtained using an Informed Voluntary Consent Form.

### Clinical and laboratory findings

The patients were questioned through a face-to-face survey conducted in the polyclinic conditions to collect their general characteristics, which included age, sex, marital status, socioeconomic income level, education level, occupation, chronic habits, chronic diseases, and medications they used. Body mass index was calculated by measuring height and weight. The suitability of the drugs was evaluated using the 2019 Beers criteria and the TIME criteria. PIMs were determined separately for the TIME and the Beers criteria. We calculated the number of patients (%) in the total study population with PIMs and the total number of PIMs cases. Patients were considered to use drugs inappropriately if at least one PIM according to the relevant criteria.

### Statistical analysis

The IBM SPSS Statistics 22 (IBM SPSS, Turkey) program was used to perform statistical analysis. The compatibility of the parameters with the normal distribution was evaluated using the Kolmogorov-Smirnov test, and it was determined that the parameters did not show a normal distribution. The Mann-Whitney U test and Wilcoxon sign test were used for comparison of quantitative data and for descriptive statistical methods (mean, standard deviation, frequency). The chi-square test, Fisher's exact test, and continuity (Yates) correction were used to compare qualitative data. The agreement between TIME-to-STOP and Beers was evaluated using the Kappa test. Significance was evaluated at a level of  $p < 0.05$ .

### RESULTS

Of the 385 geriatric patients included in our study, 67.8% were female, 32.2% were male, 73.2% were between the ages of 65–74, and 26.8% were aged > 75 years. Other sociodemographic data of the patients are presented in Table 1. The chronic habits of our patients are shown in Table 2.

The distribution of chronic diseases among the patients was: 1.6% had none, 16.6% had one, 35.8% had two, 29.9% had three, 11.4% had four, 3.9% had five, 0.5% had six, and 0.3% had seven chronic diseases. The chronic disease distribution of the patients is shown in Table 3. The most common chronic diseases were hypertension, diabetes mellitus, and dyslipidemia.

Geriatric patients who met at least one relevant criterion were considered to have PIMs or PPOs. PIMs were detected in 127 (33%), and 42 (10.9%) patients according to the TIME-to-STOP and 2019 Beers criteria, respectively. PPOs was detected in 379 (98.4%) patients according to the TIME-to-START .

For PIMs and PPOs, there were no significant differences between the sexes ( $p > 0.05$ ). According to the TIME-to-START criteria, there was no significant difference between the number of diseases among cases with PPOs and cases without PPOs. According to the Beers criteria, there was no significant difference between the number of diseases in patients with or without PIMs ( $p > 0.05$ ). However, according to the TIME-to-STOP criteria, the number of diseases in patients with PIMs was significantly higher than that in patients without PIMs ( $p < 0.05$ ). The relationship between the number of chronic diseases and PIMs/PPOs is shown in Table 4.

The rate of cases with PIMs according to the TIME-to-STOP criteria was significantly higher than that according to the Beers criteria ( $p < 0.05$ ). The kappa value was 0.398 for the consistency in the detection of PIM between the TIME-to-STOP and Beers criteria (insignificant consistency: 0.0–0.20,



**Table 1.** Distribution of sociodemographic characteristics of the patients

		n	%
<b>Age group</b>	65–74 years	282	73.2
	≥75 years	103	26.8
<b>Sex</b>	Female	261	67.8
	Male	124	32.2
<b>Marital status</b>	Married	244	63.4
	Single	1	0.3
	Widowed	137	35.6
	Divorced	3	0.8
<b>Income</b>	Income less than expenses	74	19.2
	Income equals expense	281	73.0
	Income more than expenses	30	7.8
<b>Education</b>	Illiterate	108	28.1
	Less than 8 years of education	242	62.9
	More than 8 years of education	25	6.5
	College	10	2.5
<b>Profession</b>	Retired	175	45.5
	Housewife	205	53.2
	Worker	3	0.8
	Officer	0	0
	Owns business	1	0.3
	Unemployed	0	0
	Other	1	0.3

Data are expressed as n, %.

**Table 2.** Distribution of patient habits

		n	%
Tobacco	Smoker	56	14.5
	Non-smoker	307	79.7
	Quit smoking	22	5.7
Alcohol	Drinks	10	2.6
	Non-drinking	375	97.4
Exercise	Regular	53	13.8
	None	184	47.8
	Irregular	148	38.4

Data are expressed as n, %.

**Table 3.** Distribution table of chronic diseases

Chronic Diseases	n	%
Hypertension	275	71.4
Diabetes mellitus	246	63.9
Dyslipidemia	123	31.9
Heart diseases (coronary artery disease, arrhythmias, valve diseases, etc.)	74	19.2
Lung diseases (asthma, chronic obstructive pulmonary disease, etc.)	49	12.7
Thyroid diseases (hypothyroidism, hyperthyroidism, etc.)	39	10.1
Neurological and cerebrovascular diseases (Parkinson's, Alzheimer's, stroke, vertigo, etc.)	27	7.0
Osteoporosis	13	3.4
Kidney diseases (chronic renal failure, etc.)	13	3.4
Rheumatologic diseases (gout, rheumatoid arthritis, etc.)	12	3.1
Cancers (lung, bladder, breast, etc.)	11	2.9
Psychiatric diseases (psychoses, depression, etc.)	9	2.3
Other (cirrhosis, glaucoma, etc.)	15	3.9

Data are expressed as n, %.

**Table 4.** The relationship between the number of chronic diseases and PIMs/PPOs

		Number of chronic diseases		
		Mean	Median	P value
PPO according to TIME-to START criteria	<b>Undetected (n=6)</b>	2.167 (1.4720)	2.5	0.703
	<b>Detected (n=379)</b>	2.485 (1.1159)	2.0	
PIM according to TIME-to STOP criteria	<b>Undetected (n=258)</b>	2.326 (1.0071)	2.0	<b>0.002*</b>
	<b>Detected(n=127)</b>	2.795 (1,2683)	3.0	
PIM according to Beers 2019 criteria	<b>Undetected (n=340)</b>	2.446 (1.1012)	2.0	0.190
	<b>Detected (n=45)</b>	2.762 (1.2457)	2.5	

Mean (standard deviation.) and median. Data compared by Mann-Whitney U test. \*p<0.05, statistically significant. PIMs potentially inappropriate medications, PPOs potential prescribing omissions



low: 0.21–0.40, moderate: 0.41–0.60, good: 0.61–0.80, perfect fit: 0.81–1.00). According to these results, low consistency between the two tests was observed. There were 42 cases in which PIMs were detected by both the Beers and TIME-to-STOP criteria. There were no cases in which only the Beers criteria detected PIMs. There were 85 cases in which only the TIME-to-STOP criteria detected PIMs. There were 258 cases of PIMs that were not detected by either the Beers or TIME-to-STOP criteria. The mean number of patients with PIMs according to the TIME-to-STOP criteria was significantly higher than that identified by the Beers criteria ( $p=0.01$ ).

The average number of drugs used by the patients included in the study was 5.127 (range: 1–14). PPOs were observed at a rate of 98.8% in cases without polypharmacy and 98.1% in cases with polypharmacy, with no significant difference between them, according to the TIME-to-START criteria. There was a significant correlation between the presence of polypharmacy and PIMs according

to both the TIME-to-STOP and Beers criteria. The rates of PIMs according to the TIME-to-STOP and Beers criteria were, respectively, 40.8% and 16.9% in patients with polypharmacy, which were significantly higher ( $p<0.05$  for each) than the respective 23% and 3.5% in patients without polypharmacy. The relationship between polypharmacy and PIMs/PPOs is shown in Table 5.

## DISCUSSION

As patients age, the rate of chronic diseases and drug use increases. This leads to an increase in the frequency of PIMs/PPOs and polypharmacy. In addition to the decrease in the quality of life due to aging itself, the PIMs/PPOs and the complications related to polypharmacy increase fragility and further decrease the quality of life.

In this study, we compared the drugs used by geriatric patients who applied to the Internal Medicine outpatient clinic using the 2019 Beers criteria

**Table 5.** The relationship between polypharmacy and PIMs/PPOs

	TOTAL PATIENTS (n=385, %100)	Patients with polypharmacy (n=213, 55,3%)	Patients not with polypharmacy (n=172, 44,7%)
<b>PPO according to TIME-to START criteria</b>	379 (98.4%)	209 (54.3%)	170 (44.1%)
		$p=0.696$	
<b>PIM according to TIME-to STOP criteria</b>	127 (33%)	87 (22.6%)	40 (10.4%)
		$p<0.001^*$	
<b>PIM according to Beers 2019 criteria</b>	45 (10.9%)	36 (9.3%)	6 (1.6%)
		$p<0.001^*$	

Data are expressed as n (%) and compared by Chi Square test.  $*p<0.05$ , statistically significant.

PIMs potentially inappropriate medications, PPOs potential prescribing omissions

and the TIME criteria. Among the patients, 73.2% were "young old" between the ages of 65–74, while 26.8% of them were aged  $\geq 75$  years. There is limited literature on the comparison between national and international criteria for PIMs/PPOs, especially among the elderly. Therefore, we believe that our study is an important data source.

Most studies on PIMs utilize the Beers criteria that have been criticized for not being suitable enough for the prescribing practices in Europe and our country due to its origin being in the USA (10). Our study is the first geriatric study in Turkey that investigates the prevalence of PIMs evaluated by the TIME criteria and compares it with the results of the Beers 2019 criteria. In our study, the prevalence of PIMs determined by the TIME-to-STOP criteria was 33%, while that detected using the 2019 Beers criteria was only 10.9%. This suggests that the TIME-to-STOP criteria are more sensitive for detecting PIMs in the elderly in Turkey.

We also examined the prevalence of PPOs in the same clinical study using TIME-to-START criteria. According to the TIME-to-START criteria, PPOs were found in 98.4% of the cases. The Beers criteria contains a list of PIMs, but they do not account for PPOs. Considering the high rates found in our study, it is apparent that PPOs are at least as important as PIMs.

In a study conducted in Spain, at least one case of PIMS was detected in 71% and 68.5% of patients according to the 2015 Beers criteria and STOPP criteria respectively (11). In the same study, at least one case of PPO was detected in 58% of patients according to the START criteria (11). In another study, patients hospitalized in six large teaching hospitals in six different European countries, PIMs were found in 35% to 77% and PPOs was found in 51% to 73% of the patients according to the STOPP criteria and START criteria, respectively (12). Since these studies included patients requiring hospitalization, the prevalence of PIMs was found to be higher than that in our study. Since only patients who applied

to the outpatient clinic were included in our study, slightly lower rates were found compared to those in the global literature.

Our study found that the rate of PPOs was higher than the rate of PIMs. Just as avoiding PIMs is important for preventing side effects, administering a drug that is needed is also very important for preventing the deterioration of the clinical condition. In some studies, it was shown that inadequate prescription of beta-blockers causes exacerbation of congestive heart failure and consequently has a great effect on hospitalizations (13,14).

Although the definition of polypharmacy has not been made precisely, it is defined as the simultaneous use of at least five drugs in many studies (5,15). In our study, the use of five or more drugs was accepted as polypharmacy and was detected in 213 (55.3%) of 385 patients. This is similar to a study conducted with outpatients in which total polypharmacy ( $\geq 5$  drugs) was 62.3%, and excessive polypharmacy ( $\geq 10$  drugs) was 9.7% (16). In a study investigating polypharmacy and prescription quality in the elderly using the Beers criteria (2003), it was observed that PIMs increased as the number of drugs used by patients increased (17). In a study in which PIMs in the elderly with comorbidities was evaluated using the Beers and STOPP criteria, it was observed that PIMs increased with the use of multiple drugs, according to both criteria (18). In our study, PIMs were significantly higher in the TIME and Beers criteria in patients with polypharmacy. This suggests that it is important to evaluate PIMs in the elderly who use multiple drugs and have multiple chronic diseases.

Among the distribution of the number of chronic diseases in our study, cases with two (35.8%) and three (29.9%) chronic diseases predominated. This is consistent with a geriatrics study conducted in Turkey, in which 23.7% of patients had two chronic diseases and 22.9% had with three chronic diseases (19). In our study, the number of chronic diseases in patients with PIMs, according to TIME-to-STOP criteria, was significantly higher than in patients





without PIMs. Given that the potential for PIMs increases with polypharmacy, it also increases as the number of chronic diseases increases.

When the distribution of chronic diseases is compared with studies conducted in our country, there are both similarities and differences. It is understood that these differences are due to the fact that the studies were conducted in different outpatient clinics, and there were differences in grouping the diseases. For example, the rates in our study compared with studies conducted in Çanakkale and Gaziantep were, respectively, hypertension (71.4%, 65%, 57%), thyroid diseases (10.1%, 7.8%), dyslipidemia (31.9%, 42%, 39%), diabetes mellitus (63.9%, 31%, 37%), and heart diseases (19.2%, 47%, 40%) (20,21). The distribution of chronic diseases in our study was consistent with other studies conducted in our country. For example, the distribution of hypertension in patients over the age of 65 years was found to be 71.4% in our study and 75.1% in the Turkish Hypertension Prevalence Study, which included 4992 people (22,23). In addition, our study showed a similar rate of dyslipidemia as the ELDER-TÜRK study (31.9% and 35%, respectively), in which 5694 people participated (22,24), and it had a similar rate of diabetes mellitus as the CAREFUL study that had 530 participants (63.9% and 59.4%, respectively) (22,25). These similarities suggest that the distribution of chronic diseases in our study is consistent with that of national studies, and that the data obtained in our study yielded reliable results.

The TIME and Beers criteria were created to facilitate clinical evaluation, but they are not suffi-

cient on their own for guidance of appropriate drug selection. For this reason, it would be beneficial to make a multi-dimensional evaluation that considers the principles for reducing polypharmacy along with including more criteria that can be used in clinical evaluation of PIMs and PPOs in daily practice. We believe that this would be especially advantageous in Turkey for reducing the prevalence of PIMs and PPOs and their associated negative consequences. By developing practices to prevent PIMs and PPOs, great contributions can be made for protecting the health and preserving the quality of life among elderly patients. Consequently, this will relieve some of the burden on the health system and economy.

Among the worldwide literature, there are few studies that compare the national and international scales in PIMs among elderly patients. To the best of our knowledge, our study is the first to determine the prevalence of PIMs with the TIME criteria and compare it with the results of the Beers 2019 criteria. Therefore, we believe that the results of our study are an important data source both nationally and internationally.

**Conflict of Interest:** The authors declare no conflict of interest.

The data used in this article has been derived from the data in "Comparative evaluation of potential inappropriate drug use with Beers 2019 and TIME criteria in patients aged 65 and over admitted to internal medicine outpatient clinic" medical specialization thesis.

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## RESEARCH

# COMPARISON OF BEDSIDE DIAGNOSIS METHODS WITH FIBEROPTIC ENDOSCOPIC EVALUATION OF SWALLOWING IN PATIENTS WITH POST-STROKE DYSPHAGIA

## ABSTRACT

**Introduction:** Post-stroke dysphagia increases mortality and morbidity due to aspiration pneumonia and malnutrition. We aimed to compare the applicability of the bedside water swallow test, the National Institutes of Health Stroke Scale, and the modified Mann Assessment of Swallowing Ability with the fiberoptic endoscopic evaluation of swallowing in determining dysphagia.

**Materials and Methods:** Our study included 40 patients admitted to a tertiary hospital from July to October 2021 with acute ischemic stroke. We prospectively noted each patient's age, gender, medical conditions, test scores, and the presence of pneumonia during hospitalization.

**Results:** Of the 40 patients, 27 (67.5%) were male and 13 (32.5%) female, and their mean age was 68.72 years. Eleven (27.5%) patients had aspiration, 6 (15%) had penetration, and 17 (42.5%) had therefore dysphagia. A statistically significant difference was noted between the patients with and without dysphagia for the bedside water swallow test, the modified Mann Assessment of Swallowing Ability, 2% or more oxygen desaturation, the combination of the bedside water swallow test and the modified Mann Assessment of Swallowing Ability, and saturation ( $p = 0.004$ ,  $p = 0.03$ ,  $p = 0.042$ ,  $p = 0.002$ , and  $p = 0.042$ , respectively). A statistically significance for the prediction of aspiration ( $p = 0.049$ ) was only detected using the bedside water swallowing test–modified Mann Assessment of Swallowing Ability combination.

**Conclusion:** Bedside dysphagia screening may be used to determine the presence of post-stroke dysphagia. Notwithstanding, only the bedside water swallowing test–modified Mann Assessment of Swallowing Ability combination successfully predicted aspiration.

**Key words:** Dysphagia; Endoscopy; Pneumonia; Stroke.



## INTRODUCTION

Stroke is a common health problem and one of the leading causes of death and disability in adults worldwide (1). The prevalence of stroke ranges between 0.9% and 4.1% in the Turkish population (2-4). Moreover, Türk Börü et al. (5) found that stroke prevalence among the young population (< 45 years) in Turkey was 0.6%.

Post-stroke dysphagia (PSD) is a well-known complication of stroke, and its prevalence varies between 28% and 65%, with the variation depending on the test or method used to diagnose PSD and the timing of the evaluation (1, 6). PSD is directly related to aspiration pneumonia and malnutrition, which increases mortality, morbidity, the length of hospital stay, and economic burden (7). Even if the patients with PSD may achieve spontaneous recovery in time (1, 8), they have a significantly increased 5-year mortality rate in comparison to patients without PSD (adjusted hazard ratio: 1.84; 95% confidence interval [CI]: 1.57–2.16;  $p < 0.001$ ) (8). The early detection of PSD therefore has a crucial role to play in preventing the aforementioned complications and improving swallowing functions through rehabilitation, which may include appropriate nutrition.

The diagnostic methods for dysphagia include a videofluoroscopic swallowing study (VFSS), a fiberoptic endoscopic evaluation of swallowing (FEES), and clinical bedside methods comprising different combinations (1). However, the necessary staff and/or instruments required to perform VFSS and FEES are not available in many hospitals worldwide (1, 9), so it may not be possible or practical for these tests to be performed for each stroke depending on the patient's condition (10). In this study, we aimed to investigate the applicability of the bedside water swallow test (BWST), the National Institutes of Health Stroke Scale (NIHSS), and the modified Mann Assessment of Swallowing Ability (mMASA) through comparison with the FEES to determine PSD.

## MATERIALS AND METHODS

### Study Design

Forty patients who were admitted to a tertiary hospital from July to October 2021 with first-time acute ischemic stroke confirmed via the diffusion-weighted magnetic resonance imaging were included our study. Each patient's age, gender, medical conditions, test scores for bedside water swallowing, the NIHSS, the mMASA, penetration–aspiration in the FEES, and the presence of pneumonia during their hospital stay were noted prospectively.

### Inclusion and Exclusion Criteria

The patients with a complaint of dysphagia within 3 days following their hospital stay were enrolled. Any neurological diseases other than stroke, a history of previous stroke, poor consciousness, a history of head and neck cancer, a history of any surgical intervention or trauma to the head and neck, a history of dysphagia before the hospital stay, the presence of pneumonia before the hospital stay, and patients who refused to participate in the study were excluded.

### Measurement of the Outcomes

All the patients were informed about dysphagia and the study, and their verbal and written consent form were obtained immediately following their hospital stay. The patients with dysphagia that started within 3 days following hospital admission (maximum 5 days if it started on a weekend) were visited, and the BWST, NIHSS, and mMASA were performed by two neurologists (MSB, ÜD). Two otolaryngologists (LY, BY) and a swallowing therapist (NE) noted the penetration–aspiration scale (PAS) score after the FEES had been performed. The clinicians were blinded to the performance of each other's tests. The scores for each patient were confirmed by the two independent physicians who performed the same tests.

### Bedside Water Swallowing Test (BWST)

Each subject was asked to drink 10 ml of water

from a glass in a seated position, and oxygen saturation was measured from a finger on the non-hemiplegic side during swallowing and for 2 minutes thereafter. The presence of cough, voice change, a 2% or more drop in oxygen saturation, and water flowing from the corner of the mouth, the absence of laryngeal movement, and drinking the water by taking in small volumes instead of drinking once at a time were rated as one point each. The total score ranged from 0 to 6, a score  $\geq 3$  was considered as dysphagia (11).

#### **National Institutes of Health Stroke Scale (NIHSS)**

The NIHSS is globally accepted questionnaire that measures the severity of stroke. The total score ranges between 0 and 42, and higher results indicate greater impairment. The total score is interpreted as follows: 1–4, minor stroke; 5–15, moderate stroke; 16–20, moderate to severe stroke; and 21–42, severe stroke (12).

#### **Modified Mann Assessment of Swallowing Ability (mMASA)**

The mMASA questionnaire consists of 12 items with a total value of 100 points. A total score  $< 95$  indicates dysphagia (13).

#### **Fiberoptic Endoscopic Evaluation of Swallowing (FEES) and Penetration-Aspiration Scale (PAS)**

Penetration is described as the bolus staying above the vocal cords, while aspiration means that the bolus passes into the airway below the true vocal cords during swallowing. A PAS score can range between 1 and 8. A score  $> 1$  is considered as dysphagia, 2–5, indicates penetration, and  $> 5$  denotes aspiration (14). During the FEES in this study, a fiberoptic endoscope was inserted into the side of the nose without septal deviation, and a clear view of the laryngeal structures was obtained. The patient was asked to drink a total of 5 cc of liquid (blue food coloring-dyed water), divided into 1 cc for 5 s periods. The PAS score was then noted. Afterward,

the same procedure was repeated with a thickened food (5 ml yoghurt). We used the FEES as a gold standard test to detect dysphagia in this study.

#### **Combinations of the Tests**

When the results were the same for each test, the scores were noted as a binary combination. Otherwise, the absence of dysphagia was indicated. As the saturation is part of the BWST, this combination was not included in our analysis.

#### **Statistical Analysis**

The data were analyzed using IBM Statistical Package for Social Sciences version 22.0 for Windows (SPSS Corp., Armonk, NY) with a 95% confidence interval (CI). The descriptive statistics were presented as mean  $\pm$  standard deviation (SD) for the numerical variables and as the number of cases (%) for the categorical variables. The normality hypotheses were tested using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Double-group comparisons of the normally distributed continuous variables (age, NIHSS values) were tested using the independent sample t-test; those that did not show normal distribution (BWST and mMASA values) were evaluated using the Mann–Whitney *U* test. A univariate analysis of the data was performed using a  $2 \times 2$  table, and the results were compared using either Pearson’s chi-square test or Fisher’s exact test. A result of  $p < 0.05$  was considered statistically significant.

This study was performed in line with the principles of the Declaration of Helsinki. It was approved by the institutional ethics committee (No. 2021/199, June 17, 2021) and conducted in accordance with the related privacy statements and applicable regulatory requirements.

## **RESULTS**

A total of 40 patients comprising 27 (67.5%) males and 13 (32.5%) females were enrolled in this prospective study. The mean age of the patients was 68.72 (minimum: 52, maximum: 85, SD: 10.23) years.



Twenty-two (55%) patients had diabetes mellitus (DM), 38 (95%) patients had hypertension (HT), and 20 (50%) patients had both conditions. Seventeen (42.5%), patients had minor stroke, 22 (55%) had moderate stroke, and 1 (2.5%) had moderate to severe stroke.

Their PAS scores showed that 11 (27.5%) patients had aspiration, 6 (15%) had penetration, and 17 (42.5%) had therefore dysphagia. After reevaluating their PAS scores with thickened liquid, only one patient (2.5%) who had a weak cough reflex showed a penetration to the larynx. That patient's oral intake was therefore stopped and a nasogastric tube was placed to prevent silent aspiration. The other patients with aspiration or penetration continued their oral intake of the thickened food, and none of the patients were observed as having pneumonia during their hospital stay. The swallowing rehabilitation continued after discharge.

The descriptive statistics of the outcome variables are summarized in *Table 1*. *Figures 1 and 2* represent the distribution of the values of the outcome variables of the patients with or without dysphagia, and those with and without aspiration, respectively. Statistical significance was detected in the mean values of the BWST between the patients with and without dysphagia ( $p = 0.006$ ). The other outcome variables did not show a statistically significant difference between the patients with and without dys-

phagia, or the patients with and without aspiration ( $p > 0.05$ ).

No relationship was detected in the comparison of age ( $>65$  years vs.  $\leq 65$  years), gender, the presence of DM, the presence of both DM and HT between the patients with and without dysphagia, and those with and without aspiration ( $p > 0.05$ ). *Tables 2 and 3* summarize the comparison between the outcome variables and the patients with and without dysphagia, and the patients with and without aspiration, respectively. We found a statistically significant difference in the BWST, the mMASA test, a 2% or more drop in oxygen saturation, the combination of the mMASA and BWST, and saturation between the patients with and without dysphagia ( $p = 0.004$ ,  $p = 0.03$ ,  $p = 0.042$ ,  $p = 0.002$ , and  $p = 0.042$ , respectively). The combination of saturation and the mMASA test did not change the result when compared to a 2% or more drop in oxygen saturation alone ( $p = 0.042$  for both). The combination of the mMASA test and BWST was only the test for which a statistically significant result was detected for the prediction of aspiration ( $p = 0.049$ ).

## DISCUSSION

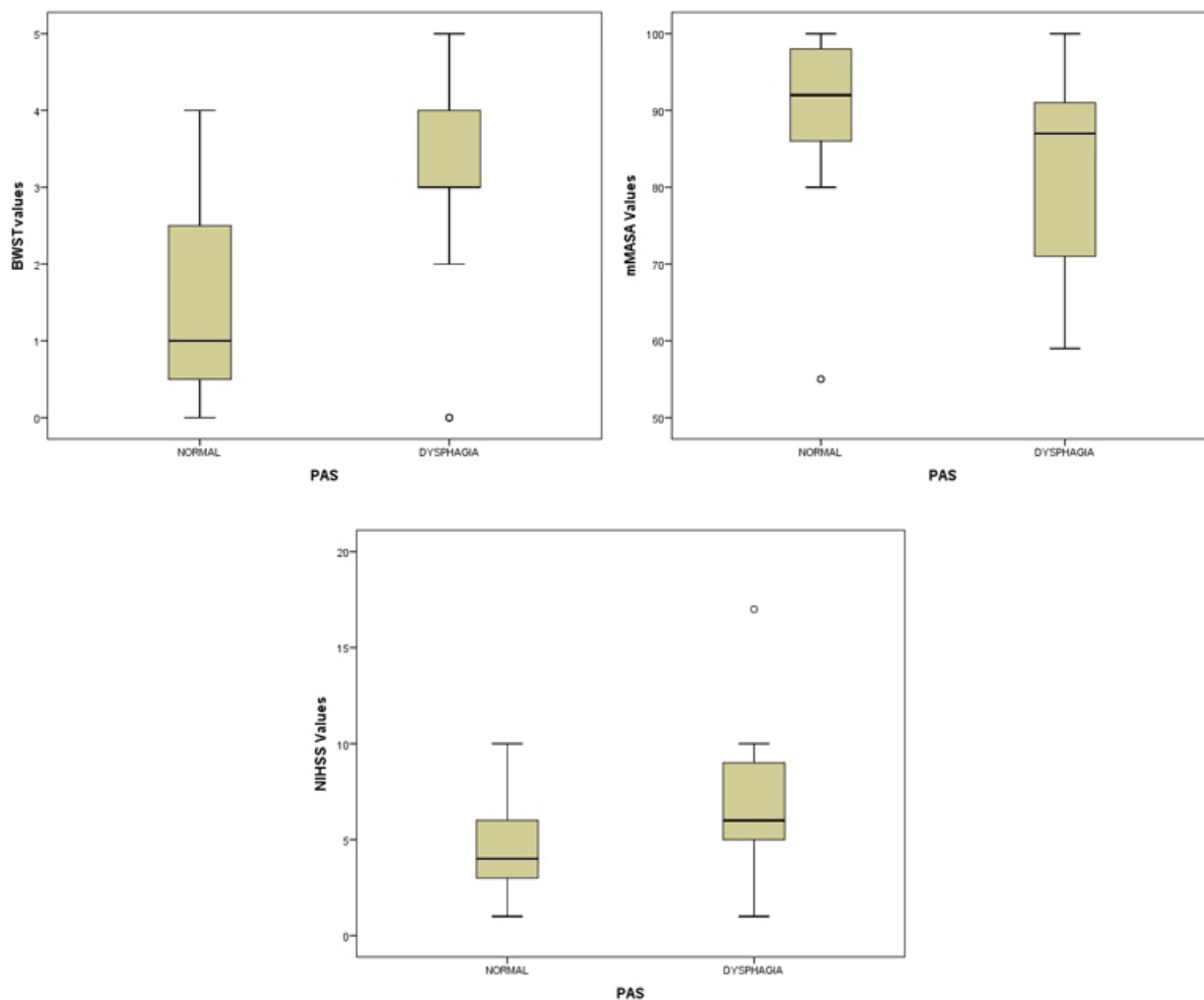
The global incidence of PSD, which carries an increased risk of morbidity and mortality due to aspiration pneumonia and malnutrition, has been

**Table 1.** The descriptive statistics of the scores of the outcome variables.

Variable	Minimum	Maximum	Mean	SD
BWST	0	5	2.25	1.69
mMASA	55	100	86.62	12.42
NIHSS	1	17	5.50	3.44
PAS	1	7	2.83	2.55

\*BWST: Bedside water swallowing test, mMASA: Modified Mann Assessment of Swallowing Ability, NIHSS: National Institutes of Health Stroke Scale, PAS: Penetration-Aspiration Scale, SD: Standard deviation

**Figure 1.** The boxplots demonstrate the distribution of values of the outcome variables of the patients with or without dysphagia (BWST: Bedside water swallowing test, mMASA: Modified Mann Assessment of Swallowing Ability, NIHSS: National Institutes of Health Stroke Scale, PAS: Penetration-Aspiration Scale).



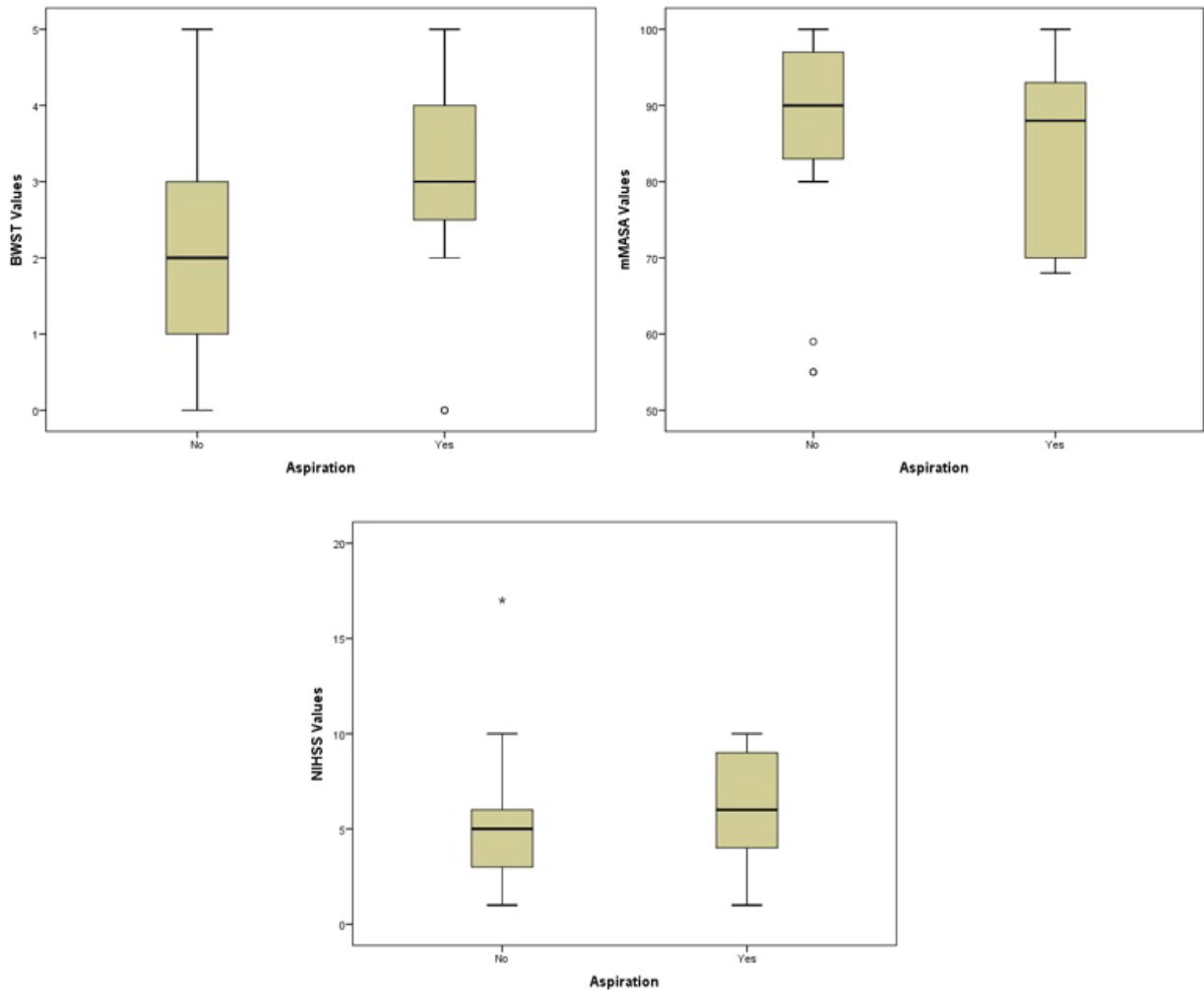
reported to be up to 81% (7, 15). Liquids infer a higher risk of aspiration than semisolids (16). An instrumental evaluation is preferred to determine PSD (17). Even though VFSSs are considered the gold standard method, the FEES is a reliable, portable, safe, and cost-effective option (1). Moreover, Wu et al. (18) found that the FEES has greater sensitivity in evaluating swallowing than the VFSS. Dysphagia screening with the FEES or VFSS or by a speech-language pathologist before any oral intake is also

recommended in the 2019 guidelines of the American Heart Association and American Stroke Association to reduce risk of aspiration pneumonia, disability, and the need for long-term institutional care (17). However, no recommendations are provided on bedside dysphagia screening tests although it is noted that the instruments and/or staff required for dysphagia screening may not be available. The applicability of bedside assessment tools is therefore a topic of interest.





**Figure 2.** The boxplots demonstrate the distribution of values of the outcome variables of the patients with or without aspiration (BWST: Bedside water swallowing test, mMASA: Modified Mann Assessment of Swallowing Ability, NIHSS: National Institutes of Health Stroke Scale)



In this prospective double-blind study, we investigated the applicability of various bedside assessment tools, including the BWST, the mMASA, the NIHSS, oxygen saturation, and combinations thereof, in comparison with the PAS scores to detect both dysphagia and aspiration in patients with acute ischemic stroke. We found that the combination of the BWST with the mMASA test achieved both maximum sensitivity and specificity (76.4% and 73.9%, respectively) compared to the other tests. However,

there was no major change when the mMASA test was combined with the BWST to determine dysphagia. The maximum sensitivity (88.2%) was observed for the mMASA, but it had low specificity at 43.4%. Oxygen desaturation of more than 2% showed maximum specificity at 86.9% but a low rate of sensitivity at 41.1%. On the other hand, the combined BWST and mMASA test was the only assessment tool combination to detect aspiration with good sensitivity (72.7%) and specificity (62%; see *Tables 2 and*

**Table 2.** Comparison between the outcome variables and the patients with and without dysphagia.

Variable	Dysphagia (n=17) n (%)	Normal (n=23) n (%)	p value	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
<b>BWST</b>							
Dysphagia	13 (76.5)	7 (30.4)	<b>0.004*</b>	76.4	69.5	65	80
Normal	4 (23.5)	16 (69.6)					
<b>mMASA</b>							
Dysphagia	15 (88.2)	13 (56.5)	<b>0.03*</b>	88.2	43.4	53.5	83.3
Normal	2 (11.8)	10 (43.5)					
<b>NIHSS</b>							
Minor	4 (23.5)	13 (56.5)	0.051	NC	NC	NC	NC
Moderate	12 (70.5)	10 (43.5)					
<b>Saturation</b>							
Dysphagia	7 (41.2)	3 (13)	<b>0.042*</b>	41.1	86.9	70	66.6
Normal	10 (58.8)	20 (87)					
<b>BWST+mMASA</b>							
Dysphagia	13 (76.5)	6 (26.1)	<b>0.002*</b>	76.4	73.9	68.4	80.9
Normal	4 (23.5)	17 (73.9)					
<b>Saturation+mMASA</b>							
Dysphagia	7 (41.2)	3 (13)	<b>0.042*</b>	41.1	86.9	70	66.6
Normal	10 (58.8)	20 (87)					

BWST: Bedside water swallowing test, mMASA: Modified Mann Assessment of Swallowing Ability, NIHSS: National Institutes of Health Stroke Scale, PPV: Positive predictive value, NPV: Negative predictive value, \*: statistically significant, NC: Not calculated as not detected a statistically significant difference.

3, respectively). We believe that the studied tests may be useful in the hospitals where the necessary equipment and/or staff is not available to perform VFSSs or FEESs. In daily clinical practice, the patients with PSD may be referred to a tertiary hospital which has VFSS or FEES to prevent any complication due to aspiration and/or malnutrition.

The global incidence of pneumonia after stroke has been reported as being 56.7% (7). However, none of the patients in our study developed pneumonia during their inpatient stays, which is in line with the results of the study by Marques et al (15). Early screening and a change of diet to thickener food may be the reason for our result. Another reason may be that our study did not include severe stroke patients, and follow-up was limited to inpatient stay only. The use of prophylactic antibiotics, acid suppressive medications, and antiemetic-prok-

inetic drugs, and oral care are some of the medical-ly preventative approaches aimed at helping prevent pneumonia. We routinely administered proton pump inhibitors to the patients in our hospital to prevent bleeding possibly caused by stress or anti-coagulants; however Arai et al. (19) reported in their meta-analysis that proton pump inhibitors are associated with a higher risk of pneumonia compared to histamine H2-blockers.

Older age, a higher NIHSS score, malnutrition, voice changes, and the location of the stroke were identified as predictors of PSD in a review by Jones et al. (20). In our study, we found no relationship between older age ( $\leq 65$  years vs.  $>65$  years) and NIHSS score (minor vs. moderate) and dysphagia. These results may be due to not include severe stroke patients and our limited study population.



**Table 3.** Comparison between the outcome variables and the patients with and without aspiration.

Variable	Aspiration Yes (n=11) n (%)	No (n=29) n (%)	p value	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
<b>BWST</b>							
Dysphagia	8 (72.7)	12 (41.4)	0.077	NC	NC	NC	NC
Normal	3 (27.5)	17 (58.6)					
<b>mMASA</b>							
Dysphagia	9 (81.8)	19 (65.5)	0.315	NC	NC	NC	NC
Normal	2 (18.2)	10 (34.5)					
<b>NIHSS</b>							
Minor	3 (27.3)	14 (48.2)	0.198	NC	NC	NC	NC
Modarate	8 (72.7)	14 (48.2)					
<b>Saturation</b>							
Dysphagia	3 (27.3)	7 (24.1)	0.838	NC	NC	NC	NC
Normal	8 (72.7)	22 (75.9)					
<b>BWST+mMASA</b>							
Dysphagia	8 (72.7)	11 (37.9)	<b>0.049*</b>	72.7	62	42.1	85.7
Normal	3 (27.3)	18 (62.1)					
<b>Saturation+mMASA</b>							
Dysphagia	3 (27.3)	7 (24.1)	0.838	NC	NC	NC	NC
Normal	8 (72.7)	22 (75.9)					

BWST: Bedside water swallowing test, mMASA: Modified Mann Assessment of Swallowing Ability, NIHSS: National Institutes of Health Stroke Scale, PPV: Positive predictive value, NPV: Negative predictive value, \*: statistically significant, NC: Not calculated as not detected a statistically significant difference.

Previous studies (9, 15) have reported the results of a combination of water tests and oxygen desaturation. In their study, Smith et al. (9) found that 2% or more oxygen desaturation had a sensitivity of 87% but a low specificity and a positive predictive value (PPV) at 36% and 39%, respectively, compared to the VFSS. In contrast, our results showed a specificity of 86.9% but a low sensitivity of 41.1% with a PPV of 70% and a negative predictive value (NPV) of 66.6%. The combination of saturation with the mMASA test did not change these values. Unlike in other studies, the BWST in our study included not only oxygen desaturation, but also the presence of cough, voice changes, water flowing from the corner of the mouth, the absence of laryngeal movement, and not drinking the water once at a time. These differences in the tests may be the reason of our results. Brodsky et al. (21) concluded that airway response with voice change improves the overall accuracy of

aspiration detection. They also found that the water test using 90–100 ml was more sensitive (91% vs. 71%, respectively) but less specific (53% vs. 90%, respectively) than the use of 1–5 ml of water. We used 10 ml of water in our study, and our results are compatible with those of their meta-analysis (21). Combining the mMASA test and BWST was the only test to detect aspiration in our study, with the combination achieving a sensitivity of 72.7%, a specificity of 62%, NPV of 85.7%, and a PPV of 42.1%. To the best of our collective knowledge, this is the only study to have used this combination to determine PSD.

The main limitation of our study was small study population from a single center. Another limitation was that we used the original cut-off values of the tests to determine PSD and failed to perform receiver operating characteristics to define the cut-off point for PSD. This may need to be adapted through

the use of different cut-off values to detect aspiration in larger study populations. A further limitation is that our study included only minor and moderate ischemic stroke patients. Finally, we failed to investigate the results according to stroke localization because of the many variations and small study population. Further studies with larger populations and different test cut-offs are therefore needed to confirm and/or increase the sensitivity and specificity of tests used in our study.

In conclusion, our results showed that the BWST, the mMASA, a 2% or more drop in oxygen saturation, and the combination of the mMASA and

BWST may be used to determine the presence of PSD. However, aside from the combination of the mMASA and BSWT, these tests were not capable of predicting aspiration.

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### Conflict of Interest

The authors declared no potential conflict of interest with the respect of the research, authorship, and/or publication of this article.

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## RESEARCH

# EVALUATION OF THE PATIENT CONSULTATIONS FOR ADMISSION TO PALLIATIVE CARE: A DESCRIPTIVE STUDY

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## ABSTRACT

**Introduction:** It is essential to comply with palliative care philosophy during consultations for hospitalisation purposes between specific medical branches and specialised palliative care services (SPCS). We aimed to evaluate the patients who were admitted or consulted to the palliative care service with a palliative care approach.

**Materials and Method:** This descriptive study is based on retrospective review of data. The consultation requests delivered to the SPCS between December 1, 2019 and December 1, 2020 were evaluated through the hospital archive. The number of consultation requests delivered to the SPCS from other departments for hospitalisation purposes, demographic characteristics of patients, their acceptance and rejection rates, and reasons for which these decisions were made were examined.

**Results:** Of the total 394 consultation requests, 53.6% (n = 211) were for males. The acceptance rate was 40.9% (n = 161). The most common primary diagnosis category was gastrointestinal cancers (21.6%), the most common consulting branch was emergency department (44.6%), the most common reason for rejection (53.2%) was the patient's acute problems and the most common reason for acceptance was the need for nutritional support with a rate of 64.0%.

**Conclusion:** It has been determined that most of the consultations requests were not accepted. It is necessary to use SPCS more effectively.

**Keywords:** Consultation; Palliative Care; Patient Admission.



## INTRODUCTION

A very few health centres, especially oncology centers, in the world have specialised palliative care services (SPCS) and accession to this health service is difficult, therefore the selection of patients for referral to the SPCS is of critical importance. Biopsychosocial approaches to increase the comfort of patients and their relatives should be presented on a medical basis. It is essential to comply with palliative care philosophy during consultations for hospitalisation purposes between specific medical branches and SPCS (1,2). In every respect, this approach contributes remarkably to patients, their relatives, hospital-staff, hospital resources, and the government.

Patients who are bedridden, do not have curative treatment, have difficulty in controlling physical and emotional symptoms, and need support from others are evaluated by the palliative care team. Hospitalization is provided for patients who are decided that inpatient care will be beneficial to the person or their family (3).

There is no consensus on who, when, on whom and how should palliative care be given. In this regard, approaches may vary according to the attending clinic (4). In our hospital, SPCS was managed by the family medicine clinic during the study period. Palliative care is an area where holistic care, one of the basic principles of family medicine, is applied effectively. With this holistic perspective, it requires a person-centered approach towards the individual, family and society, and these features form part of the core competencies of the family medicine discipline. Thus, family physicians have an important role in providing patients with access to SPCS (5,6).

The SPCS in our hospital has a capacity of 24 beds and provides services to approximately 4,000 adult patients registered to home healthcare services affiliated to the provincial health directorate, as well as adult patients who have not yet been registered with home healthcare services, but are receiving treatment in different clinics within the hospital. The requests for consultation are received from oth-

er branches in the hospital or directly from home healthcare services.

There are not enough studies in the literature on the suitability of consultations for SPCS, they also focused on the timing of the consultation. The aim of this study is to evaluate the patients who were admitted or consulted to the palliative care service with a palliative care approach.

## MATERIALS AND METHOD

### Study design and participants

This descriptive study is based on retrospective review of data. All of the consultation requests delivered to the SPCS of Samsun Education and Research Hospital between December 1, 2019 and December 1, 2020 is evaluated through the hospital archive. There is no data loss, all available data have been evaluated.

The number of consultation requests delivered to the SPCS from other departments for hospitalisation purposes, the demographic characteristics of patients, their acceptance and rejection rates, and the reasons for which these decisions were made were examined. Conditions such as urinary tract infections, acute upper/lower respiratory tract infections, acute coronary syndrome and stroke, that develop independent of the primary diagnosis were regarded as acute problems, and thus consultation for hospitalisation purposes were not accepted.

The patients were categorised into age groups as 18–64 years, 65–74 years (young old), 75–84 years (advanced old) and 85 years and older (very advanced old) (7).

### Statistical Analysis

All data were evaluated using the SPSS version 20.0 software package. Descriptive statistics consisted of number, mean, standard deviation, and percentage. Chi-Square test was used to determine the relationship between the groups. The level of statistical significance was set to a p-value of less than 0.05.

### Ethical Considerations

Approval was granted by the local non-interventional clinical research ethics committee with a protocol number GOKA/ 2020/ 7/ 11.

### RESULTS

Of the total 394 consultation requests, 53.6% (n = 211) were for males and 46.4% (n = 183) were for females. The mean age was 72.3 ± 13.5 years. The acceptance rate was 40.9% (n = 161). The acceptance rate in females (49.2%) was statistically higher than in males (33.6%) (p = 0.002).

The most common primary diagnosis category was gastrointestinal cancers (21.6%) (Table 1). The most common consulting branch was emergency department (44.6%), there was no relationship between consultation branch categories and SPCS

admission (p = 0,357) (Table 2). When these branch categories were reduced to two as hospital services and home health services, no relationship was found between them (p= 0.451). The most common reason for rejection (53.2%) was the patient's acute problems and the most common reason for acceptance was the need for nutritional support with a rate of 64.0% (Table 3). The number of consultation requests was the highest in October (14.0%, n = 55) (Figure 1). The female gender was predominant after the age of 75 (p <0.001) (Figure 2). The result of the consultation was also not found to be related to the month (p = 0.330).

### DISCUSSION

This study provides important data in terms of evaluating the appropriateness of consultations to SPCS and emphasizing the importance of integration

**Table 1.** Primary diagnoses categories of patients consulted

Primary diagnoses categories	n	%
Gastrointestinal cancers	85	21.6
Respiratory cancers	73	18.5
Other cancer diagnoses	67	17.0
Cerebrovascular accident	59	15.0
Alzheimer's disease and dementia	57	14.5
Other non-cancer diagnoses	53	13.5
Total	394	100

**Table 2.** Branch categories that make consultations according to admission status

Branch categories	Acceptance		Rejection		Total		P value
	n	%	n	%	n	%	
Emergency department	63	35.8	113	64.2	176	100	0,357
Intensive care units	63	48.8	66	51,2	129	100	
Internal clinics	23	38.3	37	61.7	60	100	
Surgical clinics	8	36.4	14	63.6	22	100	
Home healthcare services	4	57.1	3	42.9	7	100	
Total	161	100	233	100			





**Table 3.** Reasons for rejection and acceptance of consultations

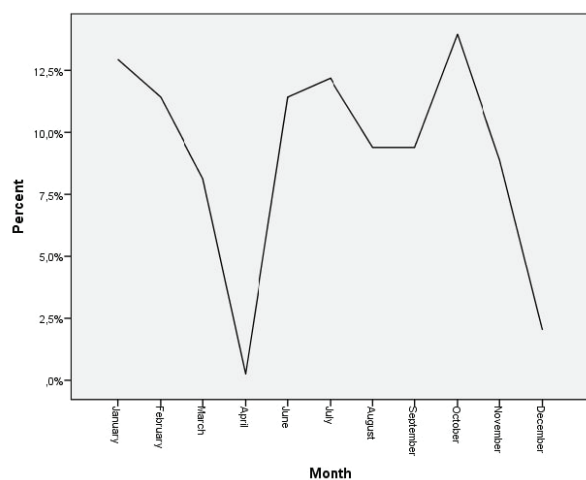
<b>Rejection</b>	<b>n</b>	<b>%</b>
Presence of acute illnesses	124	53.2
Lack of spare beds	59	25.3
COVID-19 rule out	13	5.6
Treatment rejection	10	4.3
Other	27	11.6
Total	233	100
<b>Acceptance</b>	<b>n</b>	<b>%</b>
Nutritional support	103	64.0
Wound care	20	12.4
Pain control	19	11.8
Respiratory palliation	13	8.1
Other	6	3.7
Total	161	100

with home health services. While the importance of referring patients and the time of their referral to SPCS in the early stages is frequently mentioned in the literature, it is intended to draw attention to the unwarranted consultations received by the SPCS by considering the subject from a different perspective.

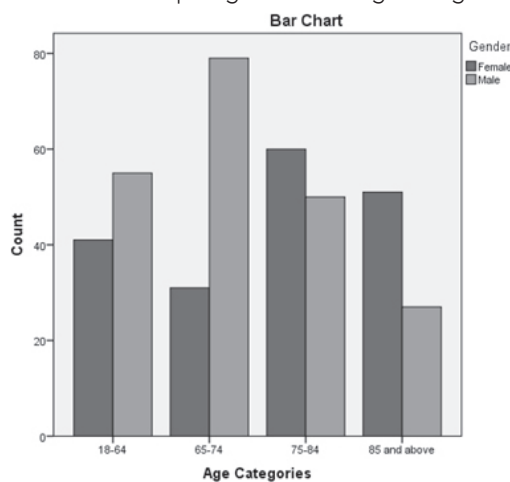
Similar to the studies conducted in Belgium, Canada and Australia, most of our patients had

been diagnosed with cancer (8-10). Although pain palliation has been reported as the main reason for consultation in the literature (11-13), our study reports nutritional support as the main reason. The prominence of pain palliation in the literature may be due to the fact that SPCSs are generally found in oncology hospitals however our hospital is a multi-disciplinary organization. Another study conducted in our country also reported nutritional support as the main reason (14).

**Figure 1.** Distribution of consultations by months



**Figure 2.** Relationship of gender with age categories



The efforts towards providing curative medical therapies are futile during the transition to end-of-life period (15). Palliative care should definitely focus on needs and not on prognosis. When focusing on chronic complaints, more primary and secondary gains can be obtained in palliative care (4). It has been shown that considering consultation to SPCS for eligible patients without any delay increases patient and family satisfaction and consequently reduces health expenditures (16-18).

Several studies report that consultation requests to SPCS are most commonly received from oncology units (19,20). Consultation requests received from home healthcare services, which should be coordinated with SPCS, are also important. This integration also provides cost-effectiveness (14). Regardless of whether the patients are bedridden at home or elsewhere, patients in need of palliative care should be referred to SPCS for the assessment of their complaints rather than to an emergency room or a specific specialist. Brumley et al. reported that palliative care in the home setting reduces the number of admissions to the emergency department (21). However, the consultation requests to our department were most frequently received from the emergency medicine units. Considering our results, it is understood that home healthcare services lag behind in consultation requests.

Looking at the issue of consultation from another perspective, it should be considered how this service can be evaluated in the most efficient way in health institutions which offer SPCS facilities. It is not a rational practice to direct bedridden patients with chronic conditions or those with poor life expectancy to SPCS when they approach the hospital with any complaint. According to the 'National Clinical Program for Palliative Care' prepared by the 'Health Service Executive' in Ireland, the patient must have an advanced, progressive, life-limiting condition along with a lack of symptom control, end-of-life planning, or existing or expected complexities with

respect to other physical, psychosocial or spiritual needs that may not be mitigated reasonably (22). Similarly, criteria of referral to SPCSs prepared by the 'Midland Cancer Network' in New Zealand focuses on the refractory complaints of these patients (23).

Despite the perceived need for early referral of patients to SPCS (24) and that the majority being referred or being able to be referred to SPCS in the terminal period still remains a global problem, the fact that less than half of the consultation requests delivered to our service were accepted suggests that the palliative care philosophy has not been well understood. In addition, some branches may be reluctant to spare time for patients with low life expectancy, and this increases the number of unnecessary consultations.

### **Strengths and Limitations**

Our service is the most comprehensive SPCS in the region in terms of its geographical location, and accepts patients from many cities. This has paved the way for the circulation of patients and consultation requests for different patient populations which may have strengthened the present study, however if multicenter and longer-term studies are carried out in the future, awareness about the consultation problem may appear more. Besides, the coincidence of our study period with the COVID-19 pandemic has restricted the admission of new patients and caused uneven patient circulation but this limitation does not hinder the evaluation of unwarranted consultation requests which is the main subject of this study.

### **CONCLUSION**

It has been determined that most of the consultations requests were not accepted. The most common diagnosis is gastrointestinal cancers, consultation requests are usually received from hospital



services, the most common reason for rejection is the patient's acute problems, and the most common reason for admission is nutritional support. It is necessary to use SPCS more effectively.

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## RESEARCH

# SURGICAL STRESS RESPONSE IN HOLMIUM LASER ENUCLEATION OF THE PROSTATE VERSUS TRANSURETHRAL RESECTION OF THE PROSTATE: A PROSPECTIVE NON-RANDOMIZED STUDY

## ABSTRACT

**Aim:** To compare immunoinflammatory markers and the surgical stress response in patients undergoing conventional transurethral resection of the prostate (TURP) or holmium laser enucleation of the prostate (HoLEP).

**Materials and Methods:** Patients with the diagnosis of benign prostate hyperplasia who needed surgical treatment were enrolled in either TURP or HoLEP surgery. Two consecutive cohorts of 25 patients in each group were non-randomly recruited based on prostate volume. Interleukin-6, C-reactive protein, tumor necrosis factor alpha, white blood cell count, neutrophil-to-lymphocyte ratio, CD4+/CD8+ ratio, and adrenaline and cortisol levels were determined at three different times: before the operation, immediately afterward, and on postoperative day 1. Operation durations, lengths of in-hospital stays, and postoperative pain scores were also assessed.

**Results:** The mean age was  $63.1 \pm 6.7$  years. Interleukin-6 and C-reactive protein values were statistically higher in both groups at postoperative day 1 than preoperatively ( $p < 0.05$ ). Interleukin-6 and C-reactive protein levels were significantly higher in the TURP at postoperative day 1 than HoLEP ( $p < 0.05$ ). The operation duration in the TURP group was significantly shorter than in the HoLEP. The length of hospital stay was shorter in the HoLEP ( $p < 0.05$ ). There was less postoperative pain in the HoLEP ( $p < 0.05$ ).

**Conclusion:** This study shows that surgical stress response is attenuated in patients undergoing HoLEP surgery in comparison with patients receiving TURP surgery.

**Keywords:** C-Reactive Protein; Hormones; Interleukin-6; Minimally Invasive Surgical Procedures; Transurethral Resection of Prostate.

## INTRODUCTION

Benign prostatic hyperplasia (BPH) is the most common illness causing significant difficulties in aging men worldwide and resulting in bladder outlet obstruction (1). The prevalence of BPH has increased in recent years in line with the aging population. An autopsy study reported that 50% and 75% of men have histological evidence of BPH in the fifth and eighth decades of life, respectively, with approximately half of them presenting with clinically significant symptoms (2). Surgery is the most effective treatment for BPH, and at least one in every five men presenting with symptoms eventually undergo surgery (3).

Conventional transurethral resection of the prostate (TURP) and holmium laser enucleation of the prostate (HoLEP) are the recommended endoscopic surgical techniques for the minimally invasive management of BPH (4). For more than 70 years, TURP has been utilized in the surgical treatment of BPH. It is the most used technique for the treatment of BPH and is regarded as the gold standard of surgical therapy for BPH involving prostates weighing less than 80 g (5). The use of high-temperature electric resection technology in TURP produces heat injury to the surrounding tissue and increases perioperative complications. Technological developments such as using bipolar electrodes, microprocessor-controlled units, and training have all contributed to reducing perioperative complications of TURP. However, transfusion, transurethral resection syndrome, clot retention, urinary tract infection, urinary retention, urethral strictures, and death are still among the reported complications of TURP (4). TURP is also associated with a longer operation time, increased blood loss, and a higher complication rate in large-volume prostates (> 80 g) (6). As a result, open surgery or HoLEP remain the surgical recommendations for the treatment of BPH in prostates weighing more than 80 g (5). HoLEP, an alternative to open surgery, does not produce thermal injury and is beneficial for reducing surgical

trauma and incidence of the corresponding complications.

In recent years, many clinical studies have examined the clinical outcomes of patients undergoing TURP or HoLEP surgery. However, little is known about the effects of these two surgical techniques on surgical stress and immune functions. To the best of our knowledge, there have been no studies focusing on the effects of HoLEP or TURP surgery on postoperative immune functions. The objective of the present study was therefore to compare the systemic inflammatory markers and surgical stress response in patients undergoing HoLEP or TURP surgery.

## MATERIALS AND METHODS

Two consecutive cohorts of patients with BPH who received surgical treatment under general anesthesia at Adana City Education and Research Hospital between February 2020 and May 2021 were enrolled in this non-randomized prospective study (ChiCTR.org/cn, ChiCTR-TRC- NCT05108662). The study was approved by the Institutional Review Board (Jan-2020, Ref 708-49) and conducted in accordance with the principles of the Helsinki Declaration.

The patients were assigned to either HoLEP or TURP surgery based on the volume of their prostate. Patients with a prostate volume greater than 80 g had HoLEP surgery, whereas those with a volume less than 80 g underwent TURP surgery. All cases were operated on by the same surgeon, who performs at least 100 HoLEP and TURP procedures each year. Each consecutive cohort consisted of 25 patients who met the study's inclusion criteria and gave consent to participate in the study.

We included patients with American Society of Anesthesiologists (ASA) scores of I-III who had BPH and were scheduled for HoLEP or TURP surgery under general anesthesia. Patients were excluded if they were diagnosed with an immune system disease, diabetes mellitus, non-prostate-related ma-



lignancies or for having a history of steroid use in the last 3 months.

Clinical variables consisting of age, body mass index, ASA score, operation duration, blood pressure, heart rate, body temperature, postoperative pain scores, and laboratory parameters were also assessed. Laboratory variables, including white blood cell (WBC) count, C-reactive protein (CRP), interleukin-6 (IL-6), tumor necrosis factor alpha (TNF- $\alpha$ ), neutrophil-to-lymphocyte ratio (NLR), CD4+/CD8+ ratio, and adrenaline and cortisol levels were measured at three time points: before the operation (pre-OP), immediately after the operation (post-OP), and on postoperative day 1 (POD1).

### **Surgical Techniques**

The equipment used for HoLEP was as follows: a high-power holmium laser (100- or 120-W platform, Lumenis, Yokneam, Israel); an end-firing 550-micron laser fiber with an energy setting of 2.0 J and frequency settings of 40–50 Hz; a continuous-flow 26F resectoscope with a distal bridge; a 7F catheter through the proximal bridge to stabilize the laser fiber; continuous saline irrigation; a rigid indirect nephroscope with a 5 mm working channel; a tissue morcellator; and a video system. The classical HoLEP technique was used as described previously (7). This method involves the 5 and 7 o'clock incisions and enucleation of one median and two lateral lobes.

TURP surgery was carried out using a cutting mode setting of 120 W, a coagulation mode setting of 100 W, a continuous-flow 26F resectoscope with a rotating inner tube, an active bipolar working element from Karl Storz, and loop electrodes (all Karl Storz, Germany). The irrigate used was isotonic 0.9% saline at room temperature. The operation technique for TURP was the Mauer Mayer method (8). In this method, resection starts with the middle lobe and continues with the resection at 9 and 3 o'clock.

### **Anesthesia Protocol**

All patients received premedication with 2 mg of midazolam intravenously before induction of anesthesia. Induction was accomplished with propofol (1.0–2.0 mg/kg), fentanyl (2 mcg/kg), and rocuronium (0.6 mg/kg). Intubation was done using an endotracheal tube. Anesthesia was maintained with sevoflurane in a 1:1 mixture of nitrous oxide and oxygen. The end-tidal concentration of sevoflurane was maintained at 1–2%. Fentanyl boluses (25–50  $\mu$ g intravenously) were administered as deemed necessary by the attending anesthesiologist. All patients were given tramadol (1 mg/kg) and paracetamol (15 mg/kg) as an intravenous infusion at the end of the operation. Neuromuscular blockade was reversed with neostigmine and atropine based on the train-of-four results.

### **Pain Score**

All patients were asked to rate their current pain intensity by 1) making a vertical mark on a 10 cm visual analog scale (VAS) ranging from “no pain” on the left to “worst pain” on the right and 2) selecting a number between 0 and 10, where 0 was “no pain” and 10 was “worst pain.”

### **Flow Cytometric Immunophenotyping**

Whole blood samples were analyzed using flow cytometry to determine the T cells (CD3+), helper T cells (CD3+/CD4+), cytotoxic T cells (CD3+/CD8+), activated T cells (CD3+/HLA-DR+), B cells (CD19+), and NK cells (CD56+/CD16+/CD3-). Briefly, lymphocyte subsets were measured by multiple-color flow cytometry with human monoclonal anti-CD3-APC-A750 (Beckman Coulter, US), anti-CD4-APC (Beckman Coulter, US), anti-CD8-PC7 (Beckman Coulter, US), anti-CD56-APC-A700 (Beckman Coulter, US), anti-CD16-FITC (Beckman Coulter, US), anti-HLA-DR-PB (Beckman Coulter, US), and anti-CD19-ECD (Beckman Coulter, US) according

to the manufacturer's instructions. Results were analyzed using the Kaluza software (Beckman Coulter).

### **Interleukin-6 and Tumor Necrosis Factor Alpha Measurement**

Serum was separated by centrifugation as soon as blood was taken from the patients. Serum samples were stored at -20 degrees for no longer than 2 months. IL-6 and TNF-a levels were measured by enzyme-linked immunosorbent assay using the DAsource IL-6-EASIA Kit (DAsource Immunoassays S.A., Belgium) and the DAsource TNF-a-EASIA Kit (DAsource Immunoassays S.A., Belgium), respectively. The assay was performed according to the manufacturer's instructions. Standard and clinical samples were pipetted into the wells with an immobilized antibody specific for IL-6 and TNF-a. The wells were washed with an automatic microtiter plate washer (Combiwash, Human Diagnostics, Germany). As the last step, the wells were measured at 450 nm. The results were calculated by the means of standard curves. Based on the manufacturer's manual, the minimum detectable doses of IL-6 and TNF-a were assumed to be 2 pg/ml and 0.7 pg/ml, respectively, and samples were evaluated considering these criteria.

### **Statistical Analysis**

The Shapiro-Wilk test was used to verify the normality of the distribution of continuous variables. Continuous variables are presented as mean  $\pm$  SD or median (interquartile range), and categorical variables are presented as numbers. Comparisons between the groups were made using Fisher's exact test for categorical variables, the Mann-Whitney U test was used to compare the median values of two nonparametric variables, and the Student's t-test was used to compare the mean values of two independent parametric continuous variables. The Friedman test was used to compare the median values of IL-6 and TNF-a for intragroup comparisons.

All statistical procedures were performed using SPSS version 18.0 (SPSS, Inc., Chicago, IL). A P value of  $< 0.05$  was considered significant.

### **RESULTS**

Demographic and clinical characteristics of the patients who underwent HoLEP or TURP surgery are presented in Table 1. One patient in the HoLEP group was excluded from the study because of his conversion to open prostatectomy due to bleeding. The mean age was  $63.1 \pm 6.7$  years old. There was no significant difference between the groups in terms of age, body mass index, or ASA scores. However, the operation time was statistically shorter in the TURP group ( $p = 0.001$ ). Body temperature at the end of the operation was statistically significantly lower in the HoLEP group ( $p = 0.006$ ). HoLEP surgery was superior to TURP surgery in terms of postoperative pain and length of hospital stay. The VAS scores at the 4th and 24th hours postoperatively were statistically significantly lower in the HoLEP group ( $p = 0.001$  and  $p = 0.015$ , respectively). The length of hospital stay was shorter in the HoLEP group ( $p = 0.010$ ).

We examined the perioperative trends in WBC, CRP, IL-6, TNF-a, NLR, CD4+/CD8+ ratio, and adrenaline and cortisol levels in all patients who had a prostatectomy and compared the mean values of the markers at post-OP or POD1 with those at pre-OP. CRP and IL-6 were significantly higher at post-OP than at pre-OP ( $p < 0.001$ ). IL-6 and CRP continued to be significantly higher at POD1 than at pre-OP ( $p < 0.001$ ). The mean levels of TNF-a decreased at post-OP ( $p < 0.001$ ). There were no differences in the levels of TNF-a between pre-OP and POD1. WBC and NLR were significantly higher at POD1 than at pre-OP ( $p < 0.001$  and  $p = .001$ , respectively). No differences were observed for the perioperative levels of the serum CD4+/CD8+ ratio or adrenaline and cortisol values.

The results of WBC, CRP, IL-6, TNF-a, NLR, and





**Table 1.** Patient demographics, operative data, and follow-up results

Variable	HoLEP (n = 24)	TURP (n = 25)	P value
Age (years)	65.4 ± 7.3	61.3 ± 5.7	0.111 <sup>a</sup>
BMI	27.3 ± 1.5	26.8 ± 2.2	0.440 <sup>a</sup>
ASA score (n)			
I	6	5	0.741 <sup>b</sup>
II	13	12	0.777 <sup>b</sup>
III	5	8	0.520 <sup>b</sup>
Prostate volume (ml)	110.8 ± 18.8	57.8 ± 13.6	<b>0.001</b> <sup>a</sup>
Preoperative heart rate (beat/minute)	69 ± 8	71 ± 11	0.633 <sup>a</sup>
Preoperative systolic blood pressure (mm HG)	111 ± 18.6	108.2 ± 22.7	0.816 <sup>a</sup>
Operation duration (minutes)	135.4 ± 63.2	71.4 ± 23.2	<b>0.001</b> <sup>a</sup>
Enucleation time (minutes)	103.2 ± 50.7	NA	NA
Morcellation time (minutes)	19.3 ± 9.1	NA	NA
Postoperative pain score			
Postoperative 4th hour	1.9 ± 1.5	4.9 ± 2	<b>0.001</b> <sup>a</sup>
Postoperative 24th hour	2.5 ± 1.6	3.8 ± 1.4	<b>0.015</b> <sup>a</sup>
Postoperative body temperature (Celsius)	35.8 ± 0.8	36.6 ± 0.4	<b>0.006</b> <sup>a</sup>
Hospital stay (days)	1.5 ± 0.6	2.6 ± 0.6	<b>0.010</b> <sup>a</sup>

BMI, body mass index; ASA, American Society of Anesthesiology; NA, Not Applicable.

\*Data are presented as mean (SD) except where otherwise indicated.

<sup>a</sup> Student's t-test. <sup>b</sup> Fisher exact test. Significant values are in bold and italics.

CD4+/CD8+ measurements at three different time intervals according to the HoLEP and TURP groups are shown in Table 2. Among these values, CRP levels were found to be significantly higher in the TURP group at post-OP and POD1 ( $p < 0.05$ ) (Figure 1). IL-6 was also significantly higher in the TURP group at POD1 ( $p < 0.05$ ) (Figure 2). WBC and NLR increased more rapidly in the TURP group at post-OP and POD1, but these increases did not reach statistical significance when compared to the HoLEP group. There was no significant difference between the two groups in terms of the levels of the stress hormones adrenaline and cortisol at the three different time intervals.

## DISCUSSION

This prospective non-randomized study evaluated perioperative changes in stress markers with clinical outcomes in a short postoperative period after TURP or HoLEP surgery. We found that CRP and IL-6 levels were significantly higher after TURP surgery compared to HoLEP surgery. Additionally, based on the surgical stress markers examined in this study, HoLEP surgery was suggested to be associated with less tissue damage than TURP surgery.

Surgical injury results in an acute-phase reaction. The acute-phase reaction initiates local and systemic responses to restore physiological homeostasis. The production of proinflammatory mediators and

**Table 2.** Changes in inflammatory markers

Markers	HOLEP (n = 24)	TUR-P (n = 25)	P value
<b>WBC (10<sup>9</sup> /L)</b>			
Pre-OP	6.3 ± 1.4	6.5 ± 1.1	0.703 <sup>a</sup>
Post-OP	6.8 ± 1.4	7.4 ± 1.1	0.181 <sup>a</sup>
POD1	9.8 ± 2.5	10.7 ± 2.9	0.096 <sup>a</sup>
<b>CRP (mg/L)</b>			
Pre-OP	4.8 ± 2.6	3.5 ± 1.4	0.486 <sup>a</sup>
Post-OP	12.6 ± 5.4	28.9 ± 7.8	<b>0.019<sup>a</sup></b>
POD1	38 ± 10.8	70.5 ± 15.6	<b>0.013<sup>a</sup></b>
<b>IL-6 (pg/ml)</b>			
Pre-OP †	21.2 (11.4–30.2)	15.6 (13.2–23.2)	0.315 <sup>b</sup>
Post-OP †	55.9 (27.1–88.3)	57.5 (44.2–73.2)	0.379 <sup>b</sup>
POD1 †	53.4 (40–124.1)	120 (92–154.5)	<b>0.006<sup>b</sup></b>
<b>TNF-a (pg/mL)</b>			
Pre-OP †	2.7 (2.3–3.3)	2.4 (2.1–3.1)	0.502 <sup>b</sup>
Post-OP †	1.8 (0.9–2.3)	1.7 (1.2–2.5)	0.621 <sup>b</sup>
POD1 †	2.3 (1.1–3.8)	2.5 (1.8–2.8)	0.903 <sup>b</sup>
<b>CD4+/CD8+ ratio</b>			
Pre-OP	1.7 ± 0.7	1.8 ± 0.3	0.809 <sup>a</sup>
Post-OP	1.5 ± 0.3	1.6 ± 0.5	0.854 <sup>a</sup>
POD1	1.9 ± 0.6	1.9 ± 0.4	0.986 <sup>a</sup>
<b>Neutrophil-to-lymphocyte ratio</b>			
Pre-OP	2.3 ± 1	2.1 ± 0.7	0.776 <sup>a</sup>
Post-OP	2.1 ± 0.6	2.7 ± 0.6	0.174 <sup>a</sup>
POD1	4.5 ± 2.2	5 ± 1.6	0.794 <sup>a</sup>

CRP, C-reactive protein; IL, interleukin; HoLEP, holmium laser enucleation of the prostate; NLR, Neutrophil-to-lymphocyte ratio; POD1, postoperative day 1; Post-OP, immediately postoperative; Pre-OP, preoperative; TURP, laser transurethral resection of the prostate; TNF-a, tumor necrosis factor alfa; WBC, white blood cell.

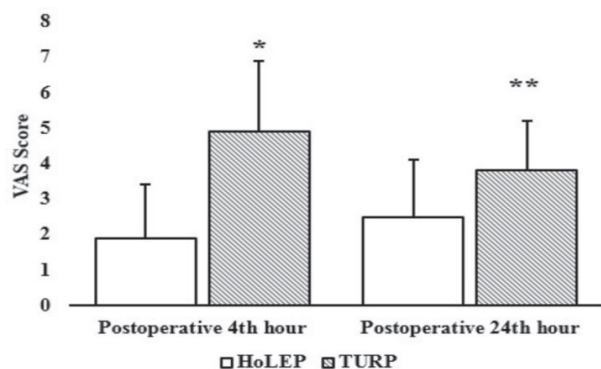
\*Data are presented as mean (SD) except where otherwise indicated.

† Data are presented as median (interquartile range).

<sup>a</sup> Student t-test <sup>b</sup> Mann-Whitney U test. Significant values are in bold and italics.



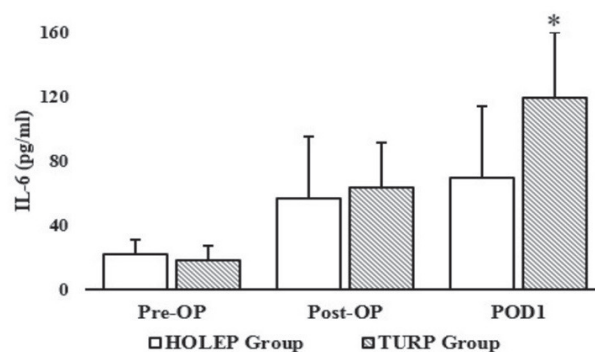
**Figure 1.** Comparison of postoperative pain scores between the groups



HoLEP, holmium laser enucleation of the prostate; VAS, visual analog scale; TURP, laser transurethral resection of the prostate. \*P < 0.05 compared at the 4th postoperative hour. \*\*P < 0.05 compared at the 24th postoperative hour.

the activation of the humoral and cellular immune systems occur during this process (9). Local reactions occur at the site of surgical injury and result in endothelial cell production of cytokines. Cytokines such as interleukin-1, IL-6, and TNF- $\alpha$  are soluble indicators for both local and systemic inflammatory reactions as part of the acute-phase response (10,11). The systemic reaction includes activation of the plasma coagulation cascade, the release of complement, and the production of hepatic acute phase reactants such as CRP and  $\alpha$ 1-acid glycoprotein. IL-6 is the major regulator of the cytokine-mediated response and CRP is the most sensitive acute-phase reactant initiated by surgical injuries. IL-6 and CRP levels have been used as an objective biochemical marker to reflect the degree of operative injury (10). Many studies have shown a lower IL-6 response after minimally invasive surgery than after open surgery (10,12,13). In addition, Shintaro et al. reported a lower IL-6 response after laparoscopic radical prostatectomy than after open radical prostatectomy (14). In our study, compared with the

**Figure 2.** Comparison of IL-6 levels between the groups



IL, interleukin; HoLEP, holmium laser enucleation of the prostate; POD1, postoperative day 1; Post-OP, immediately postoperative; Pre-OP, preoperative; TURP, laser transurethral resection of the prostate. \*P < 0.05 compared at postoperative day 1.

preoperative values, IL-6 increased by almost three times in both groups immediately after surgery. Furthermore, IL-6 and CRP levels were significantly higher in the TURP group than in the HoLEP group at POD1. These findings support there being higher surgical injury with TURP compared to HoLEP.

The improved hemostasis provided by the HoLEP surgical technique, as well as the reduced depth of penetration into the prostate tissue, may be the mechanism responsible for the lower rise in inflammation markers observed in the HoLEP group compared to the TURP group in our study. Micheal et al. reported that the mean depth of thermal injury caused by bipolar TURP was 2.4 mm in their study of 12 patients with BPH treated surgically (15). However, the penetration depth of HoLEP in prostatic tissue is only 0.4 mm. HoLEP technology generates a pulsed solid-state laser with a wavelength of 2140 nm. This laser's wavelength is substantially absorbed by water, making it more suitable for use in an aquatic environment (16). Furthermore, it has been suggested that HoLEP may become the

standard for surgical management of BPH, especially in patients on anticoagulants and bleeding diathesis (17).

In this study, the surgery duration of HoLEP was longer than that of TURP despite the fact that HoLEP showed advantages over TURP in terms of pain score and hospital stay during the perioperative phase. A previous study showed the difference in surgical duration between TURP and HoLEP (17). It is generally thought that HoLEP needs a longer operative time than TURP due to a greater resection ratio of prostate tissue with HoLEP. Past studies showed that HoLEP resects much more prostate tissue than TURP, as demonstrated by a larger drop in postoperative serum prostate-specific antigen levels, and that when the surgical time was corrected for tissue removed, HoLEP was similarly effective (18,19). In our study, the HoLEP group had a greater prostate size; the extra time needed for morcellation of the enucleated tissues may be responsible for the longer operation time with HoLEP.

Intraoperative hypothermia is common, with an incidence of around 60%. Cold bladder irrigation fluid is a significant source of heat loss during TURP, resulting in intraoperative hypothermia of 1–2° C (20). The elderly are a significant risk category because of the physiological changes associated with aging, which contribute to a decreased ability for thermoregulation. Reduced norepinephrine release and  $\alpha$ -adrenoreceptor downregulation adversely impact the vasomotor response to cold in the elderly (20,21). Additionally, as lean body mass declines with age, shivering and thus metabolic heat generation tend to decrease. Hypothermia can have serious effects, including decreased blood flow to all systems, cardiac arrhythmias, a 400% to 500% increase in tissue oxygen demand, decreased metabolism, impaired platelet function, and increased susceptibility to surgical wound infection (21). In this study, body temperature, pulse, oxygen saturation, and blood pressure were monitored as standard

care during anesthesia. We found that postoperative body temperature was significantly lower in the HoLEP group compared to the TURP group. This may be because HoLEP surgery lasted longer and possibly needed more irrigation fluid. We used all fluids at room temperature, similar to our routine clinical practice. It has been suggested that warming irrigation fluids may reduce the risk of hypothermia. However, warming large volumes of irrigation fluid may not always be practical. For this reason, the use of forced warm air has been recommended in long-term surgeries or especially in groups more sensitive to hypothermia to prevent adverse events.

There are also several limitations to this study. The patients were allocated to each group depending on prostate size. However, this nonrandomized study included having statistically similar cohorts in terms of the patients' age, weight, and ASA scores. The HoLEP group comprised the patients with a larger prostate volume. Considering the long resection time in the HoLEP group, it is likely that more prostate volume resections were performed. However, the volume of the resected tissue or postoperative PSA measurements were not obtained to confirm this.

In conclusion, both HoLEP and TURP surgery cause an increase in CRP and IL-6, which are indicators of surgical injury. These increases in surgical responses were less pronounced in HoLEP surgery compared to TURP surgery.

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#### **CONFLICTS OF INTEREST**

The authors have no conflicts of interest.



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## RESEARCH

# REAL LIFE EXPERIENCE WITH FIRST-LINE THERAPY IN ELDERLY MULTIPLE MYELOMA PATIENTS: CONVENTIONAL OR BORTEZOMIB-BASED? DOUBLE TREATMENT OR TRIPLE TREATMENT?

## ABSTRACT

**Introduction:** Elderly patients with multiple myeloma have shorter survival outcomes than younger patients. In this study, we aimed to compare the efficacy and toxicity profiles of conventional and bortezomib-based therapy as first-line therapy in elderly patients with multiple myeloma and to determine the prognostic factors.

**Materials and Methods:** We retrospectively analyzed the survival parameters with bortezomib-based therapy compared to conventional chemotherapy in newly diagnosed multiple myeloma patients over 70 years of age. We also evaluated double and triple therapy in patients receiving bortezomib-based therapy.

**Results:** A total of 79 patients were included. There was no difference between conventional and bortezomib-based therapy in terms of the overall survival and progression-free survival ( $p=0.649$ ,  $p=0.324$ ). The overall survival and progression-free survival of patients who were treated with double bortezomib-based therapy were significantly lower than those of patients who were treated with triple bortezomib-based therapy ( $p=0.001$ ,  $p=0.0036$ ). Multivariate Cox regression analysis revealed the parameters to predict the overall survival as triple bortezomib-based therapy ( $p=0.001$ ), International Staging System ( $p=0.003$ ), and lactate dehydrogenase level ( $p=0.004$ ) in elderly patients who received bortezomib-based therapy.

**Conclusion:** Factors such as frailty, chemotherapy toxicity, comorbidities, and multi-drug use affect the treatment of elderly patients with myeloma. It is important to personalize treatment in elderly patients with myeloma. In this study, there were no differences in survival outcomes between conventional and bortezomib-based therapies. Conventional therapy can still be used as a first-line treatment in some elderly patients. Triple therapy options should also be considered in conventional or bortezomib-based therapies.

**Keywords:** Multiple Myeloma; Aged; Therapeutics.



## INTRODUCTION

Multiple myeloma is a disease characterized by the clonal proliferation of plasma cells in the bone marrow, which accounts for approximately 10% of all hematological malignancies. The median age of the patients at the time of diagnosis is approximately 65 years. Thirty-five percent of patients are diagnosed at the age of  $\geq 75$  years, including 10% at the age of 85 years and above (1-3).

The incidence of MM increases with age. It is estimated that the number of elderly patients with newly diagnosed MM will increase in the coming decades as the world's population ages (4-5). Recently, the development of novel treatment modalities has led to significant advancements in the survival outcomes of younger patients with MM. However, elderly patients (defined as  $\geq 75$  years) did not show the same outcomes. There may be several reasons for this. First, there are more comorbid conditions and organ dysfunctions associated with aging in the elderly. Second, the risk of frailty is high, which is defined as a physiological decrease in coping with acute stress factors in the elderly and increasing the vulnerability. An increased risk of frailty has been associated with increased functional impairment, hospitalization, dependence, recurrent falls, disability, and death. Moreover, optimal MM treatment may not be applicable in this population because elderly patients are prone to chemotherapy-related adverse events and have a higher risk of chemotherapy toxicity (3, 5-7). Additionally, treatment targets for elderly patients may differ from those of younger patients. For example, in elderly patients with serious illnesses, it may be more critical to control the disease symptoms, maintain independence, and have a better quality of life than prolonged survival (4-5). For these reasons, elderly patients are generally not eligible for high-dose therapy (HDT) plus autologous stem cell transplant (ASCT). As a result, conservative approaches are used more frequently in elderly MM patients than in younger patients with MM.

In this retrospective study, we aimed to examine the survival outcomes of conventional and bortezomib-based treatments as a first-line therapy in newly diagnosed elderly MM patients and the factors affecting the survival of elderly patients. This study also evaluated the results of bortezomib, cyclophosphamide, and dexamethasone (VCD) treatment versus bortezomib and dexamethasone (VD) in patients with newly diagnosed elderly MM patients who were treated with bortezomib-based treatment only.

## MATERIALS AND METHODS

### Patients

In this retrospective study, multiple myeloma patients aged over 70 years who were diagnosed in the Hematology Department of Health Sciences University, Derince Training and Research Hospital and Kocaeli University School of Medicine between January 2007 and July 2020 were included. The study protocol was approved by the local research ethical committee. All the procedures were performed in accordance with the 1964 Helsinki Declaration. The diagnoses were based on the updated diagnostic criteria International Myeloma Working Group (8). All the data on disease characteristics and treatment protocols were obtained from clinical medical records. The patients were categorized according to the International Staging System (ISS)(9).

The cut-off levels of albumin and B-2 microglobulin (B-2 M) were designated as 3.5 according to ISS (3.5 gr/dL, 3.5 mg/L; respectively). The performance status of the patients was classified according to the Eastern Cooperative Oncology Group (ECOG) score. The treatment protocols were divided into two groups conventional chemotherapy, including melphalan-based therapy, VAD (vincristine, adriamycin, and dexamethasone), and novel therapy, including bortezomib-based therapy. According to

the government's health insurance policy, lenalidomide-based regimens could not be used as first-line therapy, regardless of age. Therefore, the first-line novel therapy included only bortezomib-based regimens. The treatment responses were evaluated according to the IMWG criteria (10). Progression-free survival (PFS) duration was calculated from the start of first-line treatment to disease progression or death from any cause. The overall survival (OS) was calculated as the time from diagnosis to death from any cause. The dates of death were determined using the central medical record system. Early mortality was defined as death due to any cause within 12 months of the MM diagnosis (11-12).

### Statistical Analysis

Statistical analyses were performed using NCSS (Number Cruncher Statistical System) software (Utah, USA). The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to evaluate the normality assumption. Continuous variables were presented as mean  $\pm$  standard deviation or median (minimum-maximum range), depending on the normal distribution. The categorical variables are summarized as percentages. The Mann-Whitney U test or independent samples Student t test was used to compare non-parametric or parametric variables between the two groups. The Pearson chi-square test or Fisher-Freeman-Halton test was used for comparison to examine categorical variables. The survival durations were calculated using the Kaplan-Meier method. The log-rank test was used to compare the cumulative survival in the patient groups. A multivariate analysis of the predictors of survival was performed using the Cox regression test. The parameters with p values  $\leq 0.20$  in univariate tests were included in the multivariate analysis. All statistical analyses were two-sided; the significance was defined as  $p < 0.05$ .

## RESULTS

### Patient Outcomes

A total of 79 patients were enrolled in this study. The median age at diagnosis was 74 years (range, 70–90 years); the age range of 61 (77.2 %) patients was 70–79 years, and 18 (22.8 %) patients were  $\geq 80$  years old. There were 46 men (58.2%) and 33 women (41.8%). The clinical and demographic characteristics of patients receiving conventional and bortezomib-based therapies are shown in Table 1.

The median number of lines of therapy was 2 (1–4). Among the patients who received conventional chemotherapy, 13 patients received melphalan prednisone (MP), 6 patients received melphalan-thalidomide-prednisone (MTP) and 3 patients received VAD. The remaining 57 patients received bortezomib-based therapy, including 22 patients who were treated with bortezomib plus dexamethasone (VD) and 35 patients who were treated with bortezomib, cyclophosphamide and dexamethasone (VCD). A total of 41 patients received second-line treatment, 10 patients received third-line treatment and 3 patients received fourth-line treatment. Second-line therapy was initiated due to an adverse event in one patient, refractory disease in 13 patients, and relapsed disease in 27 patients. Maintenance therapy was used as part of the first-line treatment in 12 patients. Seven patients received lenalidomide, four patients received thalidomide and one patient received bortezomib maintenance treatment.

### Survival Analysis

The median follow-up time was 15 months (range 1–93 months). The median OS and PFS were 36,5 months (20–56 months) and 11,7 months (5–16 months), respectively.

The PFS for the conventional chemotherapy group was higher than that of the borte-





**Table 1.** Baseline clinical and demographic characteristics of elderly MM patients

		All Patients (n:79)	Conventional Therapy (n:22)	Bortezomib-based Therapy (n:57)	p value
Age	Min-Max (Median) Mean±SD	70-90 (74) 75.25±4.98	70-87 (77.5) 77.32±5.52	70-90 (73) 74.46±4.55	<sup>a</sup> 0.037*
	70-79 years ≥80 years	61 (77.2) 18 (22.8)	13 (59.1) 9 (40.9)	48 (84.2) 9 (15.8)	<sup>b</sup> 0.017*
Gender	Female Male	33 (41.8%) 46 (58.2%)	10 (45.5%) 12 (54.5%)	23 (40.4%) 34 (59.6%)	<sup>b</sup> 0.680
Type	IgA Kappa IgA Lambda IgG Kappa IgG Lambda Kappa Lambda Non-Secretory	12 (15.2) 8 (10.1) 24 (30.4) 11 (13.9) 9 (11.4) 14 (17.7) 1 (1.3)	5 (22.7%) 4 (18.2%) 7 (31.8%) 5 (22.7%) 0 (0.0%) 1 (4.5%) 0 (0.0%)	7 (12.3%) 4 (7.0%) 17 (29%.8) 6 (10.5%) 9 (15.9%) 13 (22.8%) 1 (1.8%)	<sup>c</sup> 0.070
Comorbidities	Diabetes Mellitus Ischemic Cardiac Disease Pulmoner Diseases Renal Diseases Cerebrovascular Disease	11(13.9%) 27(34.1%) 5(6.3%) 23(29.1%) 2(2.6%)	3 (13,6%) 7(31,8 %) 2 (9%) 6 (27,2%) 1 (4,5%)	8 (14%) 20 (35%) 3(13,6%) 17(29,8%) 1 (1,7%)	<sup>c</sup> 0.74
ECOG PS Score	0-1 2-4	34 (43.0%) 45 (57.0%)	8 (36.4%) 14 (63.6%)	26 (45.6%) 31 (54.4%)	<sup>b</sup> 0.457
ISS	1 2-3	17 (21.5) 62 (78.5)	8 (36.4) 14 (63.6)	9 (15.8) 48 (84.2)	<sup>b</sup> 0.04*
Hb (gr/dl)	Min-Max (Median) Mean±SD	5.1-13.8 (9.9) 9.77±1.76	5.1-13.3 (9.5) 9.55±2.03	6.7-13.8 (9.9) 9.85±1.66	<sup>d</sup> 0.506
Creatinine (mg/dL)	Min-Max (Median) Mean±SD	0.6-6.5 (1.16) 1.81±1.39	0.7-5.2 (1.05) 1.48±1.22	0.6-6.5 (1.29) 1.94±1.44	<sup>a</sup> 0.082
Calcium (mg/dl)	Min-Max (Median) Mean±SD	8.1-15.7 (9.8) 10.22±1.52	8.1-13.7 (9.7) 9.79±1.22	8.1-15.7 (9.87) 10.38-1.60	<sup>a</sup> 0.220
CRP (mg/dl)	Min-Max (Median) Mean±SD	0.1-101 (1) 4.60±13.30	0.1-8 (0.8) 1.86±2.37	0.1-101 (1.64) 5.65±15.50	<sup>a</sup> 0.244
LDH (U/L)	Min-Max (Median) Mean±SD	65-560 (167) 199.83±88.15	65-560 (167) 225.38±126.42	99-388 (167) 190.42±68.13	<sup>a</sup> 0.524
B2-M (mg/L)	Min-Max(Median) Ort±Ss	2.3-39.2 (6.52) 8.26±6.12	3.1-16 (5.6) 6.39±3.50	2.3-39.2 (6.96) 8.95±6.73	<sup>a</sup> 0.088
Bone Lesion at diagnosis	Lytic+ Plasmocytoma No bone lesion	64 (81.0%) 15 (19.0%)	16 (72.7%) 6 (27.3%)	48 (84.2%) 9 (15.8%)	<sup>c</sup> 0.337
Response to 1st line therapy	CR-VGPR PR or less	26 (37.1%) 44 (62.9%)	3 (13.6%) 19 (86.4%)	23 (47.9%) 25 (52.1%)	<sup>b</sup> 0.006**
Relapse Patients	Yes No	57 (72.2%) 22 (27.8%)	16 (72.7%) 6 (27.3%)	41 (71.9%) 16 (28.1%)	<sup>b</sup> 0.943
Early Death	Yes No	16 (20.2%) 63 (79.8%)	2 (10%) 20 (90%)	14 (24.5%) 43 (75.5%)	<sup>b</sup> 0.029*
All Grade's Adverse Effects	Yes No	51 (64.6%) 28 (35.4%)	13 (59.1%) 9 (40.9%)	38 (66.7%) 19 (33.3%)	<sup>b</sup> 0.527
Grade 3-4 Adverse Effects	Yes No	27 (34.1) 52 (65.9)	7 (31.8) 15 (68.2)	20 (35.1) 37 (64.9)	<sup>b</sup> 0.545

Abbreviations: SD: Standard deviation; ECOG PS: Eastern Cooperative Oncology Group performance status; ISS: International Staging System ; Hb: Hemoglobin; B-2 M: Beta-2 microglobulin; CRP: C-reactive protein; LDH: lactate dehydrogenase; CR: complete remission; VGPR: very good partial remission; PR: partial remission

<sup>a</sup>Mann Whitney U Test, <sup>b</sup>Pearson Chi-Square Test, <sup>c</sup>Fisher Freeman Halton Test, <sup>d</sup>Student-t Test

\*p<0.05, \*\*p<0.01

zomib based-therapy group ( $29.75 \pm 6.83$  versus  $20.92 \pm 3.11$ ). The 8-year PFS for patients who received conventional chemotherapy and those who received bortezomib-based therapy were 26% and 28 % respectively); however, no statistically significant difference was observed ( $p=0.324$ ). The OS for the conventional chemotherapy group was  $39.97 \pm 5.69$  versus  $38.15 \pm 5.18$  months for the bortezomib based-therapy group. The 8-year OS for patients who received conventional chemotherapy and those who received bortezomib-based therapy were 27 % and 46 %, respectively with no statistically significant difference ( $p=0.649$ ).

Cox regression analysis revealed the parameters to predict the OS as ISS (HR:4.930; 95% CI:2.148-8.647;  $p=0.001$ ) and CRP level (HR:2.254; 95% CI:1.092-4.651;  $p=0.028$ ) in all elderly patients. The cox regression analysis revealed the parameters to predict the PFS as CRP level (HR:2.677; 95%CI:1.356-5.285;  $p=0.005$ ) and response to first-line therapy (HR:2.755; 95%CI:1.328-5.714;  $p=0,006$ ) (Table 2).

Subgroup analyses of patients who received bortezomib-based first-line therapy were also performed. The PFS of patients who were treated with VD chemotherapy was significantly lower in comparison to the patients who were treated with VCD chemotherapy ( $13.41 \pm 3.25$  months vs.  $26.78 \pm 4.49$  months,  $p=0.0036$ ). The 8- year PFS of patients who were treated with VD chemotherapy and those who received VCD chemotherapy were 14% and 37%, respectively. The OS in the group receiving VD was significantly lower in comparison to the patients who were treated with VCD chemotherapy ( $19.78 \pm 3.93$  months vs  $53.62 \pm 7.88$ ,  $p=0.001$ ). The 8- year OS of patients who were treated with VD chemotherapy and those who received VCD chemotherapy were 10% and 68%, respectively.

In univariate and multivariate analyses, the factors affecting PFS and OS in patients receiving bortezomib-based therapy are shown in Table 3. Cox regression analysis showed the parameters to predict the PFS in response to first-line therapy and

CRP level ( $p=0.023$ , and  $p=0.049$ , respectively). The cox regression analysis showed the parameters to predict the OS as VCD chemotherapy ( $p=0.001$ ), ISS ( $p=0.003$ ) and the LDH level ( $p=0.004$ ).

## DISCUSSION

In this study, we demonstrated that no difference was found between the PFS and OS between conventional chemotherapy and bortezomib-based therapy in elderly patients with newly diagnosed MM. The survival outcomes of the double (VD) and triple (VCD) treatment regimens were also compared in the bortezomib-treated group. The PFS and OS were significantly longer in the VCD regimen than in the VD regimen. The VCD regimen was found to be an independent prognostic factor for a higher OS.

Melphalan-based therapies have formed the backbone of the treatment of elderly MM patients who are not suitable for ASCT. Several studies and meta-analyses have shown a survival benefit from the use of bortezomib or thalidomide in addition to MP (melphalan, prednisolone) in elderly patients unfit for ASCT (7,13-14).

No randomized studies have compared melphalan to bortezomib (without melphalan) in transplant-ineligible patients with newly diagnosed MM. The randomized controlled trial of VISTA investigated whether VMP versus MP improved the survival outcomes in patients not eligible for ASCT as first-line therapy. This trial showed that VMP results in a significantly longer OS, time to next treatment, and time to progression than MP. The survival advantage has been demonstrated in patients > 75 years of age, despite the discontinuation of treatment and greater toxicity. The final analysis of the VISTA trial confirmed a persistent significant OS benefit after five years of follow-up (15-16). We showed that bortezomib-based therapy improved the complete response-very good partial response (CR-VGPR) response rates compared to conven-



**Table 2.** The effects of clinical parameters on OS and PFS for all elderly MM patients

Parameters of OS		Univariable		Multivariable	
		HR (95% CI)	p value	HR (95% CI)	p value
Age (years)	70-79 ≥ 80	0.913 (0.472-1.764)	0.786		
Gender	Female Male	1.366 (0.754- 2.474)	0.304		
ISS	ISS 1-2 ISS 3	4.409 (2.248-8.647)	<b>0.001**</b>	4.930 (2.148-8.647)	<b>0.001**</b>
ECOG	0-1 2-4	2.405 (1.296-4.464)	<b>0.005**</b>		0.509
Creatinine(mg/dl)	<2mg/dl ≥2mg/dl	2.233 (1.198- 4.162)	<b>0.011*</b>		0.329
LDH(U/L)	Normal Elevated	2.379 (1.266- 4.473)	<b>0.007**</b>		0.239
CRP	Normal Elevated	2.948 (1.564- 5.556)	<b>0.001**</b>	2.254 (1.092-4.651)	<b>0.028*</b>
Response to 1st line therapy	CR-VGPR PR or less	1.878 (0.912-3.869)	<b>0.087</b>		0.559
Parameters of PFS					
Age (years)	70-79 ≥ 80	0.950 (0.509-1.775)	0.873		
Gender	Female Male	1.249 (0.730-2.139)	0.417		
ISS	ISS 1-2 ISS 3	2.371 (1.332-4.222)	<b>0.003**</b>		0.107
ECOG	0-1 2-4	1.606 (0.936-2.756)	0.085		0.500
Creatinine(mg/dl)	<2mg/dl ≥2mg/dl	1.663 (0.935-2.957)	0.083		0.721
LDH(U/L)	Normal Elevated	3.005 (1.664-5.429)	<b>0.001**</b>		0.708
CRP	Normal Elevated	3.751 (2.000-7.034)	<b>0.001**</b>	2.677 (1.356-5.285)	<b>0.005**</b>
Response to 1st line therapy	CR-VGPR PR or less	3.090 (1.559-6.125)	<b>0.001**</b>	2.755 (1.328-5.714)	<b>0.006**</b>

Cox proportional hazards regression analysis; HR: Hazard ratio; CI: Confidence Interval

\*p<0.05 \*\*p<0.01

**Table 3.** The effects of clinical parameters on OS and PFS for elderly MM patients who received bortezomib-based treatment

Parameters of OS		Univariable		Multivariable	
		HR (95% CI)	p value	HR (95% CI)	p value
Age (years)	70-79 ≥ 80	1.409 (0.590-1.714)	0.440		
Gender	Female Male	1.366 (0.754-2.474)	0.210		
ISS	ISS 1-2 ISS 3	7.774 (2.605-18.200)	<b>0.001**</b>	5.442 (1.759-16.839)	<b>0.003**</b>
ECOG	0-1 2-4	3.079 (1.385-6.845)	<b>0.006**</b>	3.654 (1.504-8.877)	<b>0.004**</b>
Creatinine(mg/dl)	<2mg/dl ≥2mg/dl	3.103 (1.429-6.735)	<b>0.004**</b>		0.838
LDH(U/L)	Normal Elevated	4.341 (1.980-9.518)	<b>0.001**</b>		0.599
CRP	Normal Elevated	2.232 (1.052-4.733)	<b>0.036*</b>		0.190
Response to 1st line therapy	CR-VGPR PR or less	1.687 (0.692-4.111)	0.250		
Chemotherapy regimen	VCD VD	4.302 (1.955-9.464)	<b>0.001**</b>	5.307 (2.216-12.710)	<b>0.001**</b>
Parameters of PFS					
Age (years)	70-79 ≥ 80	1,364 (0,596-3,122)	0.462		
Gender	Female Male	1.853 (0.933-3.680)	0.218		
ISS	ISS 1-2 ISS 3	2.117 (1.047-4.281)	<b>0.037*</b>		0.302
ECOG	0-1 2-4	1.701 (0.903-3.204)	0.100		0.812
Creatinine(mg/dl)	<2mg/dl ≥2mg/dl	1.521 (0.785-2.946)	0.214		
LDH(U/L)	Normal Elevated	2.936 (1.439-5.991)	<b>0.003**</b>		0.574
CRP	Normal Elevated	3.378 (1.666-6.849)	<b>0.001**</b>	<b>2.155(1.070-5.398)</b>	<b>0.049*</b>
Response to 1st line therapy	CR-VGPR PR or less	2.852(1.343-6.226)	<b>0.007**</b>	2.519 (1.135-5.591)	<b>0.023*</b>
Chemotherapy regimen	VCD VD	1.956 (1.033-3.704)	<b>0.04*</b>		0.863

\*p<0.05 \*\*p<.001



tional therapy. However, there was no significant difference in the survival outcomes between the two treatment regimens. We believe that there may be several reasons for the difference in the survival outcomes. Patients receiving bortezomib treatment had a higher ISSstage and higher rates of early mortality. Additionally, B2-M and creatinine levels were higher in patients receiving bortezomib-based therapy; however, the difference was not statistically significant. These results suggest that those receiving bortezomib-based therapy have aggressive disease.

Although VCD is not used as first-line therapy in Western countries, it is still frequently used as a first-line treatment in some countries, including our country. No randomized studies have compared VD to VCD in transplant-ineligible patients with newly diagnosed MM. In the Upfront study, the patients aged >65 years who were ineligible for transplantation were randomized into three arms: VD, VMP, and bortezomib-thalidomide –dexamethasone (VTD). No significant differences were observed among the three treatments for median PFS or OS. Side effects were observed to be higher with VTD than with VD or VMP (17). With four cycles of VCD therapy in newly diagnosed MM patients, the CR rate was 46%, and  $\geq$  the VGPR rate was 71% (18). Continuous oral cyclophosphamide addition to VD treatment in relapsed and refractory MM showed an overall response rate of 90% ( $\geq$ PR 82%); the median event-free survival was 12 months, and the median overall survival was 22 months (19). VCD and VD treatments were compared in a retrospective study of newly diagnosed MM patients. The relapse rate ( $p=0.002$ ) and mortality rate ( $p=0.01$ ) were higher in the VD group than in the VCD group. The OS and PFS were better in the VCD group than in the VD group; however, the difference was not statistically significant. In this study, elderly patients were not evaluated as a separate group (20). In our study, we showed that the VCD regimen was associated with longer OS and PFS than the VD regimen. The VCD

regimen is an independent prognostic factor for OS. We also showed that the known risk factors for MM (ISS, ECOG, LDH and CRP) are effective in survival outcomes in elderly patients, both in the whole patient group and in the group receiving bortezomib.

Elderly patients with MM are more susceptible to treatment-related side effects; 42-53% of elderly patients experience grade 3-4 adverse events early in treatment with a new agent (21). For this reason, it causes early discontinuation of treatment or lower intensity treatments. In our study, grade 3-4 side effects were found to be slightly lower (34%). Since this was a retrospective study, side effects may have been described less frequently. Early death is another problem in elderly patients. The mortality rate in the first year was approximately 15% in elderly patients with MM. An age  $\geq$  70 or 75 years was an independent predictor of early mortality (11-12). Contrary to the rate of side effects, early death rates were higher in our study than in the literature. In particular, the early death rate in the bortezomib-based group was significantly higher than that in the conventional chemotherapy group.

### Limitations

This study has a few limitations due to its retrospective design and the small number of patients. It is used for genetic evaluation of the MM risk staging system. Since genetic evaluation was not performed in every elderly MM patient, we could not show the relationship between genetic evaluation and the survival outcomes. The myeloma frailty score also could not be evaluated in every patient.

In conclusion, as seen in the real-world data in elderly MM patients, we found that there was no difference in the survival outcomes between conventional and bortezomib-based therapies. In the receiving bortezomib group, the VCD regimen resulted in significantly better survival outcomes than the VD regimen. The treatment of multiple myeloma in the elderly is challenging due to increased side

effects, comorbidities, frailty, and poor adherence to treatment. Therefore, the treatment of elderly MM patients often needs to be individualized. MP or VD treatment may be preferred in patients who are not suitable for more intensive chemotherapy. When the conditions become suitable, triple therapy can

be initiated by adding a third drug to patients who receive both MP and VD.

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#### RESEARCH

## COMPARISON OF THE EFFICACY AND SAFETY OF DIRECT-ACTING ANTIVIRAL AGENTS IN THE TREATMENT OF HEPATITIS C VIRUS GENOTYPE 1 BETWEEN THE TURKISH ELDERLY AND YOUNGER POPULATION

### ABSTRACT

**Introduction:** Direct-acting antiviral agents are highly effective and safe treatments for chronic hepatitis C infection; however, the treatment may be more problematic in elderly patients due to accompanying comorbid conditions. This study aimed to assess the efficacy and safety of direct-acting antiviral agents among the hepatitis C virus genotype 1 infected Turkish elderly population ( $\geq 65$  years).

**Materials and Method:** Ninety-six patients older than 18 years old treated with direct-acting antiviral regimens (sofosbuvir/ledipasvir  $\pm$  ribavirin or ombitasvir/paritaprevir/ritonavir + dasabuvir  $\pm$  ribavirin) were included in the study: 48 patients (50%) constituted Group 1 ( $< 65$  years) and 48 (50%) constituted Group 2 ( $\geq 65$  years). Comorbidities, potential drug-drug interactions, the number of interacting drugs, adverse events, and sustained virologic response rates were evaluated and compared between the groups.

**Results:** Sustained virologic response rates were 100% for both of the groups, except for the two patients with substance abuse in Group 1 who dropped from the study. Patients in Group 2 had more cirrhosis ( $p = 0.005$ ) and respiratory diseases ( $p = 0.037$ ). There was no significant difference between the two groups in terms of side effects ( $p = 0.683$ ); however, side effects were significantly higher in the elderly group with two or more potential drug interactions ( $p = 0.049$ ). The presence of cardiovascular disease was also found to be associated with more side effects in the elderly ( $p = 0.022$ ).

**Conclusion:** Direct-acting antiviral regimens are highly effective in elderly patients without a significant increase in the risk of side effects.

**Keywords:** Geriatrics; Hepatitis C, Chronic; Therapy.





## INTRODUCTION

The hepatitis C virus (HCV) is a major global health problem that is estimated to affect 1.6% (about 115 million) of the population worldwide (1). Although approximately 25% of those who have HCV infection develop acute hepatitis with jaundice, chronic disease develops in approximately 70% of infected individuals (2). Globally, genotype 1 (G1) accounted for 46% of all HCV infections among adults, making it the most common (1). The seroprevalence of HCV in Turkey has been reported as 1%, and 29% are 60 years and older. In the same study, age >50 years was found to be a significant predictor for anti-HCV positivity, and the most common genotype was reported as genotype 1 (3).

Chronic hepatitis C infection is the leading cause of cirrhosis and hepatocellular carcinoma (HCC). Twenty seven percent of cirrhosis and 25% of HCC cases were estimated to evolve from HCV infections (4). Older patients are disproportionately affected by HCV infection and are at a higher risk of liver disease progression and its complications than younger patients, as the risk of cirrhosis progression is reported to be proportional to the duration of HCV infection (5).

The treatment of HCV is more challenging among elderly patients because of the increased prevalence of multiple comorbid conditions, leading to an increased risk of side effects. The emergence of highly effective all-oral direct-acting antiviral (DAA) agents with minimal adverse events has provided further data on treatment outcomes in the elderly population. Glecaprevir/pibrentasvir, sofosbuvir (SOF)/ledipasvir (LDV)  $\pm$  ribavirin (RBV), and ombitasvir/paritaprevir/ritonavir and dasabuvir (OBV/PTV/r and DSV)  $\pm$  RBV are currently approved treatments in Turkey according to genotype, treatment experience, and presence of cirrhosis. DAA agents have been found to be effective and safe in the elderly population, according to current evidence, with comparable sustained virologic response (SVR) rates (6). Nevertheless, concerns about the higher

rates of adverse events and/or drug interactions associated with concurrent medications and the increased prevalence of comorbidity in these patients continue.

In this respect, given the increasing use of DAAs in the elderly population and the high comorbid conditions and multiple drug use in this population, more real-world studies on different subgroups are needed. Thus, this study aimed to assess the efficacy and safety of DAA therapy among the Turkish elderly population ( $\geq 65$  years) with chronic HCV genotype 1 (GT1) infection and compare them with younger (<65 years) patients.

## MATERIALS AND METHOD

HCV genotype 1 infected patients older than 18 years old who were treated with a DAA-based regimen at the Akdeniz University Medical Faculty Gastroenterology Outpatient Clinic were scanned retrospectively. Patients treated with glecaprevir/pibrentasvir were not included due to a relatively new treatment option in Turkey, and most patients were previously treated with SOF/LDV  $\pm$  RBV or OBV/PTV/r and DSV  $\pm$  RBV. Patients with HBV and HIV coinfection and patients with solid organ transplantation (kidney, liver, pancreas) were excluded.

Elderly patients were defined as being 65 years and older. Patients under 65 years of age were determined to be the same number as the elderly population. Demographic parameters including age and gender, medical history and previous treatment(s), the number and type of comorbidities (HCC, diabetes mellitus, hypertension, cardiovascular, renal, and respiratory diseases), presence of cirrhosis (if any), and concomitant medications, were retrospectively analyzed from the electronic database of hospital and printed patient files. The groups were named Group 1 (aged <65 years) and Group 2 (aged  $\geq 65$  years), and the two groups were compared in terms of variables.

Hemoglobin, thrombocyte, bilirubin, albumin,

sodium, and creatine values and estimated glomerular filtration rates (eGFR) at the beginning of the treatment, every 4 weeks during the treatment, and at the end of the treatment (12 or 24 weeks) were also recorded for each patient. Potential drug–drug interactions (DDIs) were evaluated using the University of Liverpool web interaction-checker (available at [www.hep-druginteractions.org](http://www.hep-druginteractions.org)), and the number of interacting drugs were noted. The patients had received two different treatment protocols: (1) SOF/LDV ± RBV and (2) OBV/PTV/r and DSV ± RBV, and their treatment continued for 12 or 24 weeks, according to the current guidelines of that period (7).

SVR was defined as a viral load below the lower limit of quantification at least 12 weeks after the end of treatment (8). The type, severity, and number of adverse events (AEs) were recorded per person. AEs that did not require treatment discontinuation and/or dose modification were defined as mild side effects, whereas side effects that caused the patient to pause or discontinue the treatment or dose modification were defined as severe. Child-Pugh (CP) scores and models for end-staged liver disease (MELD) scores were calculated and recorded before and after treatment in patients with cirrhosis.

### Statistical Analysis

The suitability of the numerical variables included in the study to normal distribution was tested with the Shapiro–Wilk test. Numerical variables were described using mean and standard deviation or median and interquartile difference (NAF) values, and categorical variables were described using frequency and percentage values. The relationship between two categorical variables was investigated using the chi-square test (precision test). Bonferroni correction was used in the post-hoc examination of categorical variables that took more than two values. The non-parametric Mann–Whitney U test was used to compare the two independent means. The study was conducted at a 95% confidence level ( $p < 0.05$  statistically significant difference was accepted).

### Ethical Approval

Ethical approval was obtained for this study from the Akdeniz University School of Medicine Clinical Research Ethics Committee (Approval no:709). Study was conducted according to the World Medical Association Declaration of Helsinki. Approval of the Akdeniz University Hospital Administration was also obtained for access to patient records.

## RESULTS

### Baseline characteristics

A total of 96 patients older than 18 years old treated with DAA combination regimens were included in the study: 48 patients (50%) constituted Group 1 (<65 years) and 48 (50%) constituted Group 2 ( $\geq 65$  years). Among patients in Groups 1 and 2, the mean age was  $49.0 \pm 13.4$  and  $69.7 \pm 3.7$  respectively. Twenty-seven patients were men and 21 patients were women in Group 1, and 18 were men and 30 were women in Group 2; 20.8% and 47.9% had cirrhosis in Groups 1 and 2, respectively.

In Group 1, 6 of the patients were receiving OBV/PTV/r and DSV treatment, 10 patients were receiving OBV/PTV/r and DSV + RBV, 20 patients were receiving SOF/LDV, and 12 patients were receiving SOF/LDV + RBV. In Group 2, OBV/PTV/r and DSV + RBV were used by 4 patients, SOF/LDV by 16 patients, and SOF/LDV + RBV by 10 patients. The number of patients on OBV/PTV/r and DSV therapy was significantly higher (18 patients) in Group 2. Regarding RBV use, 22 patients in Group 1 and 14 patients in Group 2 were using RBV, and there was no statistically significant difference between the two groups in terms of RBV use.

In Group 1, 34 patients received 12 weeks and 14 patients received 24 weeks of treatment; in Group 2, 31 patients received 12 weeks and 17 patients received 24 weeks of treatment, and there was no statistically significant difference between the two groups in terms of treatment duration. Considering the number of drug interactions, 29 and 24 patients



received no potentially interacting drugs, 15 and 16 patients used one potential interacting drug, and 4 and 8 patients used two or more potential interacting drugs in Groups 1 and 2, respectively. There was no statistically significant difference between the groups.

The SVR rates were 100% for both groups, except for the two patients with substance abuse in Group 1, who dropped from the study. When both groups were compared in terms of side effects related to treatment, no significant difference was found between the two groups ( $p = 0.683$ ).

Nearly half of the patients had failed a prior course of IFN-based therapy (50% and 54.2% for Groups 1 and 2, respectively). Baseline characteristics of the study population according to age groups are shown in Table 1.

A comparison of comorbid diseases revealed equal distribution between the groups in terms of the presence of HCC, diabetes mellitus, hypertension, and cardiovascular diseases, whereas Group 2 had more cirrhosis (10 vs. 23,  $p = 0.005$ ) and respiratory diseases (3 vs. 10,  $p = 0.037$ ). Chronic renal diseases were higher in Group 1 (8 vs. 1,  $p = 0.014$ ) (since our center is a transplant center, many HCV patients were also candidates for kidney transplantation). Comorbid diseases in the groups are presented in Table 2.

The most common adverse event was fatigue in both groups. Fatigue was followed by nausea, vomiting, diarrhea, and dyspepsia. The rarest side effects were dizziness, loss of appetite, constipation, and dyspnea. There was no discontinuation of treatment due to adverse events. In both groups, the correlation of the presence of side effects with gender, treatment protocols, use of RBV, duration of treatment, number of potential drug interactions, treatment history, and comorbid diseases were also analyzed. We found that the incidence of side effects was significantly higher in the elderly group with two or more potential drug interactions ( $p = 0.049$ ). The presence of cardiovascular disease was

also found to be associated with more side effects in the elderly ( $p = 0.022$ ). The associations between the presence of side effects and other variables are presented in Table 3. RBV-induced anemia (decrease in hemoglobin (Hb) %) was statistically higher in Group 1 (-19.1% vs. -5.9  $p < 0.001$ ). The baseline Hb levels of this group were also significantly higher (12.5 vs. 13.7,  $p = 0.049$ ) (Table 4).

There was no significant difference between the two groups in terms of decreases in CP and MELD scores with treatment (Table 5).

## DISCUSSION

The human lifespan is gradually increasing in most countries, including Turkey (9). Elderly patients represent a significant and rapidly increasing proportion of patients infected with chronic HCV (10). Historically, age has been a major constraint for IFN/RBV-based antiviral therapy due to the large number of treatment-related side effects, especially anemia, which can severely impair the patient's clinical course, particularly in elderly patients with cardiovascular comorbidities. However, there is increasing evidence that IFN-free DAA regimens can successfully treat HCV in these patients (11,12). Antiviral therapy in elderly patients with chronic hepatitis C is still controversial; thus, the benefits expected from DAAs should be weighed against the complex clinic of this population, and the most appropriate decision for the patient should be made. While these patients need urgent treatment due to the higher likelihood of advanced liver disease, liver-related complications (cirrhosis, hepatocarcinoma), hospitalization, and death (13,14), the treatment team also has to deal with the burden of coexisting multiple comorbidities that mutually worsen each other's progression and complicate patient management.

Although most studies have reported similar DAA efficacy in elderly patients as in younger patients, concerns have been raised that treatment success may be adversely affected in subgroups

**Table 1.** Baseline characteristics of the study population

	Group 1 (n=48)	Group 2 (n=48)	p
Age (mean ± SD)	49.0±13.4	69.7±3.7	<0.001
Gender (n, %)			
Male	27 (56.3)	18 (37.5)	0,066
Female	21 (43.8)	30 (62.5)	
Treatment protocol (n, %)			
OBV/PTV/r /DSV	6 (12.5)	18 (37.5)	0.027 <sup>a</sup>
OBV/PTV/r/DSV +RBV	10 (20.8)	4 (8.3)	
SOF/LDV	20 (41.7)	16 (33.3)	
SOF/LDV+RBV	12 (25)	10 (20.8)	
Agent (n, %)			
OBV/PTV/r /DSV	16 (33.3)	22 (45.8)	0,210
SOF/LDV	32 (66.7)	26 (54.2)	
RBV (n, %)			
No	26 (54.2)	34 (70.8)	0,092
Yes	22 (45.8)	14 (29.2)	
Duration of treatment (n, %)			
12 week	34 (70.8)	31 (64.6)	0,513
24 week	14 (29.2)	17 (35.4)	
Potential interacting drug(s) (n, %)			
none	29 (60.4)	24 (50)	0,399
1	15 (31.3)	16 (33.3)	
>1	4 (8.3)	8 (16.7)	
Previous HCV treatment (n, %)			
No	24 (50)	22 (45.8)	0,683
Yes	24 (50)	26 (54.2)	
Side effect(s) (n, %)			
No	36 (75)	30 (62.5)	0,186
Yes	12 (25)	18 (37.5)	

SOF/LDV: Sofosbuvir/ledipasvir, OBV/PTV/r /DSV: Ombitasvir/paritaprevir/ritonavir and dasabuvir RBV: Ribavirin, <sup>a</sup>: OBV/PTV/r /DSV vs OBV/PTV/r /DSV +RBV



**Table 2.** Comorbid diseases accompanying HCV

Comorbid disease (n, %)	Group 1 (n=48)	Group 2 (n=48)	p
Cirrhosis	10 (20.8)	23 (47.9)	0,005
HCC	1 (2.1)	4 (8.3)	0,168
DM	6 (12.5)	8 (16.7)	0,563
HT	17 (35.4)	22 (45.8)	0,299
Cardiovascular diseases	2 (4.2)	6 (12.5)	0,140
Respiratory diseases	3 (6.3)	10 (20.8)	0,037
Chronic renal diseases	8 (16.7)	1 (2.3)	0,014

HCC: Hepatocellular carcinoma, DM: Diabetes mellitus, HT: Hypertension

**Table 3.** The associations between the presence of side effects and other variables

Variables (n, %)	Group 1			Group 2		
	SE (-)	SE (+)	p	SE (-)	SE (+)	p
Gender						
Male	21 (58.3)	6 (50)	0,614	10 (33.3)	8 (44.4)	0,441
Female	15 (41.7)	6 (50)		20 (66.7)	10 (55.6)	
Treatment protocol						
OBV/PTV/r/DSV	6 (16.7)	0 (0)	0,297	13 (43.3)	5 (27.8)	0,404
OBV/PTV/r/DSV +RBV	6 (16.7)	4 (33.3)		1 (3.3)	3 (16.7)	
SOF/LDV	16 (44.4)	4 (33.3)		10 (33.3)	6 (33.3)	
SOF/LDV+RBV	8 (22.2)	4 (33.3)		6 (20)	4 (22.2)	
Agent						
OBV/PTV/r /DSV	12 (33.3)	4 (33.3)	>0.999	14 (46.7)	8 (44.4)	0,881
SOF/LDV	24 (66.7)	8 (66.7)		16 (53.3)	10 (55.6)	
RBV						
No	22 (61.1)	4 (33.3)	0,094	23 (76.7)	11 (61.1)	0,251
Yes	14 (38.9)	8 (66.7)		7 (23.3)	7 (38.9)	
Duration of treatment						
12 weeks	25 (69.4)	9 (75)	>0.999	20 (66.7)	11 (61.1)	0,697
24 weeks	11 (30.6)	3 (25)		10 (33.3)	7 (38.9)	
Drug interaction(s)						
none	23 (63.9)	6 (50)	0,186	19 (63.3)	5 (27.8)	0,049
1	9 (25)	6 (50)		8 (26.7)	8 (44.4)	
>1	4 (11.1)	0 (0)		3 (10)	5 (27.8)	

Cirrhosis						
No	27 (75)	11 (91.7)	0,414	17 (56.7)	8 (44.4)	0,412
Yes	9 (25)	1 (8.3)		13 (43.3)	10 (55.6)	
Treatment history						
No	20 (55.6)	4 (33.3)	0,182	14 (46.7)	8 (44.4)	0,881
Yes	16 (44.4)	8 (66.7)		16 (53.3)	10 (55.6)	
HCC						
No	35 (97.2)	12 (100)	>0.999	28 (93.3)	16 (88.9)	0,624
Yes	1 (2.8)	0 (0)		2 (6.7)	2 (11.1)	
DM						
No	32 (88.9)	10 (83.3)	0,631	25 (83.3)	15 (83.3)	>0.999
Yes	4 (11.1)	2 (16.7)		5 (16.7)	3 (16.7)	
HT						
No	25 (69.4)	6 (50)	0,300	17 (56.7)	9 (50)	0,654
Yes	11 (30.6)	6 (50)		13 (43.3)	9 (50)	
Cardiovascular diseases						
No	34 (94.4)	12 (100)	>0.999	29 (96.7)	13 (72.2)	0,022
Yes	2 (5.6)	0 (0)		1 (3.3)	5 (27.8)	
Respiratory diseases						
No	34 (94.4)	11 (91.7)	>0.999	25 (83.3)	13 (72.2)	0,468
Yes	2 (5.6)	1 (8.3)		5 (16.7)	5 (27.8)	
Chronic renal diseases						
No	31 (86.1)	9 (75)	0,394	30 (100)	17 (94.4)	0,375
Yes	5 (13.9)	3 (25)		0 (0)	1 (5.6)	

SE: Side effect, SOF/LDV: Sofosbuvir/ledipasvir, OBV/PTV/r /DSV: Ombitasvir/paritaprevir/ritonavir and dasabuvir, RBV: Ribavirin, HCC: Hepatocellular carcinoma, DM: Diabetes mellitus, HT: Hypertension

**Table 4.** Comparison of two groups in terms of Ribavirin-induced hemoglobin change

	Group 1			Group 2		
	RBV (-) (n=26)	RBV (+) (n=22)	P	RBV (-) (n=34)	RBV (+) (n=14)	P
Hb first (mean ± SD)	12.5±2.0	13.7±1.4	0,049	12.4±2.0	12.8±1.2	0,715
Hb last (mean ± SD)	12.2±1.8	11.3±1.7	0,090	12.2±2.2	12.0±1.5	0,460
dHb (median, IQR)	-1.6 (12)	-19.1 (18.1)	<0.001	-1.7 (10.6)	-5.9 (14.1)	0,149

HB: Hemoglobin, RBV: Ribavirin, SD: Standart deviation, IQR: Interquartile difference



**Table 5.** Comparison of two groups in terms of decrease in CP and MELD- scores with treatment in cirrhotic patients

	Group 1 (n=10)	Group 2 (n=23)	p
CP first (median, IQR)	6 (3)	6 (2)	0,804
CP last (median, IQR)	5.5 (2.3)	5 (2)	0,882
dCP (n, %)			
increase	0 (0)	2 (8.7)	0,859
no change	7 (70)	14 (60.9)	
decrease	3 (30)	7 (30.4)	
MELD first (median, IQR)	10.5 (9.5)	10 (6)	0,767
MELD last (median, IQR)	10.5 (8.5)	8 (4)	0,220
dMELD (n, %)			
increase	2 (20)	1 (4.3)	0,281
no change	5 (50)	10 (43.5)	
decrease	3 (30)	12 (52.2)	

CP: Child-Pugh, MELD: Model for end-staged liver disease, IQR: Interquartile difference

with other negative predictive factors, including the presence of cirrhosis and some HCV genotypes (15-18). There are also studies reporting higher rates of SAEs and discontinuation of treatment in the elderly population (19-23). Therefore, studies in subgroups of this sensitive population are needed.

The dominant HCV genotype worldwide was found to be genotype 1 with a rate of 46% (1). Similarly, the dominant HCV genotype was also genotype 1 in our country (90%–93.3%) followed by genotype 3 (3.7–4.9%), genotype 2 (1.5–2.2%) and genotype 4 (1.1–2.5%) (3,24,25). Therefore, we were interested in investigating genotype 1 in our population.

In a retrospective cohort study by Qureshi et al. (26), SVR12 rates and predictors of treatment failure were evaluated in elderly ( $\geq 70$  years) and noelderly ( $< 70$  years) HCV patients (mostly genotype 1) treated with different DAA regimens. SVR12 rates were

reported as 81% in elderly group and 95% in nonelderly group. In this study, age  $> 70$  years, presence of cirrhosis, HCC and the prior treatment experience were reported as independent predictors for HCV treatment failure in univariate analysis, however, in multivariate analysis only age  $> 70$  years and cirrhosis were found as statistically significant predictors. Moreover, in this study, when age of  $\geq 65$  years was used only the presence of cirrhosis achieved statistical significance to predict treatment failure. In our study age  $\geq 65$  years were defined as the elderly group. Elderly group had also more cirrhosis in our study, however, this situation didn't affect the SVR12 rates. History of treatment experience and HCC were similar in both groups. Our results showed that SOF/LDV $\pm$ RBV and OBV/PTV/r/DSV  $\pm$  RBV-based regimens resulted in high SVR rates in patients of advanced age. Among difficult-to-treat subgroups, including patients with cirrhosis, elderly patients had similar SVRs compared with younger patients.

Actually, SVR rates were 100% for both groups, except for the two patients with substance abuse who dropped from the study. Another study investigated SVR rates of 17487 HCV-infected patients treated with SOF/LDV and OBV/PTV/r/DSV-based regimens reported high SVR12 rates without differences among the 5 age categories (SVR rates were 91.2%, 89.8%, 90.8%, 91.1%, 90.0%, and 93.8% in patients aged below 55, 55–59, 60–64, 65–69, 70–74, and 75 years or older. age was not found a predictive of SVR (27).

Consistent with our study, another retrospective post hoc analysis conducted by Saab et al. (12), who examined the efficacy of SOF/LDV in an elderly population (aged 65 years and older) with HCV genotype-1, the SVR12 rates were 97% in patients <65 years and 98% in patients ≥65 years. At the subgroup level, the SVR rate was found to be 100% in patients who were 75 years old and older, whereas the SVR12 rate was 97% and 99% in treatment-naive and treatment-experienced elderly patients, respectively. Similarly, results from the German Hepatitis C Registry reported that SVR12 rates in the elderly patient group (>70 years) were similar to the younger population (≤70 years) (92.6% vs 90.7%, respectively) (28).

As mentioned above comorbidity and multi-drug use may be higher in elderly patients. So, it is necessary to be more careful about side effects and DDIs. There are many studies in the literature, evaluating side effects and DDIs during the treatment of hepatitis C in elderly patients. In Saab's study, considering the rates of treatment modification or interruption because of the side effects, was 6% in patients under 65 years of age, and 13% in patients aged ≥65 years. The rate of treatment discontinuation was similar in both groups at 1% (12). Lens et al. (29) reported higher significant side effects in patients ≥75 years comparing to the patients 65-74 years (13% and 8.8% respectively,  $p=0.04$ ). Qureshi et al. (26) reported that approximately 50% of the elderly patients had side effects (most commonly fa-

tigue and weakness), but there were no patients discontinued the treatment. They also stated that the use of additional drugs and DDIs are more common in the elderly population. Vermehren et al. (22) also reported that, in patients with chronic HCV treated with DAAs, the predicted clinically significant DDIs was higher in patients >65 years old (54% vs 28%;  $P < 0.0001$ ) however, this situation was not effect the SVR rates. In our study, no severe adverse events related to DAAs were noted. Severity and the number of adverse events did not differ between the two age groups. The most common side effect was fatigue in both groups. There was no treatment discontinuation due to adverse events. This may be attributable to the fact that there was no statistically significant difference in terms of the number of drug interactions between the two groups and the equal distribution of most of the comorbid diseases, including HCC, diabetes mellitus, hypertension, and cardiovascular diseases, except for more cirrhosis and respiratory diseases in Group 2 and more chronic renal diseases in Group 1. In both groups, the correlation of the presence of side effects with gender, treatment protocols, use of RBV, duration of treatment, number of potential drug interactions, treatment history, and comorbid diseases were also analyzed. The incidence of side effects was significantly higher in the elderly group with two or more potential drug interactions. The presence of cardiovascular disease was also found to be associated with more side effects in the elderly ( $p = 0.022$ ). However, RBV-induced anemia (decrease in Hb%) was statistically higher in the Group 1.

In a recent study by Krassenburg et al (30), SVR after DAA therapy was found the associated with reduced risk of disease progression in CP A cirrhosis, but not in CP B-C cirrhosis. Although, ≥2-point decrease in MELD scores was observed after therapy in 19% of CP B-C patients, it was found that this did not affect the event-free survival in these group. In our study, 47.9% of elderly patients (≥65 years) and 20.8% of younger patients had cirrhosis ( $p=0,005$ ).





There was no significant difference between the cirrhotic patients in two groups in terms of decreases in CP and MELD scores after SVR12. Most of our cirrhotic patients had CP A cirrhosis, therefore, good clinical outcomes can be predicted for our patients achieved SVR.

The strengths of the study are, the fact that it was conducted in the Turkish population with the dominant genotype and with real-life data, availability of SVR 12 datas of all patients in the elderly group, assesment of drug-drug interactions and comparison of results with younger population. However, it also has several limitations, including the study's

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retrospective design and heterogeneous treatment regimens.

In conclusion, DAA regimens were highly effective in the treatment of elderly HCV population, without a significant increase in the risk of adverse effects. With proper evaluation about comorbidities and DDIs (Using an internet database about drug interactions can be helpful in this respect) adverse events and treatment failures can be effectively prevented.

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## RESEARCH

# KNOWLEDGE AND ATTITUDES TOWARD ELDERLY SEXUALITY: A COMPARISON OF YOUNG AND OLDER ADULTS

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## ABSTRACT

**Introduction:** The current study aimed to compare knowledge about and attitudes toward the sexuality of elderly people by gender and developmental periods.

**Materials and Method:** A total of 206 young adults aged 18-27 years and 127 older adults aged 60-86 years participated in this study. "The Aging Sexuality Knowledge and Attitudes Scale" and Sociodemographic Information Form were applied to the participants. Descriptive statistics were presented to explore topics including active sexual life, the frequency of sexual intercourse, and how each group defined their sexuality.

**Results:** The results of this study showed that 57.5% of the older adults continued to have an active sexual life. A two-way multivariate analysis of covariance indicated that the main effects of developmental period ( $p < .001$ ) and gender ( $p < .01$ ) were statistically significant; however, the interaction effect of developmental period and gender was not statistically significant ( $p > .05$ ). The main effect of developmental period indicated that the young adults reported less knowledge about and a more permissive attitude toward elderly sexuality than the older adults did. The main effect of gender indicated that the females had less knowledge about elderly sexuality than the males.

**Conclusion:** The results of this study provide important contributions to both educational interventions in developmental psychology, gerontology, and geriatric nursing and the theoretical literature by examining the knowledge and attitudes toward the sexuality of the elderly from a developmental perspective for the first time in Turkey.

**Keywords:** Aged; Young Adult; Sexual Behavior; Attitude; Cross-sectional Studies.

## INTRODUCTION

The period of old age is a natural stage of the life cycle process that continues with development and change. There are also changes in sexuality due to the physiological regressions that occur in this period (1). Sexuality in the elderly is an important dimension of life and is a "human right" for every human being (2). Elderly sexuality, however, is generally ignored because of some popular myths (3). Individuals in most of the societies believe that sexuality does not or should not continue in old age (4). However, studies in the literature do not seem to confirm this idea. According to a study, the rate of sexual activity among older people aged 60 years and over has been found to be 46% (5). In another study conducted with individuals between the ages of 40 and 80, it was reported that approximately half of the men and 21% of the women between the ages of 70 and 80 had had sexual intercourse within the prior year. In addition, only 23% of the women and only 17% of the men reported that elderly individuals do not have a sexual desire (6).

In old age, sexuality can be experienced in the form of sharing and relaxing together, without the aim of giving birth to a child or starting a family. In other words, the expression of sexuality changes with age (7). This situation also provides spouses with the opportunity to discover different things that they have not been able to do before and to live amicably (1). Furthermore, vaginal sex manifests itself in the form of intimacy, affection, romance or friendship with age (8). Similarly, touching, fantasy, and loving each other becomes more important for older individuals in this period (7). In old age, sexuality also includes the relaxation of the spouses by supporting each other and giving pleasure of each other. As a result, although there is a change in the content or a decrease in the frequency of sexual activity in old age, older individuals still define themselves as sexually active (9, 10), and both women and men show their interest in sexuality into their eighties (11). Therefore, it would be more accurate

to describe the changes in the sexual lives of individuals in old age as decreased sexual functionality (12).

It is noteworthy that gender differences are frequently studied as a critical variable regarding knowledge and attitudes toward sexuality. Previous studies have found that males had more permissive attitudes (13) and more knowledge compared to females (14). A few studies showed that being older was associated with knowing more about elderly sexuality (14, 15). When the attitudes of young people toward the sexuality of the elderly are examined, it is concluded that they generally think that sexuality is not important for the elderly and that they find the sexuality of the elderly to not be believable. The attitudes of elderly people toward their sexuality were found to be mostly positive. Also, elderly people with more positive attitudes are more likely to engage in sexual activity (16). In addition, older people state that the need for love and sexuality does not decrease with age and that other people commit age discrimination in this regard (17). The results of studies that compare the attitudes of young adults and older adults toward elderly sexuality are controversial. A study conducted in one state of Midwestern United States reported that the attitudes of older adults toward the sexuality of the elderly were more liberal than those of the young people (18). However, in another study conducted with Korean individuals who were between the ages of 18 and 65, it was concluded that the elderly participants were more conservative about the sexuality of the elderly as compared to the attitudes of the young participants (19).

As a result of the literature review, no empirical study was found in our country that compared knowledge levels and attitudes toward the sexuality of the elderly by considering the developmental period and gender. Therefore, it is believed that this study, which investigates knowledge about and attitudes toward the sexuality of the elderly, will fill an important gap in the literature of our country. In ad-



dition, exploring the sexual lives of both young and older adults is one of the aims of this study.

## MATERIALS AND METHODS

### 1. Sample

The young adult sample of this study was taken from Ege University and Ufuk University, and the elderly sample was taken from the community. The study sample consisted of 206 young adults aged 18 to 27 (Mage = 21.41, SD = 1.94) and 127 older adults **aged 60 years and over** (Mage = 68.42, SD = 5.72) **who were** living in Izmir and Ankara. While 71% (n = 147) of the young adults were female, 61.4% (n = 78) of the older adults were female participants. In total, 74% (n = 94) of the older adults stated that they were married. All of the young adults were single. The older adults reported the following about their educational level: 43.2% (n = 55) literate or elementary school, 35.5% (n = 45) secondary school or high school, and 21.3% (n = 27) college and above.

### 2. Measures

**Sociodemographic Information Form:** This form was prepared by researchers to obtain some sociodemographic information, such as gender, age, marital status, and perceived socioeconomic level. In addition to demographic information, this form included questions about the sexual lives of the young and older adults, such as frequency of sexual intercourse.

**The Aging Sexuality Knowledge and Attitudes Scale (ASKAS):** This scale, which was used to evaluate the knowledge and attitudes of individuals toward the sexuality of the elderly, was developed by White (20) and translated into Turkish by Doğan, Demir, Eker, and Karim (14). The 61-item scale has two subdimensions: knowledge and attitude. While the 35-item knowledge dimension of the scale is coded as "yes, no, and I do not know," the attitude dimension is evaluated on a 7-point Likert-type scale. The possible score that can be obtained on the knowledge subdimension ranges from 35 to

105, while the possible score on the attitude subdimension ranges from 26 to 182. High scores in the knowledge dimension show a low level of knowledge about the sexuality of elderly people. In addition, high scores in the attitude dimension indicate a more conservative attitude toward the sexuality of the elderly. This scale is well known for being used to assess knowledge and attitudes in our country (14, 21). In this study, the Cronbach's alpha internal consistency coefficients for the knowledge and attitude subdimensions were .91 and .92 for older adults and .90 and .92 for young adults, respectively.

### 3. Procedure

For the young sample, departments and classes were randomly determined in one university each in Izmir and Ankara, and permission was obtained from a responsible lecturer of the course to collect the data. The purpose of the research and the implementation process were explained to the participants, and the written consent was obtained. The scale was applied to the volunteers in the classroom. The scale took approximately 20 minutes to complete. Snowball sampling and an appropriate sampling method were used to recruit the older adults. Written consent was also obtained from the older adults. The application of the scale took approximately 35–40 minutes.

### 4. Data Analysis

Statistical analysis was performed using SPSS v.22. First, missing data in the data set obtained from young adults and older adults were investigated, and it was found that missing data were randomly distributed. To handle missing data, missing values were replaced with the mean score. To test the normality assumption, the values of skewness and kurtosis were investigated. Skewness and kurtosis values between +1.96 and -1.96 were considered acceptable (22). Descriptive statistics were presented to explore active sexual life and frequency of sexual intercourse, and how each group defined their sexuality. Chi-square and two-way MANCOVA tests were conducted to determine the differences

between groups. As the assumptions of MANCOVA, homogeneity of error variances for knowledge (Levene's test = 1.992,  $p > .05$ ) and attitude scores (Levene's test = .995,  $p > .05$ ) and homogeneity of covariance matrices (Box's M test = 12.60,  $p > .05$ ) were also investigated, and the assumptions for the analysis were met. The statistical significance level was set at  $p < 0.05$ .

### 5. Ethical Issues

Ethical approval for this study was obtained from the Ufuk University Social and Human Sciences Scientific Research and Publication Ethics Committee (reference number: 2018-50).

## RESULTS

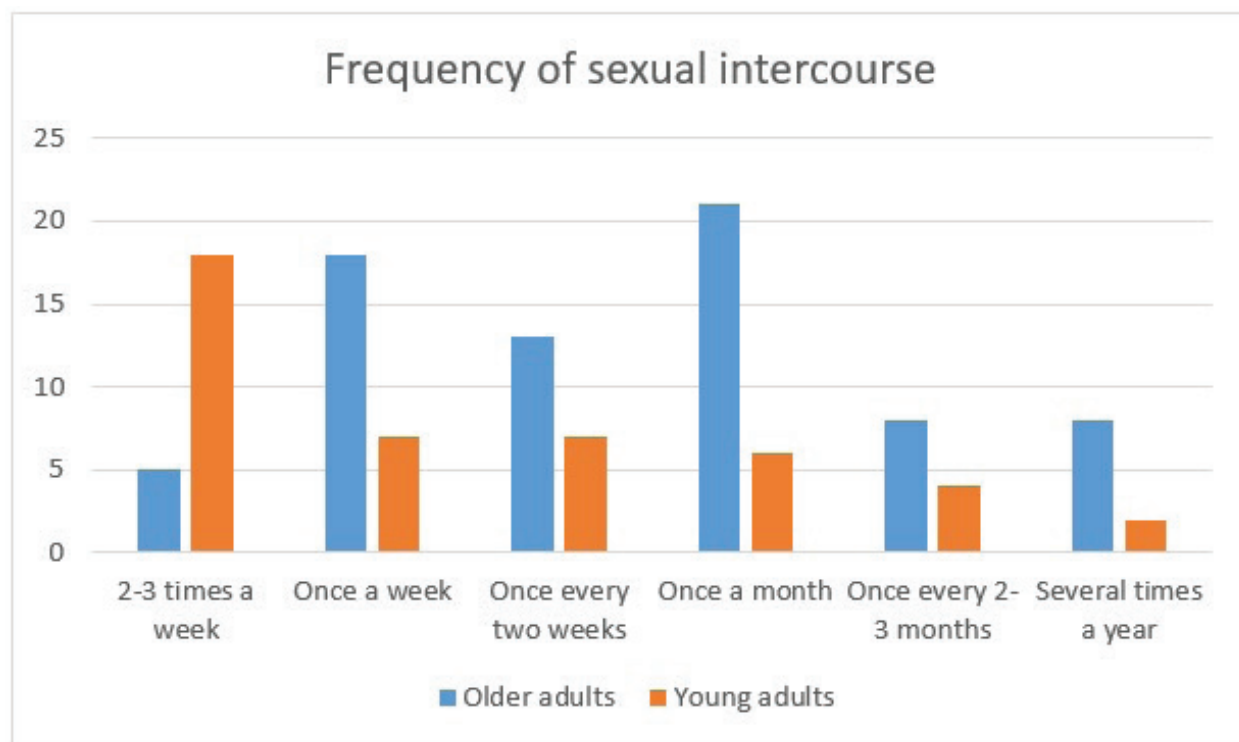
### Descriptive Statistics

**Active Sexual Life:** While 57.5% ( $n = 73$ ) of older adults stated that they continued their sexual life

actively, 42.5% ( $n = 54$ ) reported that they did not continue their sexual life. Of young adults, 34% ( $n = 70$ ) stated that they had experienced sexual intercourse. In addition, 22.8% ( $n = 47$ ) of young adults stated that they are currently sexually active, while 77.2% ( $n = 159$ ) stated that they are not active. Chi square test showed that the percentage of participants that were currently sexually active differed by developmental periods,  $\chi^2(1) = 40.918$ ,  $p < .001$ . In other words, older adults were significantly reported to have more active sexual lives.

**Frequency of Sexual Intercourse:** The participants were asked about the frequency of sexual intercourse, and the answers are presented in Graphic 1. Of older adults, 3.9% ( $n = 5$ ) reported having sex 2–3 times a week, 14.2% ( $n = 18$ ) once a week, 10.2% ( $n = 13$ ) once every 2 weeks, and 16.5% ( $n = 21$ ) reported having sexual intercourse once a month. In addition, 6.3% ( $n = 8$ ) of older adults reported hav-

Graphic 1. Frequency of Sexual Intercourse





ing sexual intercourse once every 2–3 months and 6.3% (n = 8) several times a year. 8.8% (n = 18) of young adults reported having sexual intercourse 2–3 times a week. 3.4% (n = 7) of the participants reported having sexual intercourse once a week, 3.4% (n = 7) once every 2 weeks, 3% once a month (n = 6), and 2% (n = 4) once every 2–3 months.

**Definitions of Sexual Experiences:** 54.3% (n = 69) of older adults and 33% (n = 68) of young adults defined their sexual life as sexual intercourse. There was a significant difference between young adults and older adults in terms of defining their sexual life as sexual intercourse ( $\chi^2(1) = 14.677, p < .001$ ). While 22% (n = 28) of older adults defined their sexual life as kissing, 44.7% of young adults reported their sexual life as kissing. Chi-square test showed that older adults and young adults who reported their sexual experiences as kissing differed significantly ( $\chi^2(1) = 17.509, p < .001$ ). In addition, 23.3% (n = 36) of older adults and 41.7% (n = 86) of young adults described their sexual life as hugging/touching. There was a significant difference between young adults and older adults in terms of defining their sexual life as hugging/touching ( $\chi^2(1) = 11.706, p < .001$ ). In summary, older adults defined their sexual life more as sexual intercourse, while young adults described their sexual life as kissing and hugging/touching.

### Knowledge and Attitudes by Developmental Period and Gender

A two-way MANCOVA was conducted to determine whether there was an interaction effect between developmental period (young adults vs. older adults) and gender (female vs. male) on the knowledge and attitude scores obtained from ASKAS after controlling for the variable of the city where the participants live (Ankara vs. Izmir). The mean and standard deviation values of the knowledge and attitude scores toward the sexuality of the elderly according to developmental period and gender are presented in Table 1.

The results of the MANCOVA analysis showed that the main effect of developmental period (F (2,

327) = 40.723,  $p < .001, \eta^2 = .20$ ) and gender (F (2, 327) = 5.905,  $p < .01, \eta^2 = .04$ ) on the combined dependent variables was statistically significant after controlling for the city where the participants live. The main effect of developmental period showed that there was a significant difference in the knowledge scores of the older adults and the young adults (F (1, 328) = 33.667,  $p < .001, \eta^2 = .09$ ). In terms of attitude scores, there was also a significant difference between the older adults and the young adults (F (1, 328) = 34.514,  $p < .001, \eta^2 = .10$ ). Higher scores on the ASKAS knowledge dimension indicate a lower level of knowledge. In this study, the results showed that the young adults had a lower level of knowledge than the older adults. A lower attitude score indicates a more permissive attitude regarding the sexuality of elderly people. The results showed that the young adults had a more permissive attitude than the older adults toward the sexuality of elderly people. In other words, the older adults demonstrated a more conservative attitude toward the sexuality of the elderly than the young adults. The main effect of gender indicated that there was a significant difference between the knowledge scores of the female and male participants (F(1, 328) = 11.821,  $p < .001, \eta^2 = .04$ ), with the females demonstrating less knowledge about elder sexuality than the males. In terms of the attitude scores, there was no significant difference between the female and the male participants (F(1, 328) = .171,  $p > .05, \eta^2 = .001$ ). The interaction effect of developmental period and gender was not statistically significant (F (2, 327) = 3.001,  $p > .05, \eta^2 = .02$ ).

### DISCUSSION

The purpose of this study was to investigate the knowledge levels and attitude toward the sexuality of the elderly. In this study, knowledge and attitudes towards elderly sexuality were examined by considering the gender and developmental level of the participants. In addition, in this study, active sexual life, frequency of sexual life, and meaning of sexual

**Table 1.** Mean and standard deviation values of the knowledge and attitude scores toward the sexuality of the elderly by developmental period and gender

	Developmental period	Gender	M	SD	N
Knowledge <sup>+</sup>	Older adult	Female	68.01	16.26	78
		Male	59.31	11.28	49
		Total	64.65	15.11	127
	Young adult	Female	75.50	14.55	147
		Male	72.86	15.63	59
		Total	74.75	14.88	206
	Total	Female	72.91	15.54	225
		Male	66.71	15.35	108
		Total	70.90	15.73	333
Attitude <sup>++</sup>	Older adult	Female	103.78	28.93	78
		Male	95.73	26.29	49
		Total	100.67	28.11	127
	Young adult	Female	78.80	27.37	147
		Male	81.48	22.66	59
		Total	79.57	26.08	206
	Total	Female	87.46	30.30	225
		Male	87.94	25.28	108
		Total	87.62	28.73	333

Note: <sup>+</sup> Individuals with lower knowledge scores have a high level of knowledge regarding the sexuality of elderly people. <sup>++</sup> Individuals with lower attitude scores have a more permissive attitude regarding the sexuality of elderly people.

life were investigated for both groups.

When the sexual lives of young adults and older adults were examined, it was found that older adults had a more active sexual life than young adults. There are some possible explanations for young people to report a less active sex life than older adults. Firstly, the vast majority of older adults were married, while the young adults were all single. Secondly, the majority of the young adults were women. Although it is known that sexual activity among young and single individuals has increased in recent years in our country (23), premarital sexual experi-

ence is still not supported, especially for women, and there remains an expectation of virginity at the time of marriage (24). Thirdly, single young adults may not want to report their sexual experiences because sexuality is a sensitive topic in Turkey.

Moreover, it is noteworthy that 57% of the elderly participants were continuing their sexual life. This finding is parallel to the current literature (5). In addition, when the frequency of sexual intercourse in older adults was examined, it was found that 42.5% stated that they had not had sexual intercourse in the last few years, and 16.5% stated that they had





sexual intercourse only once a month. In other words, it can be concluded that there is a decrease in the frequency of sexual intercourse in old age. It is thought that this is due to physiological, psychological, and social changes that occur with increasing age (25). This finding is consistent with studies showing a decrease in the frequency of sexual activity in old ages (9, 10). The findings in this study seem to support the literature that indicates a change in the sexual life of individuals in old age in the direction of decreased sexual functionality (12).

In terms of defining their sexual life, the older adults tended to define their sexual life as sexual intercourse more than the young adults. It is thought that this finding is mainly due to the marital status of the participants. Young adults may have defined their sexual life more in terms of hugging/touching and kissing, as they are single and have lower rates of sexual intercourse. In addition, although the older adults defined their sexual life in terms of sexual intercourse, 22% of older individuals defined their sexual life as kissing and 23.3% as hugging/touching. This means that, contrary to expectations, sexuality does not consist solely of sexual intercourse, and bodily contact, such as hugging/touching and kissing are an important part of sexuality and maintain its functionality. Therefore, the findings of this study support the view that touching and loving each other are as important as sexual intercourse in old age (11, 12).

In this study, the older adults had a higher level of knowledge about the sexuality of the elderly than the young adults. This finding is consistent with previous literature (14, 15). The explanations why older adults had more knowledge are as follows. Firstly, older adults may need and have access to more information about their aging in terms of physiological and sexual changes. Secondly, older adults indicated experiences such as having painful sexual intercourse in the information questions. Thirdly, this result may be related to the fact that this subject is avoided in the socio-cultural context of our

country and that it is not included in the education curriculum. In addition, the findings of this study are consistent with previous studies reporting that older adults were more conservative than young adults (19). In contrast to some studies conducted in developed countries (17,18), in this study—similar to the findings of a study conducted in Korea (19)—the finding that the older adults were more conservative than the younger adults may be due to cultural characteristics. It is not unexpected that attitudes regarding sexuality in older adults are more conservative in developing societies that are more collectivist and are characterized by repressive attitudes toward sexuality. Due to sexual myths and a lack of information, older adults in these countries may have internalized social prejudices about sexuality in old age and assumed that sexuality should not continue past a certain age (26). The findings of this study show the importance of cross-cultural comparisons of attitudes toward elder sexuality and the significance of examining the macro variables that affect attitudes.

This study found that the female participants had less knowledge about sexuality in older adults than the male participants; however, both females and males had similar attitudes toward sexuality in older adults. A study conducted with healthcare professionals in Turkey found that the female participants had less knowledge about sexuality in older adults than the male participants (14). Factors such as gender roles (14), sexual education differences, ignorance about female sexuality, and the fact that male sexuality is more freely discussed (27) may contribute to this gender difference. Due to these factors, males may have more ready access to information about sexuality. However, contrary to previous literature (19), in the current study, the male and female participants showed no difference in their attitudes toward sexuality in older adults. Accepted cultural values may contribute to this finding. In other words, the internalization of macro-level belief systems, traditions, or cultural dogmas may lead

to similar attitudes on the part of both males and females toward sexuality in older adults.

To our knowledge, this is the first study to compare the different developmental periods in terms of knowledge level and attitude toward the sexuality of the elderly between older adults and young adults in Turkey. Another unique aspect of this study is that it compared the sexual experiences of different developmental stages. For these reasons, this study makes an important contribution to the literature.

This study, which makes significant contributions to the literature, has some limitations. First, the sample size of the older adults participating in the study was low. In addition, both the young and older adults were recruited only from the Ankara and İzmir provinces. Data for the young adults were collected from a private university in Ankara and a public university in Izmir, so the city variable was controlled. However, the effect of university type should not be ignored in the findings obtained by controlling for the city variable. The generalizability of the findings is limited by these sample characteristics. On the other hand, educational level is an essential factor influencing the older adults' level of knowledge about and attitude toward sexuality. It is noteworthy

that it is difficult to compare the educational levels of young and older adults in cross-sectional studies. As a result, the difference in educational levels among the older adults may have a confounding influence on the findings. Secondly, due to the nature of the study's cross-sectional design, the results should be interpreted carefully. The age-related differences obtained in this study may be due to the cohort effect, which is the result of individuals from different generations having distinctive experiences and lifestyles. Longitudinal studies are needed to establish causal relationships. The final limitation relates to the collection of data through self-report scales. Because sexuality is difficult to discuss at all stages of development in Turkey, self-reported assessments may lead to social desirability.

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**Conflict of Interest:** We have no conflicts of interests to disclose.

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#### RESEARCH

## FRAILTY STATUS AND RELATED FACTORS OF ELDERLY PEOPLE RECEIVING AID FROM THE SOCIAL ASSISTANCE FOUNDATION IN BURDUR PROVINCE

### ABSTRACT

**Introduction:** This study aimed to determine the characteristics and prevalence of frailty and related factors among the elderly who receive aid from the social assistance foundation.

**Materials And Methods:** The study population consisted of 464 people over the age of 65 y who lived in the city center of Burdur and received aid from the Social Assistance Foundation. All of the samples were selected, and we aimed to reach the entire population. While frailty according to Edmonton Frail Scale was the dependent variable of the research, general health status, socioeconomic and sociodemographic characteristics, and dependence in instrumental/daily living activities were determined as independent variables. The t-test and analysis of variance were used to analyze the scale scores. The forward linear regression method was used in multivariate analysis to determine the causes of frailty.

**Results:** While 29.0% of the elderly were not frail, 11.7% were severely frail. Being 85 y old and over, being fully/semi-dependent in terms of instrumental daily living activities, having a chronic disease, using multiple medicines, and having experienced a fall within the last year were determined as factors that increase frailty.

**Conclusions:** The frailty levels identified in our study are higher than those in other studies, which were carried out for community use. In our province, which has a large elderly population, trainings for increasing the recognition of frailty as part of preventive medicine, determination and monitoring of frailty level, and planning necessary interventions will make important contributions to the active aging process.

**Keywords:** Aged; Frailty; Prevalence.



## INTRODUCTION

Following the 2002 World Elderly Meeting, the World Health Organization (WHO) brought the definition of "active aging" to the agenda. The WHO defines active aging as "the process of providing health, social participation, and security opportunities at the best level in order to enrich the quality of life of people as they age" and advocates providing these opportunities to all individuals. In this context the WHO recommends supporting the maintenance of the participation of the elderly in society in every sense (1).

The elderly confront is a very heterogeneous group. Some individuals stay fit and active in their ninth or tenth decades, whereas others show signs of disability in their early sixties despite not having any acute physical illnesses. Such differentiation of biological and chronological age introduced the terms 'fit' and 'frail.'

'Frailty' is theoretically defined as a clinically recognizable state of vulnerability resulting from a decline in the reserves and functions of many physiological systems due to aging, in a way that the ability to cope with daily or acute stressors become threatened (2). Frailty is a condition characterized by a series of adverse outcomes, such as the loss of biological reserves, disruption of physiological mechanisms, frequent hospitalizations, longer hospital stay, and delirium (3). To find out the people with frailty will help to prevent developing adverse outcomes. Therefore, a shift toward providing more person-centered and targeted care can be achieved. Frailty is not an inevitable part of aging but a comorbidity like diabetes or Alzheimer's disease (4). Complications can turn into a vicious, self-repetitive circle and result in death. This condition affects approximately 10% of people over the age of 65 y, and increases with age, reaching up to 25–50% of people over the age of 85 y (4). The cost of these frailty-related conditions is estimated to be £5.9 billion per year in the UK (5). Prevention appears to be much more cost-effective than treat-

ment, taking into account high frailty prevalence rates. As such, preventive services should be considered as the first line of defense (6).

Although many descriptive criteria have been put forward for the diagnosis of frailty, none of them has been accepted as the gold standard. The Edmonton Frail Scale was preferred because its Turkish validation study was conducted, and it was based on a questionnaire, was easy to apply, took less time, and was practical to apply in the field (7). Detection and monitoring of the frailty level and planning the necessary interventions will make a significant contribution to the active aging process.

Prevalence studies are important in terms of understanding the extent of the problem and planning intervention in the fight against frailty. Many studies in the literature have been conducted with patients admitted to the hospital. However, field studies are insufficient.

The aim of this study was to reveal the frailty levels and related factors of the elderly who received aid from the Social Assistance Foundation. The ultimate objective was to determine the priority group that needs services within the scope of the House of Healthy Plane Trees project being carried out in Burdur province.

## MATERIALS AND METHODS

**The study population** consisted of 464 people over the age of 65 y who lived in the city center and villages of Burdur and received aid from the Social Assistance Foundation. All of the samples were selected, and we aimed to reach the whole population.

**Data collection form:** The data regarding overall health status and sociodemographic and socioeconomic levels of the elderly were gathered through Katz's Activities of Daily Living Index (ADL), Lawton and Brody's Instrumental Activities of Daily Living Index (IDLA), and the Edmonton Frail Scale, which inquires about addiction status and frailty level.

**Data collection:** The data were obtained using the face-to-face interview method from participants who gave verbal consent.

**The dependent variable of the research** was the frailty level, and overall health status, socioeconomic and sociodemographic characteristics, and dependence status were taken as independent variables.

**Statistical evaluation:** SPSS program version 15.0. (SPSS; IBM Corp., Armonk, NY, USA) was used. Number, percentage, mean, standard deviation, and minimum and maximum values were used as descriptive statistics. In analytical assessments, t-test and analysis of variance were used to analyze the scale scores.  $p < 0.05$  was the cut-off value for statistical significance. Bonferroni analysis was performed to determine from which group the difference originated. The forward linear regression method was used as a multivariate analysis in order to determine the causes affecting frailty.

Approval to carry out the study was obtained from the Mehmet Akif Ersoy University Non-Interventional Clinical Research Ethics Committee (GO 2021/191).

## RESULTS

Of the elderly study population, 30.0% were  $\geq 85$  y, 72.8% were women, 74.4% were illiterate or barely literate, 71.2% had a chronic disease, with hypertension being the most (43.3%), 22.7% fell within the last year, 3.4% experienced a fracture, 2.3% were fully dependent in terms of ADL, and 6.6% were fully dependent in terms of IDLA.

The Edmonton Frail Scale mean score was  $6.5 \pm 3.3$  (Minimum: 0, Maximum: 15), while 29.0% of the elderly had no frailty, 22.2% were vulnerable, 19.3% had a mild level of frailty, 17.8% a moderate level of frailty, and 11.7% a severe level of frailty (Table 1).

Table 2 shows the effects of overall health status and demographic and socioeconomic characteristics of the participants on frailty. Being  $\geq 85$  y old, being female, being illiterate or barely literate, being widowed or divorced, not living with a spouse, using a walking stick, walker, or other such aids, having a chronic disease, taking multiple medicines, having experienced a fall within the last year, having experienced a fracture, and being fully or semi-dependent in terms of ADL and IDLA were determined as parameters affecting frailty.

Independent variables in which a statistically significant difference was found were subjected to the linear regression analysis. As a result, it was found that being  $\geq 85$  y old, being fully or semi-dependent in terms of instrumental daily living activities, having a chronic disease, taking multiple medicines, and having experienced a fall within the last year were determined as factors that increase frailty (Table 3).

## DISCUSSION AND CONCLUSION

In our study, the Edmonton Frail Scale mean score was  $6.53 \pm 3.25$ ; 29.0% of them had no frailty, 22.2% were found to be vulnerable, 19.3% had a mild level of frailty, 17.8% had a moderate level of frailty, and 11.7% had a severe level of frailty. Factors that increase frailty were the following:  $\geq 85$  y old, fully or

**Table 1.** Frailty Status of the Elderly

None n (%)	Vulnerable n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	Total n (%)
111 (29.0)	85 (22,2)	74 (19.3)	68 (17.8)	45 (11.7)	383 (100)



**Table 2.** Distribution of the Edmonton frail scale mean scores according to the characteristics of the elderly

Age group (y)	n (383)	%	X±ss	Test value	P
65-69	37	9.7	4.70±2.52	11,749	<b>0.001</b>
70-74	76	19.8	5.47±3.07		
75-79	72	18.8	6.29±3.17		
80-84	83	21.7	6.54±3.29		
85+	115	30.0	7.95±3.25		
<b>Sex</b>					
Female	279	72.8	6.87±3.21	10,642	<b>0.001</b>
Male	104	27.2	5.67±3.22		
<b>Educational Status</b>					
Illiterate/barely literate	285	74.4	7.06±3.13	32,882	<b>0.001</b>
Elementary school and above	98	25.6	4.96±3.08		
<b>Marital Status</b>					
Married	84	21.9	5.38±3.00	13,896	<b>0.001</b>
Widowed/divorced	299	78.1	6.85±3.24		
<b>Cohabitation</b>					
Spouse	75	19.6	5.37±2.90	13,699	<b>0.001</b>
Living alone	203	53.0	6.77±3.10		
Families of their children	105	27.4	6.31±3.13		
<b>Smoking status</b>					
Not smoking/quit	356	93.0	6.57±3.28	0.883	0.348
Smoking	27	7.0	5.96±2.76		
<b>Alcohol use status</b>					
Not using/quit	382	99.7	6.52±3.25	0.578	0.448
Using	1	0.3	9.00±0		
<b>Chronic disease</b>					
None	111	28.8	4.84±2.60	46,934	<b>0.001</b>
Present	272	71.2	7.21±3.24		
<b>DM</b>					
None	326	85.1	6.27±3.15	14,163	<b>0.001</b>
Present	57	14.9	8.00±3.41		
<b>HT</b>					
None	217	56.7	6.06±3.28	10,308	<b>0.001</b>
Present	166	43.3	7.13±3.11		
<b>Heart disease</b>					
None	310	80.9	6.28±3.21	9,533	<b>0.002</b>
Present	73	19.1	7.57±3.23		

<b>COPD</b>					
None	315	82.2	6.24±3.21	13,838	<b>0.001</b>
Present	68	17.8	7.83±3.13		
<b>Alzheimer's Disease/Dementia</b>					
None	347	90.6	6.16±3.12	52,154	<b>0.001</b>
Present	36	9.4	10.02±2.18		
<b>Myocardial Infarction</b>					
None	355	92.7	6.39±3.26	8,624	<b>0.004</b>
Present	28	7.3	8.25±2.56		
<b>Depression</b>					
None	349	91.1	6.27±3.16	25,131	<b>0.001</b>
Present	34	8.9	9.11±2.98		
<b>Muscle/Joint Diseases</b>					
None	252	65.8	5.87±3.16	32,153	<b>0.001</b>
Present	131	34.2	7.78±3.04		
<b>Cancer</b>					
None	377	98.4	6.47±3.24	6,382	<b>0.013</b>
Present	6	1.6	9.83±2.04		
<b>Stroke</b>					
None	362	94.5	6.39±3.19	11,215	<b>0.001</b>
Present	21	5.5	8.80±3.45		
<b>Fall within the last 1 year</b>					
None	296	77.3	5.90±3.03	54,888	<b>0.001</b>
Present	87	22.7	8.65±3.07		
<b>Fracture within the last 1 year</b>					
None	370	96.6	6.45±3.23	5,192	<b>0.023</b>
Present	13	3.4	8.53±3.15		
<b>Number of medicines taken</b>					
4 and below	323	84.3	6.22±3.12	19,280	<b>0.001</b>
5+	60	15.7	8.18±3.43		
<b>Orthosis use status</b>					
Eyeglasses	85	22.2	5.57±2.95	18,615	<b>0.001</b>
Hearing aid	10	2.6	6.30±3.09		
Walking stick, walker, etc.	145	37.9	8.01±2.92		
Not using	143	37.3	6.53±3.25		
<b>Dependence according to Katz's ADL Index</b>					
Fully dependent	9	2.3	9.77±2.22	35,958	<b>0.001</b>
Semi-dependent	33	8.6	10.33±2.34		
Independent	341	89.1	6.07±3.05		
<b>Dependence status according to Lawton and Brody's IDLA Index</b>					
Fully dependent	25	6.6	9.96±2.63	85,606	<b>0.001</b>
Semi-dependent	117	30.5	8.61±2.64		
Independent	241	62.9	5.16±2.74		





**Table 3.** Results of linear logistic regression analysis involving the factors affecting the fragility level

Independent Variables		B	S.E.	Wald	Odds Ratio	95% Confidence Interval	P
Age (y)	Advanced old age	0.273	0.103	0.113	<b>2.654</b>	0.071-0.475	<b>0.007</b>
	Under 85				Reference		
Instrumental Daily Living Activities	Dependent/Semi-dependent	1.874	0.279	0.354	<b>6.714</b>	2.424-1.325	<b>0.001</b>
	Independent				Reference		
Polypharmacy	Present	1.463	0.433	0.146	<b>3.381</b>	0.612-2.314	<b>0.003</b>
	None				Reference		
Chronic disease	Present	1.064	0.361	0.149	<b>2.950</b>	0.355-1.773	<b>0.004</b>
	None				Reference		
Fall within the last 1 year	Yes	1.488	0.322	0.192	<b>4.628</b>	0.856-2.121	<b>0.001</b>
	No				Reference		
DM	Yes	0.837	0.368	0.092	<b>2.271</b>	0.112-1.561	<b>0.022</b>
	No				Reference		

semi-dependent in terms of IDLA, having a chronic disease, taking multiple medicines, and having experienced a fall within the last year.

The level of frailty varied according to the parameter/scale used and the group with whom the studies were carried out. The level of frailty as investigated in a Cardiovascular Health Study carried out with a population aged 65 y and over in the USA was determined to be 3.9% in the 65–74 age group, 11.6% in the 75–84 age group, and 25.0% in those over 85 y old. In a study involving 10 European countries, the frailty level varied between 5.8% (Switzerland) and 27.0% (Spain), and the average prevalence was found to be 17.0% (8). In a study involving Latin America and the Caribbean, the frailty level was found to be within the range of 30–48% in women and 21–35% in men (2).

The prevalence of frailty in community-based studies was determined to be 17–31% in Brazil, 15% in Mexico, 5–31% in China, and 21–44% in Russia. It

was also found to be 49% of those receiving institutional care in Brazil. Among the hospitalized elderly in India and Vietnam, it was found to be 32% and 32%–35%, respectively. Among the elderly applying to outpatient clinics, it was determined to be 55–71% in Brazil and 28% in Peru (9,10,11).

In a systematic review of studies conducted in our country, the frailty level was found to be 44.5% (12). In the validity study of the Edmonton Frail Scale, 39.2% of the elderly were revealed to be not frail, 24.6%, vulnerable, 13.1%, a mild level of frailty, 10.0%, a moderate level of frailty, and 13.1%, a severe level of frailty (7). The prevalence rate was observed to be higher in studies conducted in Turkey than in other countries, possibly due to the different scales used or the fact that the studies were conducted in more hospitals.

The frailty levels identified in our study are higher than in other studies, which were community-based. The group with whom our study was

carried out consisted of elderly people with a low economic level who received aid from the Social Assistance Foundation. A recent research carried out in Europe revealed that the frailty and fitness levels of a country's elderly people were strongly associated with national economic indicators, and those living in low-income countries were found to have higher frailty and lower fitness levels compared to residents of high-income countries (13).

In our study, the frailty levels of those aged  $\geq 85$  y were found to be higher (odds ratio [OR]: 2,654, confidence interval [CI]: 0.071–0.475). In the literature, fragility has been observed to increase with age in both international and domestic studies (2-12), so much so that the boundaries between age and frailty are seen to be very vague, and the perception that all people will become frail at a certain age has become common. The physiological and pathological changes that occur with age are considered to cause this perception.

Frailty is generally associated with the presence of pathological conditions, such as chronic diseases in older adults (6,13,14). In our study, the risk of frailty was seen to increase in the elderly with chronic diseases (OR: 2,950, CI: 0.355–1.773). Among them, the frailty risk of those who were also at risk of developing diabetes mellitus (DM) was observed to be higher (OR: 2,271, CI: 0.112–1.561). Likewise, in many other studies in the literature, the presence of DM, glucose tolerance, and insulin resistance were found to be associated with frailty, and high glycosylated Hemoglobin A1c has been reported to increase the level of frailty (14,15,16,17).

Multiple medicine use is considered to be a risk for frailty (6,12,14,18,19,20,21). In our study, polypharmacy was found to be another factor that increases the fragility level (OR: 3.381, CI: 0.612–2.314). Older adults, especially those with a chronic illness, use more prescription and over-the-counter compounds than all other demographic groups. The interactions of these drugs with each other can pose significant dangers for the elderly population

(14,18,20). Polypharmacy-induced medicine-medicine and medicine-disease interactions and their side effects are thought to contribute to increased vulnerability. For this reason, when prescribing medicine for the geriatric group, inquiring about the medicines they are currently using and avoiding unnecessary medicine use is of importance.

Falls, which increase with age, constitute a health problem that causes high rates of morbidity and mortality in the elderly, and is factor that increases frailty (14,18,20,21,22). In our study, falling was identified as an important risk factor for frailty (OR: 4.628, CI: 0.856–2.121). The measures to be taken against falls, such as physical activity and indoor and outdoor arrangements, are also likely to be highly effective in preventing frailty.

Similar to the literature (6,9,21), in our study, frailty was found to be 6.7 times more common in the elderly who are fully or semi-dependent in terms of IDLA compared to those who were independent (OR: 6.714, CI: 2.424–1.325). A systematic review drawing on community-based studies conducted abroad determined that frailty indicators are precursors of future ADL/IDLA disability in older people (23). Since the IDLA status is inquired in the "functional independence" section of the Edmonton Frail Scale, the frailty-IDLA dependence status seems to be intertwined. Just as every intervention to ensure independence will reduce frailty, every intervention to prevent frailty will prevent the elderly from transitioning to dependence.

In conclusion, the frailty level was found to be high in the group with whom our study was conducted in our province. This suggests that our elderly residents are more vulnerable to stress factors, and their dependency and comorbidity levels are higher.

Taking into consideration that frailty is a preventable and reversible condition, unlike aging, as the rate of the elderly population has been increasing rapidly, planning trainings to aid in the recognition of frailty, especially as a part of preventive medicine,



determining and monitoring the frailty level, and planning the necessary interventions are thought to contribute significantly to the active aging process. Providing preventive services during primary care will enable the prevention of many negative situations, such as the need for and cost of care and caregiver burden.

**Limitations:** The weakness of the study is that it was conducted in a specific group that received

help from the social assistance foundation. Therefore the results cannot be generalized to society.

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## RESEARCH

# CHRONIC PAIN MANAGEMENT IN GERIATRIC PATIENTS: ANALYSIS OF AN ALGOLOGY CLINIC'S DATA

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## ABSTRACT

**Introduction:** The aim of this study is to examine whether the number of admissions to an algology outpatient clinic , the cause of pain and application of interventional procedures of pain change with advanced age.

**Materials and Method:** Data of patients who admitted to Algology Outpatient Clinic between 1 January and 31 December 2019 were retrospectively evaluated. Patients were divided into two groups: patients being <65-year-old (Group I) and ≥65-year-old (Group II). The comparative statistical analyses were performed between the groups.

**Results:** 5559(60.4%) patients were <65 years old (group I) and 3635(39.5%) patients were ≥65 years old (group II). The rate of myofascial pain ( $p<0.001$ ), spinal pain ( $p= 0.020$ ), headache ( $p<0.001$ ), dorsal/chest pain ( $p= 0.042$ ) and pelvic pain ( $p<0.001$ ) were considerably higher in group I. The rate of joint pain ( $p<0.001$ ) was higher in group II. The rate of combined drug therapy and intervention among group II (58.8%) was higher than group I (51.7%) ( $p<0.001$ ). Trigger point injection was the most common interventional procedure in both groups.

**Conclusion:** Fewer elderly patients than younger adult patients are applying to the Algology Outpatient Clinic. In the elderly, joint-related pain in particular is much more common than in young adults. In the treatment of chronic pain, interventional methods added to pharmacological treatment are more common in elderly patients than young adults.

**Keywords:** Pain; Aged; Diagnosis.

## INTRODUCTION

Chronic pain management consists of a multidisciplinary approach that can include pharmacological therapy, physical therapy, interventional procedures, and surgery (1). It is important to establish treatment with the awareness that there are age-related pharmacokinetic changes in the elderly: with aging, all pharmacokinetic phases of drugs related to metabolism, absorption, elimination, and distribution volumes may be affected. Furthermore, with advanced age, the risk of adverse drug reactions increases due to the narrow therapeutic index of most drugs (2).

Interventional methods applied in pain clinics provide advantages in many ways in elderly patients who do not benefit from pharmacological treatments or cannot continue treatment due to side effects. Interventional methods can reduce the need for surgery, the risk of complications is less than surgeries and since they are administered with mild sedation, patients can be discharged on the same day (3).

In studies investigating the profile of patients diagnosed and treated in pain clinics, the cause of pain and the treatments applied were frequently compared, but comparisons related to age were limited. Defining pain, determining its cause, and planning its management can be more difficult in elderly patients than young adults. Neuromuscular and cognitive disorders, which are also more common in the elderly, can complicate communication and identifying the cause of pain (4). Furthermore, many elderly people or caregivers thereof do not report their pain because they think it is a natural consequence of aging (5).

Chronic pain is one of the most common health problems in elderly people (> 65 years), causing disability by impairing mood, sleep, cognition, and daily living activities. In the elderly, age-related physiological changes and the presence of systemic diseases that predispose to pain pose a risk for chronic pain and its treatment (6). With the elderly population increasing rapidly throughout the world,

pain management in the elderly is gaining importance. Therefore, gathering data on possible pain treatments for the elderly is important.

The aim of this study is to examine whether the number of admissions to an algology outpatient clinic, the cause of pain and application of interventional procedures of pain change with advanced age. The results of the study can identify the services provided by pain specialists to the elderly and enable them to be developed further. It may raise awareness among the elderly, their caregivers and physicians so that the elderly can benefit more from pain clinics in the treatment of chronic pain.

## MATERIAL AND METHODS

### Ethical approval

Ethical approval of the current study was obtained from the Clinical Research Ethics Committee of the University of Health Sciences, Dışkapı Yıldırım Beyazıt Training and Research Hospital, on 28.06.2021 (Approval Number: 114/01). The Helsinki Declaration criteria were taken into consideration in the conduct of the study.

### Study population

The clinical and demographic data of 9194 patients who admitted to Algology Outpatient Clinic between 1 January and 31 December 2019 were retrospectively evaluated. To access these data, with the Origo HBYS program used by the hospital's information processing unit on selected dates, the records of all patients who applied to the Algology Outpatient Clinic were accessed. With this computer transcript, the files of the patients who applied to Algology Outpatient Clinic were accessed. The data of the patients whose files could be accessed and whose records were available were evaluated.

According to the data obtained the patients were divided into two groups: patients being <65-year-old (Group I) and ≥65-year-old (Group II). Among them, only those who received drug therapy



(non-steroidal anti-inflammatories, opioids and adjuvant analgesics) and those who underwent interventional procedures (trigger point injection, genicular, suprascapular, femoral, and obturator nerve block/ RF, facet medial nerve block/ RF, intra-articular injection, epidural steroid injection, transforaminal epidural steroid injection/dorsal root ganglion RF, occipital and trigeminal nerve block/RF, intercostal nerve block and erector spina plane block/ RF, gasser and sphenopalatine ganglion block/RF, ilioinguinal, iliohypogastric, genitofemoral, pudendal, and impar ganglion block/RF, epiduroscopy, stellate and lumbar sympathetic ganglion block/ RF, epidural port catheter, spinal cord stimulation, splanchnic ganglion block/RF) in addition to drug therapy were determined.

In addition, the types of interventional procedures and the causes of pain (myofascial pain, spinal pain, joint pain, headache, dorsal/chest pain, pelvic pain, ischemic pain, abdominal pain) in patients who underwent interventional procedures were determined. The comparative statistical analyses were performed between the groups and genders.

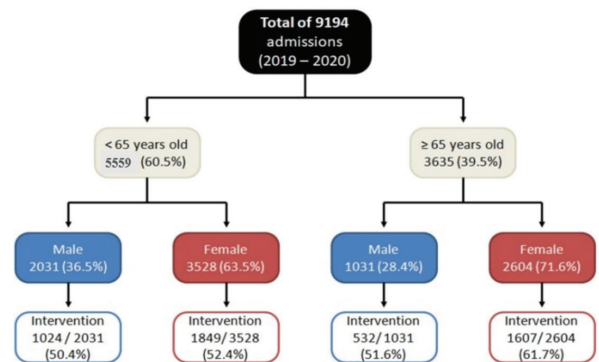
### Statistical Analysis

The Statistical Package for Social Sciences version 2015 (SPSS Inc, USA) was used for statistical analysis. The graphics were created using Microsoft Excel 2007 (Microsoft Inc, USA). Along with the Kolmogorov-Smirnov normality test ( $p < 0.001$ ), the visual inspection of histograms, normal Q-Q plots, and box plots showed that the variable "age" did not reveal normal distribution, thus it was presented as median (minimum – maximum) value. The comparisons of qualitative variable between two groups were performed using Mann-Whitney U test. The quantitative variables were presented as frequency and percent, and Pearson chi-square test or Fischer's exact test was used to make comparison between two groups. A p value of  $< 0.05$  was considered as significant.

## RESULTS

Among 9194 patients admitted to our Algology Outpatient Clinic the median age of the study population was 62 years (17 – 103 years). 5559 (60.5%) patients were  $< 65$  years old and 3635 (39.5%) patients were  $\geq 65$  years old. The rate of females were significantly higher in both age groups [Pearson: 66.081,  $p < 0.001$ ]; 6132 (66,9%) patients were female and 3062 (33.3%) patients were male (Figure 1).

**Figure 1.** The distribution of the patients who admitted to Algology Outpatient Clinic in 2019.

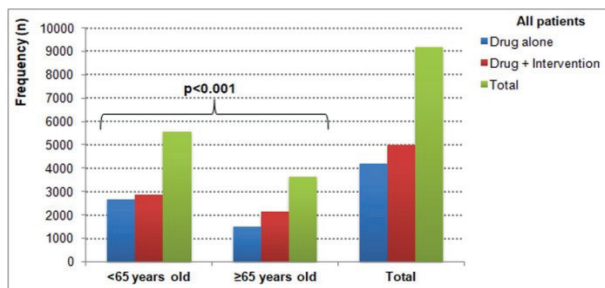


While all these patients were given medication for relief of pain, 5012 patients received one kind of intervention in addition to drug therapy. As revealed in Figure 2, the rate of combined drug therapy and intervention among the patients  $\geq 65$  years old was higher than that of the patients less than 65 years old [58.8% versus 51.7%, Pearson: 45.47,  $p < 0.001$ ].

Myofascial pain syndrome [ $n = 1965$  (39.2%)] was the most common diagnosis of 5012 patients received one kind of intervention in addition to drug therapy, which was followed by spinal pain [ $n = 1367$  (27.3%)] and joint pain [ $n = 1328$  (26.5%)], respectively. As for the diagnosis, the rate of myofascial pain syndrome ( $p < 0.001$ ), spinal pain ( $p = 0.020$ ), headache ( $p < 0.001$ ), dorsal/chest pain ( $p = 0.042$ ), and pelvic pain ( $p < 0.001$ ) were considerably higher in group I. In contrary, the rate of joint pain ( $p < 0.001$ )

was significantly higher in group II. Ischemic ( $p=0.529$ ) and abdominal pain ( $p=0.741$ ) did not reveal significant difference between the groups (Table 1).

**Figure 2.** The distribution of drug therapy alone and combined drug therapy and intervention in all patients admitted to Algology Outpatient Clinic



The distribution of the interventions applied was presented in Table 2. The rate of trigger point injection ( $p<0.001$ ), transforaminal epidural steroid injection or dorsal root ganglion radiofrequency (RF) ( $p=0.001$ ), occipital and trigeminal nerve block with RF ( $p<0.001$ ), intercostal block or erector spinal plane block ( $p=0.042$ ), Gasser and sphenopalatin ganglion block with RF ( $p=0.001$ ), and ilioinguinal, iliohypogastric, genitofemoral, pudental, impar ganglion block with RF ( $p<0.001$ ) were significantly higher in group I. However, only genicular, suprascapular, femoral, obturator nerve block with RF ( $p<0.001$ ) was significantly higher in group II.

## DISCUSSION

It has been reported that more than 50% of the elderly population experiences chronic pain. Of these, 70% complain of pain in more than one region, and

**Table 1.** The demographic and clinical characteristics of 5012 patients received one kind of intervention in addition to drug therapy.

Variable	All patients (n=5012)	Group I (<65 years old) (n=2873)	Group II (≥65 years old) (n=2139)	p value
<b>Gender</b>				
Male	1556 (31%)	1024 (35.6%)	532 (34.9%)	<b>&lt;0.001<sup>a</sup></b>
Female	3456 (69%)	1849 (64.4%)	1607 (75.1%)	
<b>Diagnosis</b>				
Myofascial pain syndrome	1965 (39.2%)	1206 (42%)	759 (35.5%)	<b>&lt;0.001<sup>a</sup></b>
Spinal pain	1367 (27.3%)	820 (28.5%)	547 (25.6%)	<b>0.020<sup>a</sup></b>
Joint pain	1328 (26.5%)	587 (20.4%)	741 (34.6%)	<b>&lt;0.001<sup>a</sup></b>
Headache	179 (3.6%)	142 (4.9%)	37 (1.7%)	<b>&lt;0.001<sup>a</sup></b>
Dorsal/Chest pain	127 (2.5%)	84 (2.9%)	43 (2.0%)	<b>0.042<sup>a</sup></b>
Pelvic pain	19 (0.4%)	19 (0.7%)	0 (0%)	<b>&lt;0.001<sup>b</sup></b>
Ischemic pain	18 (0.4%)	9 (0.3%)	9 (0.4%)	<b>0.529<sup>a</sup></b>
Abdominal pain	9 (0.2)	6 (0.2%)	3 (0.1%)	<b>0.741<sup>b</sup></b>

Note that \* indicates median (minimum – maximum) values. The p values written in bold represent statistical significance. <sup>a</sup> indicates Pearson chi-square test. <sup>b</sup> indicates Fischer's exact test.





**Table 2.** The distribution of the interventions applied in overall and between the groups.

Variable	All patients (n=5012)	Group I (<65 years old) (n=2873)	Group II (≥65 years old) (n=2139)	p value
Trigger point injection	1965 (39.2%)	1206 (42%)	759 (35.5%)	<0.001 <sup>a</sup>
Genicular, suprascapular, femoral, and obturator nerve block/ RF	806 (16.1%)	301 (10.5%)	505 (23.6%)	<0.001 <sup>a</sup>
Facet medial nerve block/ RF	695 (13.9%)	397 (13.8%)	298 (13.9%)	0.908 <sup>a</sup>
Intra-articular injection	522 (10.4%)	286 (10%)	236 (11%)	0.216 <sup>a</sup>
Epidural steroid injection	395 (7.9%)	237 (8.2%)	158 (7.4%)	0.262 <sup>a</sup>
Transforaminal epidural steroid injection/dorsal root ganglion RF	251 (5%)	169 (5.9%)	82 (3.8%)	0.001 <sup>a</sup>
Occipital and trigeminal nerve block/RF	152 (3%)	118 (4.1%)	34 (1.6%)	<0.001 <sup>a</sup>
Intercostal nerve block and erector spina plane block/RF	127 (2.5%)	84 (2.9%)	43 (2.0%)	0.042 <sup>a</sup>
Gasser and sphenopalatine ganglion block/RF	27 (0.5%)	24 (0.8%)	3 (0.1%)	0.001 <sup>b</sup>
Ilioinguinal, iliohypogastric, genitofemoral, pudendal, and impar ganglion block/RF	19 (0.4%)	19 (0.7%)	0 (0%)	<0.001 <sup>b</sup>
Epiduroscopy	22 (0.4%)	14 (0.5%)	8 (0.4%)	0.548 <sup>a</sup>
Stellate and lomber sympathetic ganglion block/RF	18 (0.4%)	9 (0.3%)	9 (0.4%)	0.529 <sup>a</sup>
Epidural port catheter	6 (0.1%)	4 (0.1%)	2 (0.1%)	1.0 <sup>b</sup>
Spinal cord stimulation	4 (0.1%)	3 (0.1%)	1 (0.05%)	0.641 <sup>b</sup>
Splanchnic ganglion block/RF	3 (0.1%)	2 (0.1%)	1 (0.05%)	1.0 <sup>b</sup>

Abbreviations: RF: radiofrequency. The p values written in bold represent statistical significance. <sup>b</sup> indicates Pearson chi-square test. <sup>c</sup> indicates Fischer's exact test.

85% have a chronic disease accompanied by pain; age-related falls and other health problems further increase the risk of pain (7). In this study, patients over 65 years of age constituted only 39.5% of the patients who applied to the Algology Clinic. The rate of admission due to pain decreased with advanced age, which may be due to the inadequate referral of elderly patients, who are often overly dependent on their relatives and caregivers, to the clinic.

In studies evaluating patients who applied to the Algology Clinic in Turkey, the number of women was reported to be higher than the number of men (8,9). Furthermore, a study in which only elderly patients

were evaluated showed that incidence of pain was reported to be higher in women than in men (10). In this study, the number of women (66.9%) who applied to the Algology Outpatient Clinic was higher than the number of men in both groups. Studies showing that women have a lower pain threshold, higher pain intensity, and less pain tolerance than men support these results (11,12). In addition, women may be able to express pain more easily, while men may have difficulties expressing pain.

Pharmacokinetic changes, such as decreased drug absorption; variability in volume of distribution due to drug lipophilicity; increased therapeutic response to protein-bound drugs due to hypoalbuminemia

minemia; and decreased renal elimination and hepatic metabolism, are often seen in elderly patients (13). In addition, drug interactions during the use of analgesic drugs are more common in elderly patients due to additional drugs being used for systemic diseases (14). Multimodal treatment is often required in the treatment of chronic pain. For this, drugs with various mechanisms of action that create a synergistic effect are used together. However, multimodal treatment is more difficult to apply in the elderly than young adults because of side effects related to polypharmacy (15). Therefore, with regard the pharmacological aspect of chronic pain treatment of the elderly, additional non-drug treatments are required, one of which is interventional procedures.

Rather than the treatment of the underlying pathology, the aim of interventional pain treatment is to prevent the transmission or perception of pain signals. It is less invasive than surgery, has lower risk of complications, and does not require a long hospital stay. Moreover, the risk of serious complications in these treatments, which are applied under the guidance of fluoroscopy and ultrasonography, can be minimized (16). Patients who may benefit from interventional procedures are those who do not have a strong indication for surgery, who are unsuitable surgical candidates due to age or medical comorbidities, or who cannot tolerate oral pain medications at doses necessary to control their symptoms (17), which includes most elderly patients with chronic pain. In this study, the rate of interventional procedures combined with drug therapy was higher in patients over 65 years of age (58.8%) than patients under 65 years of age (51.7%).

Myofascial pain syndrome was the most common reason for application of interventional procedure for both elderly and young adult patients in this study, and trigger point injection was the most common procedure. Both exercise and trigger point injection are recommended in the treatment of myofascial pain (18). Nonsteroidal anti-inflamma-

tory drugs (NSAIDs) may increase the risk of heart failure symptoms (19) and cause prothrombotic activity in patients who are at risk for major vascular events (20). Therefore, NSAIDs should be used with caution in elderly patients, for whom cardiac and renal diseases are more common.

Myofascial pain syndrome was the most common reason for application of interventional procedure for both elderly and young adult patients in this study, and trigger point injection was the most common procedure. In this study, the number of elderly patients who applied to the Algology Out-patient Clinic with the complaint of joint pain and underwent interventional procedure was found to be higher than that of young adults. In our clinic, the first choice for interventional treatment of joint pain is usually intra-articular injection; in patients who do not respond to this, a combined radiofrequency ablation (RFA) therapy with nerve blocks (genicular nerve for knee; suprascapular nerve for shoulder; femoral and obturator nerves for hip) associated with the pain sensation of the joint is applied. In this study there was no difference in the frequency of intra-articular injection between patients over 65 years of age and under 65 years of age (51.7%); however, genicular, suprascapular, femoral, and obturator nerve block/RFA was more common in patients over 65 years of age than in under 65 years of age. This result shows that elderly patients need more advanced interventional procedures for the treatment of joint pain compared to young adults.

There are studies suggesting that the prevalence of chronic low back pain (LBP), which is the most common cause of spinal pain, gradually increases from young adulthood to age 60 then declines (21). However, some studies have revealed that LBP is common among older adults (22). In this study, interventional procedures applied for spinal pain causing low back and neck pain in patients under 65 years of age were found to be more than patients over 65 years of age. Transforaminal epidural steroid injection/dorsal root ganglion radiofrequency



(RF), which is applied in the treatment of radicular pain of the low back and neck, was observed to be applied more frequently in young adult than elderly patients. This may be because disc herniation, which causes radicular pain, is more common in young adults. It is known that degenerative spine-related pain (facet syndrome and spinal stenosis) mostly affects the elderly population. However, there was no significant difference between the groups in terms of application of facet medial nerve block/RF and epidural steroid injection.

Primary headaches peak around the age of 40, and their frequency decreases with age. However, although primary headaches (tension-type headache, migraine, hypnic headache) are more common than secondary headaches in the elderly, the incidence of secondary headaches increases with advanced age. In this study and in line with the literature, rates of headache-related pain, occipital nerve, trigeminal nerve, gasser ganglion, and sphenopalatine ganglion block/RF application were higher in patients under 65 years of age than patients over 65 years of age. A change in chronic-headache pattern or new-onset headache in advanced age is suggestive of a secondary headache (subarachnoid or intracranial hemorrhage; temporal or giant cell arteritis; central nervous system tumors) in elderly individuals and requires further investigation (23). Pharmacological therapy is the cornerstone of headache management (24). Interventional pain methods are frequently used with elderly patients who are resistant to pharmacological treatments or who cannot tolerate pharmacological treatment

due to comorbidities (25). These techniques include occipital nerve block, sphenopalatine ganglion block/RF, and gasser ganglion block/RF (26). There are many studies suggesting that these methods are both effective and lasting (27).

In this study, the data of patients who applied to the Algology outpatient clinic were examined retrospectively between 1 January and 31 December 2019 before the COVID-19 pandemic. Thus, it contains the most up-to-date data that can be obtained before the pandemic. In this study; the number of applications to the algology outpatient clinic, the number of drugs and interventional procedures, and the cause of pain in those who underwent interventional procedures were compared between the elderly and young adults. However, the cause of pain in those receiving only drug therapy was not evaluated so this is the limitation of this study.

## CONCLUSIONS

Fewer elderly patients than younger adult patients are applying to the Algology Outpatient Clinic. Myofascial pain is the most common reason that both elderly and young adult patients apply to the Algology Outpatient Clinic. In the elderly, joint-related pain in particular is much more common than in young adults. In the treatment of chronic pain, interventional methods added to pharmacological treatment are more common in elderly patients than young adults. For this reason, it would be beneficial to develop and expand non-drug treatment practices for chronic pain in elderly patients.

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## RESEARCH

# ATTITUDES ON AGEISM AMONG FIRST- AND SIXTH-YEAR MEDICAL STUDENTS AND RELATED FACTORS

## ABSTRACT

**Introduction:** This study's aim was to investigate the attitudes of first- and sixth-year medical students on ageism and related factors, and to examine their willingness to work with older patients in their professional lives.

**Materials and Method:** In this cross-sectional study, the target population comprised 637 students, 352 of whom were first-year and 285 were sixth-year medical students, studying at Akdeniz University Faculty of Medicine in the 2018–2019 academic year. The dependent variable was their attitudes on ageism. The Ageism Attitude Scale was used to assess the students' attitudes. The Mann-Whitney U test, Kruskal-Wallis, Spearman correlation, and multiple regression analyses were used for data evaluation.

**Results:** At total of 524 students were included (access rate 82.3%), 53.8% were first-year students. The mean Ageism Attitude Scale score was  $84.1 \pm 8.9$  (33–107). Forty-six percent of the study group stated that they would rather not work with older patients. In Agesim Attitude Scale scoring, the determinants of a positive attitude are: *being a female, having good/very good communication with grandparents, desire to live with parents when their parents are very old, and desire to work with elderly patients in their professional life.*

**Conclusion:** The attitudes of medical students toward older patients were generally positive but their reluctance to work with them in their professional life was high, a determinant of having a negative attitude. From the first year of education, the curriculum and social activities should support increased communication with healthy older people to raise awareness about ageism.

**Keywords:** Ageism; Attitude; Medical Students.



## INTRODUCTION

Ageism is a concept focusing on the negative aspects of being older or the phenomena of aging and is manifested with stigma, prejudice, and discrimination against people due to their age (1,2). Accordingly, old age is accepted as a period of inevitable decline and dependency in physical and mental capacity. In societies where ageism is common, individuals develop negative attitudes toward themselves over time and are affected by their negative consequences (1,3,4).

Ageism can be encountered in many areas, such as family, work, social life, and health, and it negatively affects older people in terms of benefitting from resources/services (3,5). Studies show that ageism has negative effects on people's physical and mental health (1,2,5,6).

The older population is increasing worldwide. The increase in the population aged 80 years and above, which is expressed as the phenomenon of "the aging of aging," indicates that older people will constitute a significant part of the group receiving healthcare services, and the problem of ageism will become more important (7). Ageism affects the clinical practice and decisions of health service providers and creates an obstacle for healthcare. Studies have reported that ageism can be observed in screening, diagnosis, and treatment processes (8). Therefore, it is important to examine the attitudes of healthcare providers toward older patients. There are many studies in the literature using different scales to investigate ageist attitudes mostly among nursing students, health sciences, and physicians (4,7,9–11). However, the number is limited of studies investigating the attitudes of medical students toward older people at different stages of their education and their desire to care for them in their future professional lives (12–16).

Studies have shown that the ageist attitudes of medical students and physicians are "complex and mixed"—they have both negative and positive stereotypes about older people (8,9). Although vari-

ables such as gender, age, education, knowledge about aging, exposure to older people, and previous positive relationships with them are the determinants of their attitudes toward older patients/geriatrics and their interest in working with them, previous studies in the literature have observed that the results are mixed and even contradictory (11). The issue of gender, especially in medicine, is a subject that has been emphasized especially in recent years, and it affects both attitudes and career choice. After graduating of faculty, medical students continue to enter specialties that are traditionally associated with males and females (17). A study conducted in Turkey also shows that career choices of physicians are affected by gender roles. Females tend to specialize in medical departments with regular working hours, no shifts, no barriers to their academic progress, and where they will not be excluded (18). In fact, it is the society's value system, which also determines the gender roles that are effective in the career choice and attitudes of medical students. It is important to evaluate the general motivations of the medical student for choosing the medical profession and the value systems that make up their perspective on life. According to the results of the study in which Rokeach Value Survey was used, medical students prefer the terminal values of "health", "love" and a "happy family life", i.e. concrete values and values of communication, which reflects the content of their profession, aimed at helping and interacting with other people (19). In an other study that evaluated the personal values of medical students with Schwartz's Portrait Values Questionnaire; the three most important personal values were "benevolence", "self-direction", and "universalism". "Benevolence" and "universalism" correlated positively with both the emotional and cognitive dimensions of empathy (20). Thus, supporting the self-transcending personal values (universalism and benevolence) of the medical student is important in terms of professional values such as a positive attitude towards the elderly.

Negative attitudes of medical students, society's future physicians, toward old age will disrupt communication with older patients and negatively affect health service delivery. Accordingly, it is important to take steps to assess the attitudes of physician candidates toward older people and improve them, if needed. This study aimed to determine the attitudes of first- and sixth-year medical students toward ageism, the factors influencing their attitudes, and their willingness to work with older patients in their professional lives.

## MATERIALS AND METHODS

This study is a cross-sectional research conducted in Akdeniz University Faculty of Medicine. This faculty was established in 1973 in Antalya, in the south of Turkey, and is among the first accredited medical faculties. In the faculty, which has 354 faculty members, hybrid system (integrated and problem-based learning) and classical methods as well as interactive/active education techniques (special study modules, social support projects, etc.) are applied. There are 2162 students from every region of Turkey. The percentage share of the accepted students in general is 0.4 (21).

The study population consisted of 637 students, 352 of whom were first-year medical students (MS1) and 285 were sixth-year medical students (MS6), studying at Faculty of Medicine in the 2018–2019 academic year. Since we aimed to reach the whole population, we did not select a sample. By the end of the study 524 students had been reached (access rate: 82.3%; 80.1% for MS1, 84.9% for MS6). Data were collected with questionnaire by supervision in February 2019.

The dependent variable of the study was the attitudes of students toward ageism. The Ageism Attitude Scale (AAS) was used to assess the students' attitudes. The AAS was developed by Vefikuluçay in Turkey, and its validity and reliability have been established. The Cronbach's alpha reliability coef-

ficient of the scale reported by the original author was 0.80 (22). In our study, it was found to be 0.79.

The AAS consists of 23 items. There are positive and negative attitude statements on the scale. The positive attitude statements are scored as follows: 5=*completely agree*, 4=*agree*, 3=*unsure*, 2=*disagree*, and 1=*absolutely disagree*. The negative attitude statements are scored in the opposite direction. The lowest and highest overall scores were 23 and 115, respectively. Higher scores indicate more positive attitudes (22).

The AAS consists of three subdimensions: (i) restricting the life of the elderly, (ii) positive ageism, and (iii) negative ageism. Restricting the life of the elderly refers to beliefs and attitudes that would limit the social lives of the elderly (min 9–max 45). Positive ageism involves holding positive beliefs and attitudes towards the elderly (min 8–max 40). Negative ageism encompasses the negative beliefs and attitudes of society toward the elderly (min 6–max 30) (22).

The independent variables were age, gender, year of medical school, family type, sibling presence, education level of mother/father, income perception, residence and region lived in longest, joining in student clubs, living in the same house or city with grandparents, perception of communication with grandparents, presence of elderly relatives in need of care, presence of relatives staying in nursing homes, having visited a nursing home, desire to live with their parents when their parents are very old, desire to live with their children in their own very old age, desire to work with elderly patients in their professional life, the state of knowledge on the concept of ageism, and desire to receive training on ageism.

## Ethical Considerations

This study was approved by the Clinical Research Ethics Committee of the Akdeniz University (2019/126) and was conducted in full compliance with the principles of the Declaration of Helsinki.





Prior to the study, participants were fully informed about the objectives of the study and the anonymity of their data and gave their informed consent.

### Statistical Analysis

Data were evaluated using IBM SPSS v. 23.0 software. Descriptive data are presented as frequencies, percentages, means, standard deviations, median, and minimum to maximum values.

Assessing normal distribution of the data was performed by the Kolmogorov-Smirnov test and skewness/kurtosis values. Since the distribution was not normal, the Mann-Whitney U test was used to compare two groups, and the Kruskal-Wallis analysis was used to compare three or more groups. Spearman's correlation was used to explore correlations between age and AAS scores. Multiple regression models were used to determine the independent predictors of AAS scores. The models were applied with the backward elimination method. In addition to the variables found to be significant in bivariate analysis, the year (MS1 or MS6) was added to the model.

The level of significance for statistical tests was established as  $p < 0.05$ . When significance was found in the Kruskal-Wallis test, the Bonferroni-corrected Mann-Whitney U test was used as a post hoc test.

## RESULTS

In the research group, 53.8% were first-year students, 91.2% had siblings, 45.6% joined student clubs throughout their education life, 44.1% had visited a nursing home at least once, and 2.1% of them had relatives staying in a nursing home. Other descriptive data for the study group are presented in Table 1.

Only 24.0% of the study group stated that they knew the concept of ageism. The most frequently cited source of information was the internet (63.5%), followed by television (19.0%), and newspapers/magazines (15.9%).

The mean AAS total score was found to be  $84.1 \pm 8.9$ . Overall distribution, distribution in subdimensions, and item scores are presented in Table 2.

In the study group, 46.0% stated that they would prefer not to work with elderly patients if given the choice. The two most common reasons were communication problems (42.3%) and the elderly being a difficult patient group due to comorbidities (30.3%). In MS1, 43.6% did not want to work with the elderly; 48.8% of MS6 students gave this response. The difference was not statistically significant ( $p = 0.239$ ).

Independent variables and AAS scores were compared with bivariate analyses. Results with significant differences are shown in Table 3.

Although the overall AAS score of the MS6 group was slightly higher than that of MS1, the difference was not significant ( $84.3 \pm 8.9$  and  $83.9 \pm 9.0$ , respectively;  $p = 0.598$ ). Similar findings were observed for subdimension scores ( $p > 0.05$ ).

No significant correlation with AAS scores was found regarding age, family type, income perception, presence of relatives living in a nursing home, having visited a nursing home, the region lived in longest, and knowing the concept of ageism ( $p > 0.05$ ).

While 74.2% of the study group expressed that they would wish to live with their parents when their parents were very old, only 39.3% stated that they would wish to live with their children in their own very old age. Of those who stated that they would like to live with their parents when their parents are very old, 48.8% stated that they would not wish to live with their children in their own very old age. This difference was statistically significant (Table 4).

A multiple regression analysis was performed for AAS overall and subdimension scores. The results are presented in Table 5. In the AAS overall score, *being a female, having good/very good communication with grandparents, desire to live with parents when their parents are very old, and desire to work*

**Table 1.** Sociodemographic characteristics of participants.

Characteristics	n (524)	Mean ± SD <sup>a</sup> (Min–Max) or %
Age (years)	524	21.4 ± 3.0 (18–30)
Year of medical school		
First	282	53.8
Last	242	46.2
Gender		
Female	245	46.8
Male	279	53.2
Family type		
Nuclear	459	87.6
Extended	65	12.4
Education status of mother		
Illiterate/literate	38	7.3
Primary/secondary school (4–11 years)	171	32.6
High school (12 years)	131	25.0
University/postgraduate (>12 years)	184	35.1
Education status of father		
Illiterate/literate	12	2.3
Primary/secondary school (4–11 years)	119	22.7
High school (12 years)	112	21.4
University/postgraduate (>12 years)	281	53.6
Household income perception		
Income greater than expenses	164	31.3
Income equal to expenses	302	57.6
Income less than expenses	58	11.1
Residence where the students lived the longest		
Province/metropolitan	327	62.4
District	157	30.0
Town/village	40	7.6
Region where the students lived the longest <sup>b</sup>		
Mediterranean	225	43.3
Aegean	78	15.0
Eastern/Southeastern Anatolia	71	13.7
Central Anatolia	57	11.0
Marmara	56	10.8
Black Sea	33	6.3

<sup>a</sup> Standard Deviation; <sup>b</sup>n=520 (4 had lived abroad longest)



**Table 2.** Distribution according to Ageism Attitude Scale (AAS) items, subdimensions, and overall scores (n=524).

Number and Item	Completely disagree	Disagree	Unsure	Agree	Absolutely agree	Transformed
	%	%	%	%	%	Mean ± SD <sup>a</sup>
1. Life of elders should be limited to their houses.	55.3	33.2	6.5	3.2	1.7	4.4 ± 0.9
5. External appearance of elders is repulsive.	50.8	36.5	9.0	1.9	1.9	4.3 ± 0.9
12. It is unnecessary for elders to buy a house, car, items, clothes.	39.3	46.9	8.4	3.2	2.1	4.2 ± 0.9
14. Elders who lose their spouses should not get remarried.	23.1	42.7	25.4	6.5	2.3	3.8 ± 1.0
17. Elders should be put into nursing homes.	28.1	42.9	22.1	5.0	1.9	3.9 ± 0.9
19. In hospitals, priority should be given to young people rather than elders.	30.0	51.5	13.9	2.7	1.9	4.0 ± 0.8
21. In jobs, elders should be paid less than young people.	29.8	48.3	14.9	5.5	1.5	4.0 ± 0.9
22. Elders cannot carry bags and packages without help.	12.8	40.1	35.7	10.9	0.6	3.5 ± 0.9
23. Care of elders should not be seen as an economic burden by family members.	2.3	5.7	6.9	52.1	33.0	4.1 ± 0.9
<b>Restricting life of the elderly; Mean ± SD<sup>a</sup> (Min–Max)</b>	<b>36.2 ± 4.4 (16–45)</b>					
2. Elders are more patient than young people.	10.3	30.3	26.7	28.4	4.2	2.9 ± 1.1
4. Priority should be given to elders in places where waiting in line is required.	3.1	5.3	13.9	52.7	25.0	3.9 ± 0.9
6. Young people should benefit from the experience of elders.	1.5	3.4	12.6	56.1	26.3	4.0 ± 0.8
7. Elders should be cared for by the family members with whom they live.	0.8	1.3	2.7	49.0	46.2	4.4 ± 0.7
8. Elders are affectionate.	2.1	5.7	39.3	39.3	13.0	3.6 ± 0.9
9. When decisions are made in the family, opinions of elders should be taken into consideration.	1.3	4.2	16.2	61.6	16.6	3.9 ± 0.8
13. Elders are more tolerant than young people.	6.8	20.8	41.2	27.5	4.2	3.0 ± 1.0
20. In family budgeting, the opinions of elders should be taken into account.	2.7	8.0	20.6	59.0	9.7	3.7 ± 0.9

<b>Positive ageism; Mean ± SD<sup>a</sup> (Min–Max)</b>	<b>29.3 ± 4.2 (8–39)</b>					
3. Elders get ill all the time.	5.5	32.6	29.8	29.0	3.1	3.1 ± 1.0
10. The basic responsibility of elders is to help their children with tasks, such as house and kitchen work and care of their grandchildren.	16.0	48.3	22.3	10.3	3.1	3.6 ± 1.0
11. When hiring for a job, young people should be preferred instead of elders.	2.5	19.3	34.7	31.9	11.6	2.7 ± 1.0
15. Elders cannot adapt to changes like young people.	3.4	17.6	25.4	44.7	9.0	2.6 ± 1.0
16. In promoting individuals at work, priority should be given to young people.	6.7	21.4	33.2	31.5	7.3	2.9 ± 1.0
18. Elders should not go out-side on their own.	16.0	45.2	27.3	9.0	2.5	3.6 ± 0.9
<b>Negative ageism; Mean ± SD<sup>a</sup> (Min–Max)</b>	<b>18.6 ± 3.3 (6–28)</b>					
<b>AAS overall score; Mean ± SD<sup>a</sup> (Min–Max)</b>	<b>84.1 ± 8.9 (33–107)</b>					

<sup>a</sup> Standard Deviation

with elderly patients in their professional life are determinants of positive attitudes towards the elderly.

## DISCUSSION

This study aimed to investigate the attitudes of medical students toward the elderly and their intention to work with them in their professional careers. The participants held generally positive attitudes. This result was found to be similar to other studies conducted in our country (15,16,22). It can be surmised that the traditions in Turkish society, which include cultural respect for the elderly, are influential on this point. However, it was observed that some attitude statements yielded low scores. Two of the four items scoring less than three are related to working life. It is important to raise the awareness of medical students about the manifestations of ageism in the workplace. We think that future physicians should develop the view that the elderly can find a place in working life as long as they desire.

Nearly half of the students (46.0%) stated that they would not want to work with elderly patients. Although the difference was not significant, the “not want to work with the elderly” was higher among the MS6. According to two studies conducted in our country, in the first one 39.2% of the medical students stated that they would not want to work in a unit providing care for elderly (16), and in the second 40.2% of the students stated that they were not willing/undecided to serve elderly individuals (15). In a study in China, 51.7% of medical students do not consider pursuing a career in geriatric medicine after graduation (12). Voogt et al. (23) found that 44.7% of MS1 students had no interest in geriatric medicine. Hughes et al. (13) found that 19% of MS1 students were willing to pursue a geriatric career. In a study conducted in Poland, 61.5% of nursing students stated that they would like to work with the elderly in the future, while the rate was 36% in medical students (4). Both the literature and the results of our study show a reluctance of medical students to



**Table 3.** Distribution of Ageism Attitude Scale (AAS) by subdimension and overall scores for certain variables (n=524).

Variables	Restricting the elderly		Positive ageism		Negative ageism		AAS overall score	
	Mean $\pm$ SD <sup>a</sup>	Median (Min-Max)	Mean $\pm$ SD <sup>a</sup>	Median (Min-Max)	Mean $\pm$ SD <sup>a</sup>	Median (Min-Max)	Mean $\pm$ SD <sup>a</sup>	Median (Min-Max)
<b>Gender</b>								
Female (n=245)	37.1 $\pm$ 3.6	37 (21–44)	29.7 $\pm$ 3.5	30 (19–39)	18.9 $\pm$ 3.1	19 (6–28)	85.7 $\pm$ 7.5	86 (48–107)
Male (n=279)	35.4 $\pm$ 4.9	36 (16–45)	28.9 $\pm$ 4.7	30 (8–39)	18.2 $\pm$ 3.4	18 (6–28)	82.6 $\pm$ 9.8	83 (33–103)
<b>p value</b>	<b>&lt;0.001</b>		0.219		<b>0.024</b>		<b>&lt;0.001</b>	
<b>Education status of mother</b>								
Secondary school and below (n=209)	36.4 $\pm$ 4.5	37 (16–45)	30.0 $\pm$ 3.9	30 (18–39)	18.6 $\pm$ 3.1	19 (6–28)	84.9 $\pm$ 8.1	86 (59–103)
High school and above (n=315)	36.1 $\pm$ 4.4	36 (19–45)	28.9 $\pm$ 4.3	29 (8–39)	18.6 $\pm$ 3.4	19 (6–28)	83.5 $\pm$ 9.4	84 (33–107)
<b>p value</b>	0.612		<b>0.004</b>		0.890		0.161	
<b>Education status of father</b>								
Secondary school and below (n=131)	36.2 $\pm$ 4.8	37 (16–45)	30.0 $\pm$ 4.4	30 (14–39)	18.2 $\pm$ 3.2	19 (6–28)	84.5 $\pm$ 8.6	85 (44–103)
High school and above (n=393)	36.2 $\pm$ 4.3	36 (19–45)	29.0 $\pm$ 4.1	29 (8–38)	18.7 $\pm$ 3.3	19 (6–28)	83.9 $\pm$ 9.0	84 (33–107)
<b>p value</b>	0.777		<b>0.024</b>		0.225		0.524	
<b>Presence of sibling(s)</b>								
Yes (n=478)	36.4 $\pm$ 4.4	37 (16–45)	29.4 $\pm$ 4.2	30 (8–39)	18.6 $\pm$ 3.2	19 (6–28)	84.4 $\pm$ 8.7	85 (33–107)
No (n=46)	34.7 $\pm$ 4.9	35 (21–45)	28.4 $\pm$ 4.2	29 (20–36)	17.9 $\pm$ 3.9	18 (6–28)	80.9 $\pm$ 10.2	82 (48–101)
<b>p value</b>	<b>0.013</b>		0.167		0.284		<b>0.015</b>	
<b>Residence where the students stayed longest</b>								
Village/town (n=40)	36.7 $\pm$ 5.9	37 (16–45)	29.9 $\pm$ 5.5	30.5 (8–37)	18.6 $\pm$ 4.3	19.5 (6–27)	85.2 $\pm$ 12.0	86.5 (33–102)
District (n=157)	35.8 $\pm$ 4.3	36 (21–45)	29.8 $\pm$ 3.7	30 (16–39)	18.4 $\pm$ 3.1	19 (6–28)	83.9 $\pm$ 8.4	85 (48–102)
Province/metropolitan (n=327)	36.4 $\pm$ 4.3	37 (19–45)	29.0 $\pm$ 4.2 <sup>b</sup>	29 (11–39)	18.6 $\pm$ 3.2	19 (9–28)	84.0 $\pm$ 8.8	84 (42–107)
<b>p value</b>	0.233		<b>0.036</b>		0.502		0.227	
<b>Joining student clubs</b>								
Yes (n=239)	36.8 $\pm$ 4.5	37 (16–45)	29.2 $\pm$ 4.6	29 (8–39)	18.7 $\pm$ 3.3	19 (6–28)	84.7 $\pm$ 9.6	85 (33–107)
No (n=285)	35.7 $\pm$ 4.4	36 (19–45)	29.4 $\pm$ 3.9	30 (14–39)	18.4 $\pm$ 3.2	19 (6–28)	83.6 $\pm$ 8.3	84 (44–102)
<b>p value</b>	<b>0.001</b>		0.441		0.547		0.074	

Living in the same house or city with grandparents								
Yes (n=366)	36.5 ± 4.3	37 (16-45)	29.5 ± 4.3	30 (8-39)	18.7 ± 3.2	19 (6-28)	84.6 ± 8.7	85 (33-103)
No (n=158)	35.5 ± 4.6	36 (19-45)	28.9 ± 3.9	29 (11-38)	18.3 ± 3.5	18 (6-27)	82.7 ± 9.3	82.5 (42-107)
<b>p value</b>	<b>0.009</b>		0.084		0.331		<b>0.014</b>	
Perception of communication with grandparents <sup>c</sup>								
Good/very good (n=404)	36.6 ± 4.1 <sup>b</sup>	37 (16-45)	29.8 ± 4.0 <sup>b</sup>	30 (8-39)	18.8 ± 3.3	19 (6-28)	85.2 ± 8.0 <sup>b</sup>	86 (33-107)
Moderate (n=88)	35.3 ± 4.8	36 (19-45)	28.1 ± 4.2	28 (14-38)	18.0 ± 2.8	18 (9-23)	81.4 ± 9.4	82 (44-103)
Bad/very bad (n=27)	33.8 ± 6.7	33 (19-44)	26.6 ± 5.7	26 (11-36)	17.3 ± 4.4	18 (6-23)	77.8 ± 14.3	78 (42-100)
<b>p value</b>	<b>0.005</b>		<b>&lt;0.001</b>		0.074		<b>&lt;0.001</b>	
Presence of elderly relatives in need of care								
Yes (n=112)	35.9 ± 4.9	36 (16-45)	29.2 ± 4.8	30 (11-39)	18.0 ± 3.2	18 (6-26)	83.0 ± 9.4	83.5 (42-102)
No (n=412)	36.3 ± 4.3	37 (19-45)	29.3 ± 4.0	30 (8-39)	18.7 ± 3.3	19 (6-28)	84.3 ± 8.8	85 (33-107)
<b>p value</b>	0.615		0.952		<b>0.017</b>		0.233	
Desire to receive training on ageism								
Yes (n=319)	36.8 ± 4.2	37 (16-45)	29.9 ± 3.8	30 (14-39)	18.7 ± 3.1	19 (6-28)	85.4 ± 7.9	86 (44-107)
No (n=205)	35.3 ± 4.6	36 (19-45)	28.3 ± 4.6	28 (8-38)	18.4 ± 3.5	19 (6-27)	82.0 ± 9.9	82 (33-102)
<b>p value</b>	<b>&lt;0.001</b>		<b>&lt;0.001</b>		0.675		<b>&lt;0.001</b>	
Desire to live with their parents when their parents are very old								
Yes (n=389)	36.9 ± 4.0	37 (16-45)	30.0 ± 3.7	30 (16-39)	18.8 ± 3.2	19 (6-28)	85.6 ± 7.7	86 (59-107)
No (n=135)	34.3 ± 5.0	35 (19-43)	27.4 ± 4.9	28 (8-37)	17.9 ± 3.6	18 (6-28)	79.6 ± 10.6	81 (33-102)
<b>p value</b>	<b>&lt;0.001</b>		<b>&lt;0.001</b>		<b>0.008</b>		<b>&lt;0.001</b>	
Desire to live with their children in very old age								
Yes (n=206)	36.8 ± 4.2	37 (16-45)	30.6 ± 3.7	30 (16-39)	18.5 ± 3.2	19 (6-28)	85.9 ± 7.8	86 (59-105)
No (n=318)	35.8 ± 4.6	36 (19-45)	28.4 ± 4.3	29 (8-39)	18.6 ± 3.3	19 (6-28)	82.8 ± 9.4	84 (33-107)
<b>p value</b>	<b>0.006</b>		<b>&lt;0.001</b>		0.815		<b>&lt;0.001</b>	
Desire to work with elderly patients in professional life								
Yes (n=283)	36.8 ± 3.9	39 (23-45)	30.3 ± 3.5	30 (16-39)	19.2 ± 3.0	19 (11-28)	86.2 ± 7.3	86 (63-107)
No (n=241)	35.5 ± 4.9	36 (16-45)	28.2 ± 4.6	29 (8-38)	17.8 ± 3.4	18 (6-27)	81.5 ± 9.9	82 (33-103)
<b>p value</b>	<b>0.005</b>		<b>&lt;0.001</b>		<b>&lt;0.001</b>		<b>&lt;0.001</b>	

<sup>a</sup> Standard Deviation; <sup>b</sup> The group that causes the difference; <sup>c</sup> 5 students stated that there are no elders in the family



**Table 4.** Comparison of the desire to live with their parents when their parents are very old with the desire to live with their children in their own very old age.

Desire to live with their parents when their parents are very old	Desire to live with their children in very old age					
	Yes		No		Total	
	n	% <sup>a</sup>	n	% <sup>a</sup>	n	% <sup>b</sup>
Yes	199	51.2	190	48.8	389	74.2
No	7	5.2	128	94.8	135	25.8
Total	206	39.3	318	60.7	524	100.0

<sup>a</sup> Percentage of row; <sup>b</sup> Percentage of column

McNemar's test,  $p < 0.001$

work with elderly patients. There are studies in the literature reporting that physicians are more cynical and distrustful in working with the elderly than other health professionals (9).

In this study, communication problems with the elderly were pointed to as the most common reason for preferring not to work with the elderly. In the literature, it has been posited that ageism is often caused by a lack of knowledge and experience in communicating with the elderly (4). In this study and many others, a positive relationship was found between interest in working with older people/willingness to consider a career in geriatric medicine and attitudes toward the elderly (12-16,23). For this reason, efforts to facilitate communication with the elderly as early as possible in the medical education process and to develop a curriculum to encourage a more positive attitude toward the elderly may increase the self-confidence of physician candidates about elderly patient care and enable them to pursue a career in this field. Of course, it should not be ignored that not only the positive attitude but also many other factors are effective in career choice. For example, in a study conducted with senior students in Turkey, in focus group interviews; interest, ability, money, prestige, status, acceptable and manageable working conditions, narrow and focused or general application area, score from the medical specialty exam, professional satisfaction,

relations with patients/patient relatives, ethical relations, abroad opportunities identified as factors affect career choices (24).

Another reason why physician candidates do not wish to work with the elderly was that they are difficult to treat due to their comorbidities. Indeed, the elderly may have more than one chronic disease, which can make managing cases more complex. Dealing with elderly individuals with many chronic diseases can be difficult for physician candidates who are trained to treat quickly and expect immediate results (6). Similarly, in a study, medical students frequently stated "a lack of opportunity for professional development, professional satisfaction, or a lack of visible therapeutic effects" among their reasons for preferring not to work with the elderly. The authors stated that many of these reasons were based on stereotypical stigmatisations of the elderly in society (4). In fact, it can be concluded that all these reasons are related to a lack of knowledge, experience, positive attitudes in medical students about the elderly and the aging process.

Consistent with our results, many studies have found that females' attitudes are more positive (12,22,25,26). This may be due to the dominant caregiving role attributed to females by traditional gender roles. Females are raised to be more emotional and compassionate and that they are expected to empathise better than male may reinforce this

**Table 5.** Results of multiple linear regression models to determine important factors on attitudes towards ageism.

<b>Model 1. Dependent variable: Restricting the elderly</b>					
<b>Independent variables</b>	<b>B<sup>a</sup></b>	<b>SE<sup>b</sup></b>	<b>Beta<sup>c</sup></b>	<b>t</b>	<b>p</b>
Female	1.516	0.370	0.170	4.102	<0.001
Joining student clubs	1.203	0.370	0.135	3.249	0.001
Good/very good perception of communication with grandparents	0.931	0.338	0.115	2.759	0.006
Desire to receive training on ageism	0.656	0.390	0.072	1.681	0.093
Desire to live with their parents when they are very old	2.240	0.441	0.218	5.083	<0.001
<b>Model 2. Dependent variable: Positive ageism</b>					
<b>Independent variables</b>	<b>B<sup>a</sup></b>	<b>SE<sup>b</sup></b>	<b>Beta<sup>c</sup></b>	<b>t</b>	<b>p</b>
Female	0.690	0.346	0.082	1.994	0.047
Education status of mother	0.803	0.353	0.094	2.278	0.023
Good/very good perception of communication with grandparents	1.170	0.314	0.153	3.720	<0.001
Desire to receive training on ageism	0.671	0.374	0.078	1.794	0.073
Desire to live with their parents when their parents are very old	0.986	0.449	0.102	2.197	0.028
Desire to live with their children in very old age	1.296	0.381	0.151	3.399	0.001
Desire to work with elderly patients in professional life	1.194	0.369	0.142	3.236	0.001
<b>Model 3. Dependent variable: Negative ageism</b>					
<b>Independent variables</b>	<b>B<sup>a</sup></b>	<b>SE<sup>b</sup></b>	<b>Beta<sup>c</sup></b>	<b>t</b>	<b>p</b>
Female	0.599	0.280	0.091	2.138	0.033
Not having elderly relatives in need of care	0.804	0.341	0.101	2.357	0.019
Desire to work with elderly patients in professional life	1.331	0.280	0.202	4.755	<0.001
<b>Model 4. Dependent variable: Ageism Attitude Scale overall score</b>					
<b>Independent variables</b>	<b>B<sup>a</sup></b>	<b>SE<sup>b</sup></b>	<b>Beta<sup>c</sup></b>	<b>t</b>	<b>p</b>
Female	2.756	0.720	0.154	3.825	<0.001
Good/very good perception of communication with grandparents	2.686	0.664	0.166	4.044	<0.001
Desire to live with their parents when their parents are very old	4.156	0.871	0.202	4.772	<0.001
Desire to work with elderly patients in professional life	3.229	0.753	0.180	4.288	<0.001

<sup>a</sup> Unstandardized coefficient; <sup>b</sup> Standard error; <sup>c</sup> Standardized coefficient





situation. In a study, female medical students were showed higher levels of self-transcending personal values (universalism and benevolence) correlated positively with empathy than males (20). Thus, it is important to specifically target males in studies to improve attitudes towards the elderly. There are also studies indicating that males' attitudes are more positive (14) or that there is no difference between the genders (15,23,27).

While living in the same house/city with one's grandparents had no effect on the attitude score, the attitudes of those who judged their communication with grandparents as good/very good were more positive. In a study conducted by Ayoğlu et al., no relationship was found between attitude and "having a  $\geq 65$ -year-old family member" or "living with a  $\geq 65$ -year-old person" (14). Voogt et al. (23) found that "experiences, including positive relationships with older relatives and experiences providing care for older adults" were related to more positive attitudes. This led us to believe that the quality of communication with the elderly is important. Positive attitudes are influenced by positive personal experiences with older individuals. Students' positive interactions with older adults prevent applying ageist stereotypes to all older adults and increase the possibility of positive thinking about old age (9). Therefore, increasing young-old interaction can be an opportunity for promoting positive attitudes.

Those who stated that they prefer to live with their parents when their parents are very old had a more positive attitude. It may be that a sense of obligation, which includes protection and care toward parents, is also reflected positively in their attitudes. Interestingly, while three-quarters of the study group stated that they prefer to live with their parents, only one-third said that they would wish to live with their own children. Almost half the group who stated that they wanted to live with their parents stated that they did not wish to live with their children. On the one hand, this shows the belief of young physician candidates that care of the elderly should be provid-

ed by children, maintaining their traditional societal characteristics; on the other hand, it indicates that they are exposed to the effects of social and cultural change. In today's modern societies, living alone or settling into an institution is increasingly preferred by older people, because they do not want to affect the lives of their children, or because they want to live autonomously in their own environment. The students reported that the most important reason for wishing to live with their parents in the future is their responsibility to take care of them. Additionally, they stated that they do not want to be a burden on their own children, which is why they do not want to live with them in the future, thus supporting this interpretation.

Joining student clubs was a positive determinant for "restricting the life of the elderly." No study has been found in the literature examining the relationship on this issue. In our study, it was seen that clubs were mostly associated with social responsibility. It may be assumed that these students' empathy skills are higher, and this relates to positive attitudes.

The mother's educational status of secondary school and below was a positive determinant for "positive ageism." This may be a reflection of more traditional points of view in families with lower levels of education, or it may be because children growing up in families with a high level of education are generally exposed to individualised lives.

Students' lack of elderly relatives in need of care was a positive determinant for "negative ageism." Having an elderly relative in need of care in the family creates both an emotional and a physical burden, which can lead to problems such as depression, burnout, and social isolation for caregivers. These problems may negatively affect the attitudes of individuals toward aging and the elderly.

Similar to some studies (14,27), no significant relationship was found between years of education and attitudes in this study. However, there are others demonstrating that the attitude of first-year students is more positive (12,25,26) or more negative

(13,15,16) than the others. In medical education, it is important to consider the biopsychosocial aspect of aging as a whole and to include the issue of ageism, but more importantly, to determine appropriate targets and use appropriate educational techniques to effect changes in attitude. It is not enough to have only knowledge-based goals in the curriculum regarding this subject. Attitude targets that emphasize overcoming stereotypes about the elderly should be included. It is recognised that curricula that include empathy-building components are more likely to lead to positive changes in attitude (11,25). At the same time, the attitudes of lecturers/teachers—the role models in learning environments—are also important. For this reason, investigating the attitudes of faculty members toward the elderly should be addressed in the future.

This study has some limitations. It was a cross-sectional study, and thus, causality cannot be confirmed. Although two separate years of medical students were investigated, it is important to conduct prospective studies in which the same student groups will be followed throughout the education process. Another limitation of the study is that it was conducted in only one medical school. Thus, the results cannot be generalised to students in other medical schools. There may also be self-reporting bias.

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In conclusion, the attitudes of MS1 and MS6 medical students toward the elderly were generally positive but at a level that could be improved. The situation of not wishing to work with elderly patients in professional life was high, and this was a determinant of a negative attitude. To increase the willingness to serve elderly individuals, curricula should be supported from the first years of education, and social activities like community support projects should be organised to increase communication with healthy older people. Being male was a negative predictor for both overall and all the subdimension scores of the AAS. Poor communication with grandparents and not wishing to live with their parents when they are very old were other risk factors for negative attitudes.

There is a need for multicentre longitudinal studies aimed at monitoring the attitudes of medical students toward the elderly. In addition, it is important to conduct studies that evaluate the personal value systems of medical students and examine the relationship between the value systems and the attitudes towards the elderly.

## Conflict of Interest

The authors declare that there is no conflict of interest.



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## RESEARCH

# COST ANALYSIS OF ELDERLY PATIENTS ADMITTED TO THE INTENSIVE CARE UNIT AT A UNIVERSITY HOSPITAL IN TURKEY

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## ABSTRACT

**Introduction:** The cost of the intensive care unit for geriatric patients may be high because of their increased incidence of organ failure due to age, the associated need for multiple drug use and the need for supportive treatments. Our study aimed to contribute to the improvement of intensive care unit costs and the development of new care strategies for patients aged over 65 years in the intensive care unit.

**Materials and Method:** Once we received ethics committee approval for the study, patients aged above 65 years admitted to the level 3 intensive care unit were divided into three groups. Reason for hospitalisation, duration of hospitalisation, disease severity scores, medication and additional costs and total cost of treatment in the intensive care unit were evaluated.

**Results:** 43.5% (n=212) of a total of 487 patients treated were over 65 years of age. The mean age of the 212 geriatric patients was 76.66±7.4 years, and 20.03% of them were admitted to the intensive care unit after a sepsis diagnosis. A total of 22.64% of the patients were discharged to home, and 52.36% were discharged to wards. The average stay duration was 12.32±14.86 days, and the cost of treatment in the intensive care unit was 25,231 Turkish liras, including the drug cost of 4,769 liras.

**Conclusion:** The rate of admission of geriatric patients to the intensive care unit has increased, but survival is still low. Health policies should be restructured to reduce hospitalisation costs for this fragile group.

**Keywords:** Intensive Care Unit; Hospitalization; Health Care Costs; Aged.



## INTRODUCTION

Intensive care unit(ICU) treatments are among the top high-cost treatments, and their costs increase every day. A high patient/healthcare staff ratio is the primary reason for the high cost. Admission of elderly patients with complicated and severe diseases to the ICU increases costs even further. Relevant literature has indicated that 5% of patients admitted to the hospital need ICU. Although this rate seems low, ICU expenses constitute 8%–30% of total hospital expenses(1).

Elderly patients aged above 65 years are admitted to ICUs at an increasing rate. The ICU survival rate of patients in the elderly age group is low, and the likelihood of returning to normal life upon survival is also very low(2). Although previous studies have suggested that advanced age alone is not an obstacle to ICU admission, healthcare professionals might hesitate to decide in favour of ICU admission due to the low life expectancy of elderly patients during and after ICU treatment.

Although there is no major difference in terms of the cost of treatment in the ICU for elderly patients compared to that for younger patients, the treatment cost in the former patient group, which has low life expectancy, is a separate cause of concern(3). The cost of ICU treatment of elderly patients places an additional burden on the social security systems (SSS) in individual countries.

Our study aimed to contribute to the improvement of ICU patient admission strategies by examining the general characteristics and ICU costs of patients aged above 65 years.

## MATERIALS AND METHOD

The study commenced upon receiving the approval of the hospital ethics committee (No:23;19.02.2019). The files and hospital bills of patients aged above 65 years and admitted to the general ICU of the Department of Anesthesiology, Eskişehir Osmangazi University Faculty of Medicine between January 1,

2018 and December 31, 2018 were retrospectively analysed. The patients were divided into three age groups as follows: 65–74 years, 75–84 years and 85 years and above. The reason for ICU admission, duration of ICU stay, sex, age, ICU death rate, and acute physiology and health evaluation score (APACHE 2) were retrieved from patient records.

In Turkey, the SSS covers health expenditures for all citizens. The payment system for ICU patients is calculated on a per calendar day basis, and the bed, all monitoring fees and medication fees are included in the package fees. The package fee was 1040,72 Turkish Lira (TL) for patients admitted to the 3<sup>rd</sup> level ICU during the study duration. Furthermore, fees for additional and special procedures (such as extracorporeal membrane oxygenation (ECMO), continuous renal replacement therapy, plasmapheresis, etc.) were separately paid in the form of Annex-2B payment. For our study, the ICU expenses, device and drug expenses, and Annex 2B expenses of the patients were recorded in TL currency.

### Statistical Analysis

Continuous data are reported as mean  $\pm$  standard deviation. Categorical data are given in percent (%). Shapiro Wilk's test was used to examine the suitability of the data for normal distribution. A one-way analysis of variance (one-way ANOVA) was used for cases with three or more groups compared to normally distributed groups. The Kruskal-Wallis H test was used for the cases with three or more groups compared to the groups that did not conform to normal distribution. For the variables that did not conform to normal distribution, Spearman correlation coefficients were calculated to determine the direction and magnitude of the relationship (correlation) between the variables. Pearson Chi-Square and Pearson Exact Chi-Square analyses were used in analyzing the crosstabs produced. The program IBM SPSS Statistics 21.0 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) was used for

the analysis. A value of  $p < 0.05$  was accepted as the criterion for statistical significance.

## RESULTS

Of the 487 patients treated in the ICU, 43.5% ( $n=212$ ) were over 65 years of age. The mean age of the 212 geriatric patients was  $76.66 \pm 7.4$  years, and 20.03% of these patients were admitted to the ICU upon being diagnosed as having sepsis. A total of 52.36% of the patients died in the ICU, and the mortality rate decreased with increasing age (Table 1). The duration of the ICU stay was  $12.32 \pm 14.86$  days, and the average cost of treatment in the ICU was 25,231 TL, including the medication cost of 4,769 TL. The cost of treatment in the ICU based on age group is given in Table 2. Thus, there was no significant statistical difference between the age groups' cost of treatment in the ICU. In addition, there was no correlation between the ICU costs and LOS, the APACHE 2 score, and age (Table 3).

## DISCUSSION

In our study of patients over the age of 65 years receiving intensive care, we found that the mortality rate of the patient group above 85 years of age was statistically significantly lower than that of the other two age groups. In addition, we observed that there was no statistically significant difference in the

treatment costs reimbursed by the SSS across the three groups.

The increase in the elderly population causes a significant burden on the SSS in individual countries(4). The aging of the population leads to a decrease in the size of the workforce and ultimately results in a decrease in tax revenues. Furthermore, retirees are allotted inadequate funds, which are offset by tax revenues, reducing public revenues. In addition, the increase in medical care expenditures for elderly individuals also places an additional burden on the SSS(4). A study conducted in the USA found that, on average, a man would spend \$268,679 and a woman would spend \$361,192 for health care expenses during their lifetime. Moreover, the same study found that 60% of lifelong health expenditures were paid after the age of 65; accordingly, it was predicted that health expenditures in the USA would increase by 20% in the future due to the ageing of the population(5).

In our study on patients over 65 years of age admitted to the ICU, we found that the average ICU hospitalisation cost for the patients during the study period was 25,231 TL, of which 4,769 TL was the drug cost. In the same year (2018), the per capita gross national product (GNP) in Turkey was declared as 45,750 TL by the Turkish Statistical Institute (6). More than half of this amount was spent on treatment for any geriatric patient treated in the

**Table 1.** Mortality rates based on age group

Age groups ( $X^2$ )	Discharge Status		Total	p
	Discharged n/%	Death n/%		
65–74	53(52.5)	38 (34.2)	91	0.017
75–84	35 (34.7)	47 (42.3)	82	
≥85	13 (12.9)	26(23.4)	39	



**Table 2.** The expenditures of patients by age groups

	Age Groups			p
	65–74	75–84	85 and above	
Medical Equipment (TL)	446.22 (135.85–1945.30)	475.31 (196.50–1407.36)	392.80 (97.55–1125.89)	0.53
Drugs (TL)	1285.55 (407.02–6582.69)	1227.34 (327.53–3587.61)	1225.36 (373.19–4287.39)	0.79
Annex-2b (TL)	3651.56 (1631.89–12867.09)	4104.32 (1650.42–7964.28)	3998.17 (1575.25–8127.87)	0.74
SSS (total) (TL)	7519.64 (2697.35–22749.85)	6234.80 (2671.49–14331.24)	6045.59 (1981.50–17323.92)	0.47

SSS: Social Security System; TL: Turkish Liras

**Table 3.** The correlation analysis of expenditures and specific parameters

	Age	APACHE 2	ICU LOS
Medical Equipment	r:0.072 p:0.296	r:-0.007 p:0.917	r:0.05 p:0.470
Drug	r:-0.056 p:0.417	r:-0.025 p:0.720	r:-0.024 p:0.733
Annex 2B	r:-0.121 p:0.078	r:0.028 p:0.686	r:-0.031 p:0.653
SSS (total)	r:-0.131 p:0.057	r:0.036 p:0.607	r:-0.022 p:0.755

APACHE 2: Acute Physiologic and Chronic Health Evaluation 2 Score

SSS: Social Security System

Pearson correlation test ; Correlation is significant at 0.05 level

ICU for an average of 12 days. Faced with a similar situation, Denmark reduced its health expenditures through a regulation to the same level as that of the USA in 1997; as a matter of fact, Denmark's health expenditures were twice that of the USA in 1985(4). The most striking point of this regulation was the transition from a therapeutic approach to a preventive approach and a decrease in the duration of hospital stays to 3 days(4). A review of population distribution in Turkey suggested that the incidence

of the age group above 65 years in the total population, which was 8.76% in 2018, would increase to 10.2% in 2023 and to 20.8% in 2050(4). The results of the present study, which was conducted in a university hospital in a metropolitan city, suggest that the formulation and implementation of an action plan for improving elderly health and care in the 2020s is warranted.

The costs of treatment in the ICU constitute 30% of total hospital expenditures(1). In general, admis-

sion of patients to the ICU is decided by considering the severity of the disease, comorbidities and expected prognosis. Although only about 30% of patients admitted to the ICU are above 65 years of age, the cost of their ICU treatment constitutes a larger portion of total ICU costs(7,8). These high costs create ethical and practical issues in terms of the admission of elderly patients to and the treatment process in the ICU(9,10).

Elderly patients are admitted to the ICU in three ways. First, if the patient is conscious, a joint decision regarding admission can be made through discussion with the patient, relatives of the patient, and caregivers. In the second case, elderly patients are generally not available to give their consent. Therefore, based on the severity of the disease, caregivers and the family, along with the treating physician, decide whether ICU treatment is needed, taking into account the previous decisions made by the patient. In emergency cases, where there is no time to collect information, elderly patients are admitted to the ICU and treatment is initiated. In many countries, decisions regarding withdrawing life support treatments are then considered when possible(11). In contrast, in our country, which adopted the principle of "first come, first served," the decisions of patients regarding ICU admission are not or can not be made in advance, and after all patients are admitted to the ICU, acute treatment is provided, regardless of the benefit they would receive from the treatment.

Intensive care triage begins with the referring clinician- and consultant physician-focused process, but potential benefits can only be obtained if a decision to admit the patient to the ICU is made considering the input of clinicians, patients and their relatives(8). If the benefit of admission to the ICU is deemed low, other alternatives, such as intermediate ICU or palliative services, should be considered. Making end-of-life decisions during the decision process should not be avoided, nurses should be involved in the decision-making processes regard-

ing the patient and due sensitivity towards cultural and ethical issues should be shown (8).

A study found that most elderly patients reject admission to ICUs, and interestingly, the survival rate of patients admitted to ICU increased with age(12). Similarly, in our study, we found that the mortality rate in our patients admitted to the ICU was the highest in the 75–84 age group (42.3%); however, the same rate decreased to 23% in the group above 85 years of age.

In patients whose clinical symptoms do not improve, ICU treatment can be terminated earlier (13). In certain studies, different mortality rates were found (29%–93%)when the withholding and withdrawal approaches were adopted for ICU patients aged above 80 years. In another study where these approaches were not in place, the mortality rates varied between 56%–69%. The purpose of withholding or withdrawal approaches is to provide a comfortable death(11,14). The limitations of these approaches vary among countries in terms of religious beliefs and income levels(11). In our study, there was no statistical difference between the age groups in terms of ICU admission and costs. This was associated with the fact that the withholding and withdrawal approaches are not legally supported in Turkey and that clinicians refrained from adopting these approaches.

Advanced age alone does not constitute a contraindication for admission to the ICU(3). If there is a medical requirement, the indications for admission to the ICU for the elderly should be the same as those for young individuals(15). A study conducted in the United States reported that 29.7% of the 65–74 years age group, 27.9% of the 75–84 years age group, and 21.1% of the 85 years and above age group in need of ICU were admitted to the ICU(16). Regarding ICU hospitalisation indications in Turkey, it is known that age is not regarded, and the "first come, first served" system is adopted across the organization for facilities. Therefore, it is impossible to provide such statistics. During our study duration,





43.5% of the ICU admissions were patients above the age of 65 years.

The main reason for the high costs of elderly patients is the use of drugs and treatments to manage organ failures associated with chronic diseases. Although many studies reported an inverse relationship between advanced age and cost, Eren *et al.* suggested in their study that it was the duration of stay in the ICU rather than the age that increased the cost, yet they were not able to clearly reveal the reasons for prolonged hospitalisation(17,18). In a more comprehensive study by Kara *et al.* that compared the costs of treatment in different ICUs, it was found that the average age of their patients was 52.6; similarly, they concluded that the prolonged hospitalisation period, but not the advanced age, increased the cost(17). They also found that the mortality rate was 30%, and the average duration of stay in the ICU ranged between 6.6 and 8.6 days. In contrast to the results of the above study, there was no significant statistical correlation between LOS and costs in the present study. Kara *et al.* found a similar mortality rate of 51.2% in the thoracic ICU, where the relatively elderly population with a mean age of  $62 \pm 16$  years were mostly treated (17). However, Kara *et al.* evaluate neonatal and pediatric intensive care patients in their study. It should be logical to think that the treatment and related cost results were different from our study in which was evaluated elderly patients. A study conducted in Turkey found a mortality rate of 54.9% in patients above the age of 65 years receiving intensive care(1,3,19). A study abroad evaluated the ICU costs of the geriatric group and found a mortality rate of 35% in patients above the age of 90 receiving intensive care(7). The most common reason for ICU admission was respiratory failure, and the cost of hospitalisation was lower for the geriatric age group than for the younger age groups(7).

In another cost-related study from Turkey, the relationship between the costs of the intensive care unit and the length of stay in the intensive care unit

was evaluated; Accordingly, the mean age of the patients was  $53.8 \pm 22$  and the mean duration of the intensive care unit was  $10 \pm 12$  days, similar to the results of our study(19). The results of this study suggest that the surgical devices and laboratory costs of patients receiving intensive care were the highest during the first three days and decreased thereafter, where as the cost of drugs increased to 43.6% in the subsequent days of hospitalisation. This was associated with the high treatment costs of hospital infections(19).

In the present study, the mortality rate of the 75–84 age group was statistically significantly higher than that of the other two age groups. However, there was no statistically significant difference in terms of the treatment costs reflected to SSS and the duration of stay in the ICU across the three age groups. The incidence of comorbidities in elderly patients increases compared with those in other patient groups. The comorbidity rate was found to be  $2.6\% \pm 2.2\%$  in patients aged 65–84 years and  $3.6\% \pm 2.3\%$  in those above 85 years of age. This leads to increased mortality, loss of physical independence and increased duration of stay(20). This is because the withholding and withdrawal approaches are not legally supported in Turkey and clinicians are afraid of adopting them.

A review of the reasons for admission to the ICU showed that sepsis (20%) was the most common, followed by respiratory failure (16%), pneumonia (12%) and pulmonary thromboembolism (4%). It was observed that respiratory system problems mostly resulted in admission to the ICU. According to the VIP 1 study, the most frequent reason for admission to the ICU was acute respiratory failure, with an incidence rate of 25%, whereas mechanical ventilation accounted for a substantial part of the ICU expenditures(21). However, in cases where the initial symptoms were delirium and cognitive impairment, the mortality rate was higher due to delayed diagnosis and treatment(22). The increased prevalence of secondary acute respiratory distress syndrome in sep-

tic elderly patients causes the need for prolonged mechanical ventilation and, ultimately, a prolonged ICU stay(23).

A total of 25% of our patients were discharged from the ICU and transferred to the wards. The process of discharging elderly patients from the ICU to the wards depends on the characteristics of the wards. It is known that experience with geriatric patients is inadequate in some of these services, and accordingly, the process of being discharged from the ICU is affected(24). Evaluation of elderly patients by a geriatrician before discharge to the wards and transferring postoperative patients to a geriatric unit may contribute to reducing mortality rates by reducing the rate of readmission to the ICU (24).

It was reported that the quality of life and recovery rate of elderly patients who needed mechanical ventilation for more than 7 days was low and that they had more cognitive disorders(25). The functional and mental competence of elderly patients during the post-ICU process should be examined, and the focus should be on achieving a better quality of life. In a study of 2,646 patients that included the elderly population in the ICU, it was found that only 1/3 of the subjects could have continued their lives independently during the 6-month survival period(25). This group of patients has functional loss, becomes bedridden, and needs a high level of home care. Moreover, their relatives may become socially, cognitively and functionally disabled as second victims while transitioning from the role of beloved ones to caregivers (8).

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## Limitations of the study

The costs of the drugs used by the patients for their chronic illnesses, the hospital infections that occurred during their hospital stay, and the costs related to secondary organ failure were not recorded separately. Finally, due to the retrospective nature of the study and legal issues in Turkey, it was not possible to determine whether doctors had decided to withhold or withdraw.

In conclusion, ICU treatment expenditures for geriatric patients constitute a substantial part of the GNP, and considering the increase in the elderly population, it would be appropriate to develop cost-reducing strategies for the future. The costs of ICU can be reduced by effective communication between caregivers and family, active implementation of decisions about discontinuation of or pause in treatment in the ICU follow-up and treatment process and the involvement of caregivers in the treatment as a team. This kind of approach for this fragile patient group may be effective in reducing ICU costs.

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## Conflicts of Interest

The authors declare that they have no conflicts of interest.

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## RESEARCH

# CONSEQUENCES OF SOCIAL ISOLATION AND LONELINESS IN PEOPLE OVER THE AGE OF 65 DURING THE COVID-19 PANDEMIC: A MIXED METHODS STUDY

## ABSTRACT

**Introduction:** The purpose of this study was to examine the social and emotional loneliness of people (n = 216) over the age of 65 during the COVID-19 pandemic and then to understand in-depth the consequences of social isolation and loneliness among participants selected from the survey participants.

**Materials and Method:** We used a sequential explanatory mixed methods design consisting of two phases. In the quantitative phase, the 11-item Loneliness Scale for the Elderly (LSE) was used for determining the level of loneliness. This scale was adapted by Akgül and Yeşilyaprak (2015). In the qualitative phase, an open-ended question survey and semi-structured in-depth interviews were conducted with 14 participants chosen through purposeful sampling.

**Results:** The quantitative data showed that the mean score for emotional loneliness (5.74) was higher than the mean score for social loneliness (2.14). There were no significant differences among the age groups. However, the mean score for overall loneliness increased (6.52) with age. There was a significant difference between overall loneliness and marital status (p = 0.025) and living alone (p = 0.046). Three major themes were identified in the qualitative phase: Emotional consequences, social consequences, and physical consequences.

**Conclusion:** The results suggest that emotional loneliness and limited interaction with loved ones are the main consequences of the social isolation imposed during the pandemic. These results should be taken into account when developing strategies to facilitate the daily routines, well-being, social interaction-based activities, and social support systems for older people during times of social isolation.

**Keywords:** COVID-19 Pandemic; Aged; Social Isolation; Loneliness.



## INTRODUCTION

Elderly people throughout the world have been considered at high-risk for infection by the COVID-19 virus due to the severity of the symptoms and the high mortality risk (1). Elderly people affected with the COVID-19 virus show severe reactions due to the compromised immune systems of people with age-related lowered resistance and concomitant hypertension, diabetes, obesity, and cardiovascular and respiratory disease (2,3). For this group, social isolation is recommended as the primary protective mechanism and the safest way to prevent transmission (1).

Social isolation requires the individual to be separated from others, which means maintaining a physical distance from one's family, friends, and other social networks. The isolation may be exacerbated by other factors, such as cognitive or physical disability, retirement, loss of a spouse or friend (4,5). Loneliness describes the state where there is a decrease in the number of friends and a perception of absence (6). Social loneliness describes the state where relationships with friends and colleagues are less than anticipated or desired, while emotional loneliness refers to having no sincere, true, and trustworthy relationships as would be desired (7). Social isolation and loneliness are associated with poor quality of life and malnutrition, sleeping disorders, physical and mental disorders, high rates of mortality, and suicide (8-10). Furthermore, problems such as anxiety, insecurity, and emotional stress, often due to misinformation, have also caused older people to have psychological problems that have reduced their quality of life (11). Symptoms such as depression, gaining or losing weight, increased or decreased appetite, sleeping disorders, psychomotor agitation or retardation, feelings of worthlessness, inability to focus, and fear of death have all been observed (12,13). In this study, the levels of social and emotional loneliness caused by the COVID-19-related social isolation of elderly people ( $\geq 65$ ) and the problems caused by their loneliness

are investigated through mixed-methods research where quantitative and qualitative methods are both used.

## MATERIALS AND METHOD

### Ethical Considerations

Approval for the study was obtained from the Ege University Committee on Scientific Research and Publication Ethics with the approval date and number 27/08/2020-E.215325.

### Data Collection

A sequential descriptive mixed-methods design was used for this study, where quantitative and qualitative data were used together. Combining a social science perspective with quantitative methods in health studies creates methodological variety (14). Hence, the mixed methods approach is suitable for studies in which the results require explanations, and where the purposes of the study can be best achieved through research that has more than one phase (15). The study sample comprised volunteer participants over the age of 65. Both paper surveys ( $n = 169$ ) and online surveys ( $n = 47$ ) were used for this study and data were collected during the 6 weeks between March 2020 and April 2020. Study information and informed consent statement were included in paper surveys and online surveys.

Paper surveys were collected in two ways in accordance with the COVID-19 safety. Phone surveys ( $n = 48$ ) were conducted by researchers. Phone survey participants were collected through community neighbors who volunteer to share their inner circle over the age of 65 in Izmir and Sanliurfa to whom we forward the study task. Phone survey participants were informed about the study before the interview and, provided informed consent for study participation. Participants were asked to choose the answer that fitted their situation best to each question. If a participant had difficulty understanding an item, the item was read out again. All answers were filled out on paper survey sheets by researchers. In

the second part of the paper survey, participants (n = 121) were recruited from different community pharmacies in Izmir and Sanliurfa. To accelerate paper survey participants recruitment over the age of 65, pharmacies were invited to take part in the study. Pharmacies were selected from with the highest number of elderly patients by observation. Pharmacists who volunteered to co-operate were informed about the study. To ensure the safety of participants' COVID-19 precautions, surveys were collected in two steps. First, pharmacists delivered paper surveys to volunteered participants. Then as a second step, pharmacists collected surveys which were filled out by volunteered participants in their homes. Qualitative interviews were conducted with 14 people who were selected from among the participants (n = 216) who completed the survey. Face-to-face interviews (n = 8) were conducted in Izmir and Sanliurfa by considering COVID-19 precautions. The rest of the interviews (n = 6) was conducted via videophone interviews among participants able to use videophone call.

The Loneliness Scale for Elderly (LSE) which was developed by Gierveld and Kamphuis (1985), was revised by van Tilburg and de Jong Gierveld (1999), and adapted into Turkish by Akgül and Yeşilyaprak (2015), was used for the quantitative stage of this study (16,17,18). This scale consists of 11 questions, six of which measure emotional loneliness and five of which measure social loneliness. Cronbach's alpha was found to be .85 for this three-point Likert scale. The participants completed a demographic information form together with the questionnaire. For the qualitative data through semi-structured interviews, the researchers prepared open ended questions based on the literature.

### **Analysis**

The quantitative data were analyzed using IBM SPSS Statistics v.22.0 (IBM Corp., Armonk, NY, USA). The scoring technique created by the developers of the scale was used. The questions (Q: 1, 4, 7, 8, 11) relating to social loneliness, which include pos-

itive statements, are scored as 1 = yes, 2 = maybe, 3 = no; the questions (Q :2, 3, 5, 6, 9, 10) relating to emotional loneliness, which include negative statements, are scored as 3 = yes, 2 = maybe, 1 = no. Descriptive statistics, the Kruskal-Wallis test, the Mann-Whitney U test, the Chi-square test, and Fisher's exact test were used in the analysis. The thematic analysis method was used to analyze the qualitative data, and the interview texts were analyzed according to the thematic analysis process described by Braun and Clarke in 2006 (19).

**Quantitative Findings:** The data regarding the demographic information of the participants are given in Table 1.

It was found that the mean emotional loneliness score (5.74) was higher than the mean social loneliness score (2.15). Social and emotional loneliness scores were derived from the mean of each participant's total scores of social or emotional loneliness scores. Furthermore, according to our findings (Table 3), emotional loneliness increases with increased age. The findings also indicated that the mean for emotional loneliness was higher (6.68) in the unmarried (widowed, divorced, bachelor) participants.

No statistically significant differences ( $p > 0.05$ ) were found between loneliness levels and the following categorical variables: age, gender, educational background, occupation, whether they had children, the place of residence and domestic partner; however, significant differences were found between marital status and loneliness level ( $p = 0.025$ ) and between living alone and loneliness level ( $p = 0.046$ ). The statistical difference ( $p = 0.003$ ) between marital status and emotional loneliness level was also significant. The differences between domestic partner and emotional loneliness ( $p = 0.022$ ), living alone and emotional loneliness ( $p = 0.014$ ), and living with spouse and emotional loneliness ( $p = 0.011$ ) were all statistically significant. The differences between the emotional loneliness levels ( $p = 0.011$ ) of participants who lived in a city with their spouses and those living in an urban or rural area and their social loneliness levels ( $p = 0.013$ ) were significant.



**Table 1.** Demographic characteristics of participants (n = 216)

Age	Frequency	%
65–69	123	56.95
70–74	49	22.68
75+	44	20.37
<b>Gender</b>		
Female	120	55.56
Male	96	44.44
<b>Marital Status</b>		
Married	143	66.2
Single	5	2.32
Widowed	68	31.48
<b>Educational level</b>		
Illiterate	57	26.98
Primary	66	30.56
Middle school	18	8.33
High school	34	15.74
Vocational School	16	7.41
Bachelor	21	9.72
Graduate School	4	1.85
<b>Children</b>		
None	9	4.17
1	12	5.56
2	61	28.24
3+	134	62.03
<b>Occupation</b>		
Retired	113	52.31
Housewife	74	34.26
Employee/other	29	13.43
<b>Live in</b>		
City	196	90.74
Rural	20	9.26
<b>Living with</b>		
Alone	14	6.48
Husband/Wife	147	68.06
Husband, wife and kids	38	17.59
Sister/Brother/Mother/Kids	17	7.87

The LSE loneliness scores (n = 216) are given in Table 2. The mean loneliness score for participants is 7.89, while the mean score for social loneliness is 2.15, and the mean score for emotional loneliness is 5.74.

**Table 2.** The mean loneliness scale scores for participants (n = 216)

	Valid N	Mean	Standard Deviation	Median	Min.	Max.	Range
Social loneliness	216	2.15	2.31	2	0	9	9
Emotional loneliness	216	5.74	3.22	6	0	12	12
Total	216	7.89	4.80	8	0	21	21

**Table 3.** Loneliness scale scores between variables (n =216)

Valid N		Social Loneliness			Emotional Loneliness			Total score			
		Mean	SD	p	Mean	SD	p	Mean	SD	p	
<b>Gender</b>	Male	96	2.46	2.43	.095	5.47	3.36	.276	7.93	5.09	.938
	Female	120	1.90	2.19		5.96	3.10		7.86	4.58	
<b>Age</b>	≥75	44	2.09	2.08	.961	6.52	3.02	.147	8.61	4.36	.416
	70-74	49	2.24	2.42		5.41	3.45		7.65	5.38	
	65-69	123	2.13	2.36		5.59	3.18		7.72	4.72	
<b>Marital Status</b>	Married	143	2.07	2.26	.502	5.26	3.21	.003	7.33	4.76	.025
	Widowed /Divorced / Single	73	2.30	2.41		6.68	3.04		8.99	4.71	
<b>Education</b>	Illiterate	57	2.32	2.38	.909	5.88	3.45	.370	8.19	5.59	.609
	Primary	66	2.09	2.14		5.48	2.94		7.58	4.41	
	Middle School	52	2.13	2.48		6.33	3.15		8.46	4.46	
	Vocational/Bachelor/Grad.School	41	2.02	2.32		5.22	3.39		7.24	4.68	
<b>Occupation</b>	Retired	112	2.27	2.41	.187	5.85	3.34	.795	8.12	4.81	.661
	Housewife	74	1.77	2.08		5.74	2.91		7.51	4.55	
	Employee/other	30	2.63	2.39		5.33	3.56		7.97	5.44	
<b>Children</b>	Yes	206	2.10	2.28	.210	5.70	3.22	.374	7.80	4.83	.156
	No	10	3.10	2.81		6.60	3.27		9.70	3.83	
<b>Number of children</b>	None	10	3.10	2.81	.060	6.60	3.27	.526	9.70	3.83	.221
	1	12	1.67	2.27		4.58	3.63		6.25	5.34	
	2	61	1.59	2.09		5.82	3.15		7.41	4.44	
	3+	133	2.38	2.33		5.74	3.22		8.12	4.95	
<b>Live in</b>	City	189	2.03	2.31	.013	5.70	3.33	.592	7.72	4.87	.169
	Rural	27	3.00	2.13		6.04	2.31		9.04	4.16	
<b>Living with</b>	Lonely	47	2.47	2.57	.582	6.81	3.03	.022	9.28	4.79	.077
	Wife/Husband and children	38	1.79	2.30		4.63	3.36		6.42	4.73	
	Kids / Sister-Brother	23	2.04	2.06		6.09	3.10		8.13	4.76	
	Wife/Husband	108	2.16	2.26		5.59	3.17		7.75	4.73	
<b>Living alone</b>	Yes	47	2.47	2.57	.375	6.81	3.03	.014	9.28	4.79	.046
	No	169	2.06	2.23		5.44	3.22		7.50	4.74	
<b>Living with sb</b>	Yes	146	2.06	2.27	.420	5.34	3.23	.011	7.40	4.75	.053
	No	70	2.33	2.41		6.57	3.05		8.90	4.78	





**Table 4.** *Quotes from qualitative interviews by theme*

Main themes	Sub-themes	Participant's quotes
Emotional consequences	Infection anxiety and fear	"Before the pandemic, I was using public transportation. Since the pandemic started, for a year we couldn't use it anymore because, for me, the chances are high to get infected from this kind of place." (Attendee 4, male, 71)
	Feelings of longing for loved ones	"I couldn't see my children, I mostly feel upset because of this (she gets emotional, crying), they couldn't come because of the fear of getting me infected." (Attendee 10, female, 72)
	Craving for social life and rituals	"My grandchild is born, I couldn't get to see my grandson, I couldn't visit my son and daughter-in-law." (Attendee 4, male, 71)
	Ageism	"the pandemic made us feel our age, that is, we get old as we are over 65 years, although we were not aware of it, it (she means life) is flowing away." (Attendee 8, female, 70)
	Feeling rejection	"When I went to my village, I said to my cousin let me see you, he said please don't come. I asked then that he would come, he said I can't come its dangerous. (his voice getting shrill while talking) I'm feeling bad about that. I lose something every day with kinship. Deeply, it feels so sad". (Attendee 3, male, 66)
	Feeling uncertainty and psychological fatigue	"When I think about changes in our lives with the pandemic: we spend more time on eating, our daily routines have changed. I used to read books before the pandemic, now I've stopped reading, the things you have to do is getting less. I think some kind of mental distress. I don't know, at the beginning you are watching TV lying down, now you watch while sitting down. You get up first, by yourself, when you want to drink water, you are now waiting for your spouse and your child, it seems like a very unfortunate, meaningless life." (Attendee 2, male, 70)

<p>Social Consequences</p>	<p>Lack of family visits</p> <p>Lifestyle changes</p> <p>Using technology</p>	<p>"We are terrified that a guest will come, you can't open the door if they come, you can't let them in, but you miss them if they don't come." (Attendee 1, female, 70)</p> <p>"Sometimes my brother stops by to see me, he sits under the balcony to talk, he calls me on my phone, we see each other from far away and talking to each other on the phone, that's it." (Attendee 10, female, 72)</p> <p>"We live in the house and in our garden. We have lost contact with almost everybody, just phone calls, small talk, it's our new sterile life." (Attendee 11, female, 70)</p> <p>"I've started to play computer games during the pandemic, I cannot understand how time flies, you can play for hours." (Attendee 3, male, 66)</p> <p>"At the beginning of the pandemic, we made group calls with my friends, one or two times, but then we just got used to the situation, and just started texting from time to time." (Attendee 11, female, 70)</p>
<p>Physical Consequences</p>	<p>Limited access to or inaccessibility of healthcare services</p> <p>Difficulties in reaching out for daily needs</p> <p>Adaptation problems in lockdown hours for those over 65</p>	<p>"I don't have any health problems, but I have check-ups. I had to cancel my appointments when the pandemic started due to staff shortages" (Attendee, 11, female, 69)</p> <p>"Sometimes I feel desperate, it's hard to go to the market or there is nobody younger to ask help for it, it was really hard at times. (His voice is getting shrill; he gets emotional). (Attendee 4, male, 71)</p> <p>"We are really affected by the curfew: by the time we get up and have breakfast it's almost 12 A.M, then there's lunch. Time flies so quickly that we can't even understand what to do. (Attendee 2, male, 70)</p>



### Qualitative Findings

During the qualitative phase of this study, three main themes, namely emotional, social, and physical consequences, with a total of 12 categories (Table 4) were obtained.

### DISCUSSION AND CONCLUSION

This study shows that, due to COVID-19, emotional loneliness arising out of social isolation is evident in people aged 65 and over. These older people experience a range of problems in accommodating themselves to the changes in their daily lives and routines. Of the participants, 72.7% described their experience of loneliness, and for many this was experienced at levels, two, three, and four. The qualitative statements of the participants regarding their loneliness support our quantitative findings. Feelings of loneliness are associated with decreased social communication and social support (10). We believe that our findings about loneliness are strongly associated with limited social communication and a lack of social support due to social isolation. Our participants' statements were similar to those in the study by Batra et al. (12), which concluded that older population maintained their physical and mental health by creating meaningful relationships. A study by Kılıc and colleagues (20) on people over the age of 65 found that loneliness levels were higher in those who lived alone than in those who lived with their spouse or children (20). While no statistically significant differences ( $p > 0.05$ ) were found between loneliness levels and age, gender, educational background, occupation, whether they had children, the place of residence or domestic partner, significant differences were found between marital status and loneliness level ( $p = 0.025$ ) and between living alone and loneliness level ( $p = 0.046$ ). It is assumed that this stems from conjugal social relations (spouse, children, and other related social connec-

tions) and interaction. Many studies on loneliness have reported that loneliness increases with age (21-23). In this study, no age-dependent differences were found in total loneliness levels; however, it was observed that emotional loneliness increased with age (6.52). Another significant finding was the difference in emotional loneliness among elderly people who live in a city together with their spouse ( $p = 0.011$ ). There were no findings connecting loneliness with pathological physical or mental disease. However, negative psychological impacts, such as eating disorders, psychomotor retardation, feelings of valuelessness, anxiety, depression, and acute stress, were all reported by participants, which confirmed the results found by other researchers (12,13).

The constant emphasis on the risk of infection, the anxiety due to the necessity to self-protect, the social isolation imposed on people over the age of 65, and a lack of adequate communication all contributed to the depressive responses. It was also evident that the eating habits of people over the age of 65 had changed, they could not go for their routine health checks, and in these ways, their environments had become less conducive to healthy living. A lack of, or else limited, communication via telephone with their close circle, such as children and relatives, had led many to experience fears, anxieties, and feelings of valuelessness, as has been stated by other researchers (12,13). However, this intense need for communication had also caused people to develop skills in new ways of communicating involving communication technologies such as video calls and social media.

Taking into consideration all the uncertainties of the COVID-19 pandemic, together with its enforced social isolation, it is suggested that programs should be developed to assist older people to maintain their daily activities and their well-being oriented activities. Awareness programs should be created to ensure the continuity of social commu-

nication, and social support assistance should be developed in parallel with the restrictions imposed by the pandemic. Finally, long-term studies using methodological variety should be conducted in order to understand the long-term impact of enforced social isolation during a pandemic.

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## Disclosure Statements

The authors state that there are no conflicts of interest in this study.



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## RESEARCH

# COMPARING THE EFFECTS OF HYDROXYCHLOROQUINE, FAVIPIRAVIR, AND HYDROXYCHLOROQUINE PLUS FAVIPIRAVIR ON SURVIVAL OF GERIATRIC POPULATION WITH COVID-19-RELATED PNEUMONIA: A PROPENSITY SCORE-MATCHED ANALYSIS

## ABSTRACT

**Introduction:** Elderly patients are among the most vulnerable populations during the COVID-19 pandemic. Although hydroxychloroquine and favipiravir, separately and in combination, have been used in the general population, their benefits are unclear, especially in the geriatric population. This study aims to compare the effects of different drug regimens on the clinical outcomes of elderly patients with COVID-19-related pneumonia.

**Materials and methods:** This retrospective cohort study, conducted in a tertiary healthcare center between April 2020 and October 2020, included all patients over 65 years of age admitted to the emergency department with confirmed COVID-19-related pneumonia. Patient characteristics and clinical outcomes were recorded. The patients were classified into hydroxychloroquine, favipiravir, and hydroxychloroquine plus favipiravir treatment groups. Propensity score matching was performed to balance the differences between the groups. The primary outcome was 30-day survival. The secondary outcomes were length of hospital stay and the need for mechanical ventilation.

**Results:** A total of 335 patients were included in the study; 144 were matched according to the propensity scores and divided into groups of 48 each. There was no significant difference between the treatment groups' survival curves. The length of hospital stay was significantly longer in the favipiravir group. No significant difference was detected in mortality or the need for noninvasive or invasive mechanical ventilation.

**Conclusion:** The hydroxychloroquine, favipiravir, and hydroxychloroquine plus favipiravir treatments had similar effects on 30-day survival, mortality, and the need for mechanical ventilation. The length of hospital stay was longer in the patients treated with favipiravir.

**Keywords:** COVID-19; Geriatrics; Hydroxychloroquine; Favipiravir.



## INTRODUCTION

Coronavirus disease 2019 (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) affects people of all ages (1). However, elderly patients are among the populations most vulnerable to more severe illness and mortality, because aging itself and multiple accompanying comorbidities can increase the risk of poor outcomes in this population (2). A large epidemiologic study reported that the case fatality rate (CFR) was 2.3% in all populations compared to a CFR of 8% in patients between 70 and 80 years and 14.8% in patients older than 80 years (1). Another study reported that the pneumonia in elderly patients was significantly more severe compared to young and middle-aged patients with COVID-19 related pneumonia (3).

Comorbidities and polypharmacy lead to more challenging management of COVID-19 in the geriatric population (4). Since a specific pharmacotherapy is still not approved for COVID-19, an individualized approach while carefully assessing the adverse effects and interactions of suggested treatments should be practiced for elderly patients (4). To date, many treatment alternatives have been recommended for patients with COVID-19, including antiretroviral drugs (mostly lopinavir/ritonavir), interferons, remdesivir, ribavirin, chloroquine, hydroxychloroquine (HCQ), and favipiravir (FVP) (5). However, treatment guidelines vary between countries (5). In Turkey, the use of HCQ and FVP for COVID-19 was recommended by the COVID-19 Scientific Board of the Ministry of Health (6). Although the use of HCQ has been discontinued in Turkey, many resource-limited countries continue to use HCQ to treat COVID-19 (7). A nationwide epidemiologic study from Turkey showed that FVP was given to 34.5% of patients over 60 years old and 41% of patients over 80 years old. Conversely, HCQ was used for 79% of patients over 60 years old (8). The use of the combination of HCQ and FVP was also reported in elderly patients with COVID-19 (5).

Although many studies have evaluated the safety and efficacy of FVP and HCQ for COVID-19, inconsistent results have led to a debate about their confident utilization (9). FVP is a selective RNA polymerase inhibitor that has been shown to be effective in preventing viral replication in human cells (10). Preliminary results from a systematic review and meta-analysis indicate that FVP is safe; however, its effectiveness is limited in the treatment of COVID-19 (11) critically impacting public health systems. A number of already approved and marketed drugs are being tested for repurposing, including Favipiravir. We aim to investigate the efficacy and safety of Favipiravir in treatment of COVID-19 patients through a systematic review and meta-analysis. This systematic review and meta-analysis were reported in accordance with the PRISMA statement. We registered the protocol in the PROSPERO (CRD42020180032). Some adverse effects related to FVP have been reported in the literature; however, they are mostly manageable (12,13). HCQ is also among the most controversial treatments for COVID-19. Despite the lack of strong evidence, the antiviral and anti-inflammatory activities of HCQ have been suggested as effective in treating COVID-19 (14) hydroxychloroquine (HCQ). Conversely, several systematic reviews and meta-analyses showed no tangible benefits of HCQ treatment in mild COVID-19; moreover, significant adverse effects were reported (15). Conjecturally, the combination of HCQ and FVP is also suggested through their synergistic effects on different target sites (16).

For COVID-19, the use of treatments with limited effectiveness and potential adverse effects raises concerns, particularly in a more vulnerable elderly population. Data on the effects of HCQ and FVP treatments in the geriatric population are scarce in the literature. This study aims to compare the effects of HCQ, FVP, and HCQ plus FVP on the clinical outcomes in elderly patients with COVID-19-related pneumonia.

## MATERIALS AND METHODS

### Study Design and Settings

This was a retrospective cohort study conducted in a tertiary healthcare center between April 1, 2020, and October 1, 2020. Institutional review board (No: 15/21, 17.09.2020) and the Ministry of Health of Turkey, COVID-19 Scientific Research Platform approval (No: 2020-10-07T14\_14\_00) was obtained before the study began.

### Study Protocol

All patients admitted to the emergency department (ED) between April 1, 2020 and October 1, 2020 with COVID-19 were screened from the hospital's electronic medical records (EMR).

Inclusion criteria were as follows: the

1. Patients above 65 years of age who had a positive PCR test for SARS-CoV-2
2. Patients who had confirmed pneumonia on a chest CT,
3. Patients who had been treated with HCQ, FVP, or HCQ combined with FVP for COVID-19.

The exclusion criteria were as follows:

1. Patients younger than 65 years
2. Patients who needed mechanical ventilation in the ED
3. Patients who died within 72 hours of admission
4. Patients whose clinical outcomes could not be determined from the EMR or by phone call.
5. Patients who were not treated in adherence to the guidelines of the COVID-19 Scientific Board of the Ministry of Health of Turkey
6. Patients whose treatment regimens changed during the first five days of hospitalization.

Patient demographics, initial symptoms, vital signs, laboratory test results, severity of illness, comorbidities, administered treatment, length of hospital stay, and patient outcomes were obtained from the EMR. Patients discharged from the hospital were phone called by an investigator to determine the clinical outcome. All included patients were classified into three groups according to treatment with HCQ, FVP, or HCQ plus FVP. Characteristics related to the patients' demographics, clinical features, and outcomes were compared between the treatment groups.

### Treatment Groups

HCQ: 200 milligrams (mg) orally twice per day for 5 days.

FVP: 1600 mg twice per day orally on the first day as a loading dose and 600 mg twice per day orally for 4 more days as a maintenance dose.

HCQ plus FVP: 200 mg HCQ plus 1600 mg FVP orally twice on the first day and 200 mg HCQ plus 600 mg FVP twice per day orally for 4 more days.

### Outcome measures

The outcomes of this study were the effects of HCQ, FVP, and HCQ plus FVP on patients' 30-day survival and length of hospital stay. Thirty-day follow-up was determined as the study endpoint to evaluate the short-term effects of HCQ, FVP, and HCQ plus FVP treatments on patient outcomes.

### Data Analysis

MedCalc version 20 (MedCalc Software Ltd. Ostend, Belgium) was used for the statistical analysis. The categorical variables are presented as numbers and percentages. The continuous variables are presented as means and standard deviations or medians and interquartile ranges according to the normality of the distribution. The Kolmogorov–Smirnov





test was used to assess the normality of the distribution. Propensity score (PS) matching was performed between the cohorts to balance the covariates, including age, sex, the Carlson comorbidity index, the pneumonia severity index, adjuvant antibiotic treatments, and use of low-molecular-weight heparin, to prevent possible biases caused by the study's retrospective nature. One-way ANOVA or Kruskal-Wallis tests were used to compare the continuous variables according to the normality of the distribution. Pairwise comparisons with Tukey's or Dunn's posthoc tests were carried out if 3 groups comparison was statistically significant. The chi-square test was used to compare the categorical variables. The Kaplan–Meier method was used to construct 30-day survival curves. The log-rank test was used to compare the survival curves.

## RESULTS

During the study period, 2772 patients were screened for eligibility, of whom 355 were eligible. After excluding 20 patients due to missed information or loss of contact, 335 patients were included in the study. The mean age of the patients was  $75 \pm 8$  years, and 188 (56%) were male. Among the patients, 84 (25%) were discharged from the ED, 188 (56%) were admitted to hospital wards, and 63 (19%) were admitted to intensive care units. Mortality occurred in 78 patients (27%). HCQ was used in 64 (19%) patients, FVP was used in 193 (58%) patients, and HCQ plus FVP was used in 78 (23%) patients.

A total of 144 patients were matched according to the PS, which resulted in 48 patients for each treatment group. There were no significant differences between the demographic features and initial vital signs between the groups (Table 1).

Mortality occurred in 32 patients (22%) within 30 days of ED admission, including 12 (25%) in the HCQ group, 11 (23%) in the FVP group, and 9 (19%) in the HCQ plus FVP group. The PS-matched Kaplan–Meier survival curves of the treatment groups are shown

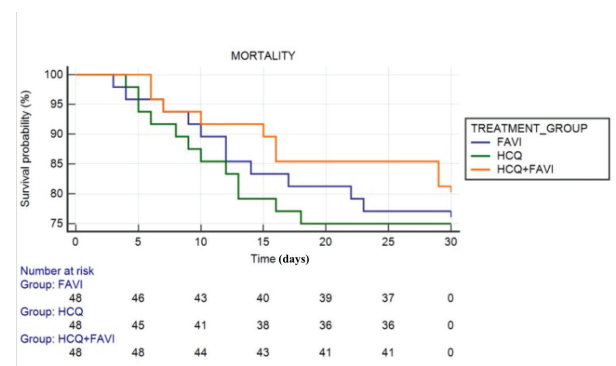
in the Figure 1. The mean survival time were  $24.9 \pm 8.9$  days (95% CI: 22.4–27.5) in the HCQ group,  $25.8 \pm 8.1$  days (95% CI: 23.6–28.1) in the FVP group, and  $27.1 \pm 6.9$  days (95% CI: 25.2–29) in the HCQ plus FVP group. There was no statistically significant difference between the survival curves of the treatment groups ( $p=0.7$ ).

The length of hospital stay was significantly longer in the FVP group ( $p=0.007$ ). In the post hoc comparisons, this difference was detected between the FVP and the HCQ groups (mean difference [md]=3.7 days,  $p<0.05$ ) and between the FVP and the HCQ plus FVP groups (md=3.5 days,  $p<0.05$ ). No significant difference was detected for mortality or the need for noninvasive and invasive mechanical ventilation between the treatment groups ( $p=0.8$ ,  $p=0.9$ , and  $p=0.7$ , respectively) (Table 2).

## DISCUSSION

This study's results showed that HCQ, FVP, and HCQ plus FVP had similar effects on the 30-day survival of geriatric patients with COVID-19-related pneumonia. However, HCQ-containing regimens provided a shorter length of hospital stay. To date, no studies have focused on the survival of elderly patients with COVID-19 treated with HCQ and FVP or the combined treatment of HCQ and FVP.

**Figure 1.** Kaplan Meier Survival Curve of the patients for 30 days survival



**Table 1.** Demographic features of the patients

	Total (n=144)	HCO (n=48)	FVP (n=48)	HCO + FVP (n=48)	p value
Age (mean±SD)	73,4±8,1	73,6±8,6	73,4±7,9	73,1±8,1	0,94
Male sex (n, %)	75(52,1)	22(45,8)	24(50)	29(60,4)	0,34
DM (n, %)	51(35,4)	11(22,9)	18(37,5)	22(45,8)	0,08
HTN (n, %)	111(77,1)	39(81,3)	33(68,8)	39(81,3)	0,24
COPD (n, %)	27(18,8)	9(18,8)	8(16,7)	10(20,8)	0,87
CAD (n, %)	34(23,6)	14(29,2)	8(16,7)	12(25)	0,34
Cancer (n, %)	8(5,6)	3(6,3)	4(8,3)	1(2,1)	0,4
CVD (n, %)	25(17,4)	10(20,8)	10(20,8)	5(10,4)	0,3
CKD (n, %)	11(7,6)	3(6,3)	6(12,5)	2(4,2)	0,28
Heart failure (n, %)	2(1,4)	-	2(4,2)	-	-
Charlson CI (n, %)	6,43±2,39	6,15±2,13	6,56±2,3	6,58±2,71	0,6
<b>Vital Signs</b>					
Temperature, °C, (mean±SD)	37,5±0,7	37,4±0,5	37,6±0,7	37,5±0,8	0,14
SBP, mmHg, (mean±SD)	118,1±18,1	115,67±22,71	119,83±19,13	118,15±18,1	0,59
DBP, mmHg, (mean±SD)	67,88±10,92	68,54±9,05	68,54±13,06	66,56±10,37	0,6
HR, bpm, (mean±SD)	94,51±16,58	91,38±14,19	96±17,99	96,15±17,2	0,28
RR, breath/m, (mean±SD)	23,31±3,65	23,04±4,36	23,33±3,01	23,56±3,52	0,78
SaO <sub>2</sub> , (mean±SD)	93,13±5,78	94,35±4,49	91,73±7	93,31±5,38	0,08
GCS, (mean±SD)	14,77±0,56	14,81±0,39	14,65±0,78	14,85±0,41	0,16

HCO: hydroxychloroquine, FVP: favipiravir, SD: standard deviation DM: diabetes mellitus, HTN: hypertension, COPD: chronic obstructive pulmonary disease, CAD: coronary artery disease, CVD: cerebrovascular disease, CKD: chronic kidney disease, CI: comorbidity index, SBP: systolic blood pressure, DBP: diastolic blood pressure, HR: heart rate, RR: respiratory rate, SaO<sub>2</sub>: oxygen saturation, GCS: Glasgow coma scale

Optimal management for COVID-19 has continuously evolved since the beginning of the pandemic. Since there is no specific therapy for COVID-19, several alternative treatment options have been suggested. HCO is one of the most controversial drugs among the alternative treatment options. Most systematic reviews and meta-analyses have revealed that HCO treatment has no tangible benefit in treating or preventing COVID-19 (17). In addition,

possible adverse events have been reported to be associated with its use (17). Although many countries have abolished or limited the use of HCO, there is still usage of HCO, especially in resource-limited countries (7). Uncontrolled use of HCO for COVID-19, particularly in a more vulnerable geriatric population, could pose a higher risk due to comorbidities or concomitant drug use (18). Conversely, FVP has been suggested as a safe alternative for



**Table 2.** Clinical outcomes of the patients

	Total (n=144)	HCQ (n=48)	FVP (n=48)	HCQ + FVP (n=48)	p value
Survived days (mean±SD)	26,2±8,5	25,15±9,2	25,9±8,2	27,6±7,9	0,33
Mortality (n, %)	34(23,6)	13(27,1)	11(22,9)	10(20,8)	0,76
Antibiotics (n, %)	118(81,9)	40(83,8)	39(81,3)	39(81,3)	0,95
NIMV (n, %)	34(23,6)	11(22,9)	11(22,9)	12(25)	0,96
IMV (n, %)	23(16)	6(12,5)	8(16,7)	9(18,8)	0,7
Wards LOS (mean±SD)	7,65±4,9	6,13±4,14	9,8±5,81	6,34±3,5	<b>0,007</b>
ICU LOS (mean±SD)	11,18±8,84	9,07±7,54	9,5±6,35	14,71±11,04	0,18

HCQ: hydroxychloroquine, FVP: favipiravir, SD: standard deviation, NIMV: non-invasive mechanical ventilation, IMV: invasive mechanical ventilation, LOS: length of stay, ICU: intensive care unit

treating patients with COVID-19 (19). However, contradictory results regarding the treatment effectiveness of FVP from previous studies limit the usability of this agent for the elderly population (202021, we searched PubMed, bioRxiv, medRxiv, ClinicalTrials.gov, Cochrane Central Register of Controlled Trials (CENTRAL).

FVP is an RNA-dependent RNA polymerase inhibitor that acts as a purine analog and therefore inhibits DNA replication (19). FVP has been shown to be effective in treating infections caused by RNA viruses, including influenza, Ebola, rabies, norovirus, and SARS-CoV-2 (21). Many studies have compared the efficacy and safety of FVP with the standard care in COVID-19. Manabe et al. conducted a systematic review and meta-analysis to measure viral clearance and clinical improvement in patients with COVID-19 treated with FVP (19). They reported that the FVP treatment favors viral clearance by 7 days and contributes to clinical improvement in 14 days compared to a placebo, remdesivir, HCQ, other available antivirals, and the standard care (19). It has been suggested that FVP treatment could be an effective treatment, especially in patients with mild to moderate COVID-19. In another systematic review and

meta-analysis, Hassanipour et al. evaluated clinical improvement, viral clearance, ICU admission, adverse events, and mortality rates in patients with COVID-19 treated with FVP compared to the standard of care or other antiviral treatments (11critically impacting public health systems. A number of already approved and marketed drugs are being tested for repurposing, including Favipiravir. We aim to investigate the efficacy and safety of Favipiravir in treatment of COVID-19 patients through a systematic review and meta-analysis. This systematic review and meta-analysis were reported in accordance with the PRISMA statement. We registered the protocol in the PROSPERO (CRD42020180032). Better clinical improvement was reported in the patients treated with FVP during 7 days of hospital admission (risk ratio =1.24, 95% CI: 1.09–1.41, p=0.001). However, no significant difference has been shown regarding viral clearance, intensive care unit (ICU) admission, adverse events, and mortality in the general group of patients with mild to moderate COVID-19 (11critically impacting public health systems. A number of already approved and marketed drugs are being tested for repurposing, including Favipiravir. We aim to investigate the efficacy and safety of Favip-

iravir in treatment of COVID-19 patients through a systematic review and meta-analysis. This systematic review and meta-analysis were reported in accordance with the PRISMA statement. We registered the protocol in the PROSPERO (CRD42020180032). Özlüßen et al. performed a systematic review and meta-analysis on the effectiveness of FVP on mortality and the need for mechanical ventilation in patients with moderate to severe COVID-19 (202021, we searched PubMed, bioRxiv, medRxiv, ClinicalTrials.gov, Cochrane Central Register of Controlled Trials (CENTRAL). They reported that FVP treatment had no superiority over the standard of care or other antivirals for up to 14 days after COVID-19 diagnosis (202021, we searched PubMed, bioRxiv, medRxiv, ClinicalTrials.gov, Cochrane Central Register of Controlled Trials (CENTRAL). However, systematic reviews and meta-analyses are mostly limited due to the low number of randomized controlled trials (RCTs), the higher number of retrospective studies, and the heterogeneity of the included studies. More recently, the preliminary results of the PRESCO study (Preventing Severe COVID-19 Disease) which is a double-blind, placebo controlled, randomized, multi-center phase 3 trial, showed that FVP did not achieve statistical significance for the sustained clinical recovery in 1231 patients. (22). Because of the PRESCO study was only included adult outpatients with mild-to-moderate COVID-19, more randomized-controlled trials that also include a broader population such as elderly patients, children and hospitalized patients are needed.

Many studies have compared the safety and efficacy of HCQ and FVP in patients with COVID-19 in general populations. The safety and efficacy of FVP were compared to HCQ plus oseltamivir in an RCT in patients with mild and moderate COVID-19 (9). Both drug regimens provided similar efficacy for viral clearance and length of hospital stay. Moreover, no serious adverse events were seen in either group except for one patient who died of myocarditis on

the eighth day of infection in the HCQ group. Another RCT by the same investigators comparing the efficacy of FVP and chloroquine revealed no significant difference between the groups regarding the length of hospital stay, the need for mechanical ventilation, and adverse effects (23). Guner et al. compared the effects of HCQ, FVP, and HCQ plus FVP on the need for ICU transfer in hospitalized patients with mild to moderate COVID-19 (5). Both HCQ and HCQ plus FVP provided a lower need for ICU transfer compared to FVP alone. Among the patients, 10.4% were over 65 years old. However, no subgroup analysis was performed for elderly patients in this study. In addition, 73.3% of the study patients were younger and had lower C-reactive protein and ferritin levels in the HCQ group compared to the patients receiving FVP-containing regimens (5). Başaran et al. compared the effects of HCQ, HCQ plus azithromycin, and FVP-containing regimens in non-critical COVID-19 patients on symptoms and clinical improvement (24). Longer symptom resolution, clinical improvement, and length of hospital stay were reported in the patients treated with the FVP-containing regimens. However, it is important to note that FVP was initiated as a second-line treatment in patients who deteriorated under the HCQ or HCQ plus azithromycin treatments (24). In our study, the length of hospital stay was also significantly longer in the FVP group. Conversely, FVP treatment was one of the first-line treatments like the HCQ and the HCQ plus FVP groups. The possible reason for a longer hospital stays in FVP group despite its being first-line treatment in our study could be that the geriatric population in our study is more sensitive to be clinically deteriorated compared to the Basaran et al.'s non-critical general population. In another study, Ömeroğlu et al. compared the effects of HCQ, FVP, and HCQ plus FVP on symptom improvement, PCR negativity, and the need for hospitalization in patients with COVID-19 (25). HCQ was significantly better for symptom im-



provement and PCR negativity than FVP or HCQ plus FVP. However, no significant difference was reported for the need for hospitalization between the treatment groups (25). In an RCT by Bosaeed et al., the FVP and HCQ combination was also compared to the HCQ or FVP monotherapies in patients with moderate to severe COVID-19 (16). Time to clinical improvement and the mortality rate were not significantly different between the treatment groups (16). In our study, mortality and the need for invasive or noninvasive mechanical ventilation rates were also similar between the treatment groups. The negative results of FVP were mostly attributed to the late initiation of therapy or its use as a second-line therapy (24-26). Although FVP was initiated in the early period as a first-line therapy in this study, the outcome did not change. This difference could be because previous studies were conducted with a younger population with mild to moderate COVID-19. However, in this study, like Bosaeed et al.'s study, the patients were critically ill and required hospitalization at the time of diagnosis (16). From the point of our study results view, FVP alone or the combination with HCQ did not provide additional benefit than HCQ treatment. Moreover, resulted in longer hospital stays. Although our study is very limited for suggesting that FVP had no better than HCQ, we believe that the new results from high-quality RCTs would direct clinicians to alternative anti-viral treatments for COVID-19.

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## LIMITATIONS

This study has several limitations. First, this was a single-center retrospective study, which limits the generalizability of the study results. Second, although PS matching was performed to minimize potential biases caused by this study's retrospective nature, a significant amount of data was lost during the matching process. This resulted in a lower number of patients being included in the final analysis. Third, this study only included a geriatric population with COVID-19-related pneumonia. Therefore, including a general population could lead to different results. Fourth, although the COVID-19 treatment guidelines recommended by the Ministry of Health of Turkey were strictly adhered to in our study center, some adjunct treatments, such as steroids or antibiotics, varied between the patients. This might have led to some differences in patient outcomes. Fifth, the adverse effects associated with treatment regimens were not evaluated in this study. Especially in a vulnerable population, including elderly patients, the adverse effects of treatments would influence treatment selection.

## CONCLUSION

In this study, we found that HCQ, FVP, and the combination of HCQ plus FVP had similar effects on 30-day survival. Although no differences were detected in mortality or the need for noninvasive or invasive mechanical ventilation, the length of hospital stay was longer in the patients treated with FVP-containing regimens.

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## RESEARCH

# INVESTIGATION OF THE EFFECT OF THE USE OF CINEMA IN MEDICAL EDUCATION ON THE ATTITUDES OF MEDICAL STUDENTS TOWARDS THE ELDERLY: AN INTERVENTIONAL STUDY

## ABSTRACT

**Introduction:** Healthcare professionals' attitudes towards the elderly are at the basis of the healthcare services provided to the elderly. Although training in geriatrics is known to be necessary, when and how are still not clear. This study aims to evaluate the attitudes of Medical Faculty students towards the elderly and the change in their attitudes after watching a movie about elderly people.

**Materials and Method:** The presented study is an interventional study that included 402 1st and 6th-grade medical students. A film named "AMOUR" which is about an aged couple's life events was watched. Attitude changes were analyzed pre and post-intervention via UCLA Geriatric Attitude Scale (UCLA-GAS) and Kogan Elderly Attitude Scale (KAOPS).

**Results:** The data from 402 filled questionnaires were analyzed. Female ratio was 57.6% (n=103) in first year and 54.1% (n=73) in sixth year. Pre and post-intervention UCLA-GAS scores were 48.12±5.19 and 46.38±5.86, respectively (p<0.001). Similarly, the mean scores of the pre-and post-intervention KAOPS were found as 102.35±12.80 and 98.22±13.64 points, and the decrease was significant (p<0.001). There were a strong positive correlation between pre and post-intervention UCLA-GAS (r=0.648, p<0.001) and KAOPS (r=0.758, p=0.001).

**Conclusion:** This study shows that female students have more positive attitudes than male students, and as the academic period increases, there is a decrease in students' positive attitude scores. Big family members have higher scores than nuclear family members while having a nursing home visit is not effective on the positive attitude towards the elderly.

**Keywords:** Ageism; Attitudes; Art; Medical Students; Geriatrics.





## INTRODUCTION

Today, advances in medicine and technology have enabled people to live longer. According to the World Health Organization (WHO) data, approximately 650 million of the world population are elderly people, and this figure is expected to reach two billion in 2050 (1). In Turkey, it is estimated that the proportion of the elderly population will be 10.2% in 2023, 12.9% in 2030, 16.3% in 2040, and 25.6% in 2080 (2). The increase in the elderly population is accepted as an indicator of the socioeconomic development of a society. However, the aging of the population affects many areas of society, from health to education, job opportunities, and family life. The social and economic consequences of longevity will be significant for Turkey; therefore, precautions should be taken (2).

Attitudes of health professionals towards the elderly are the basis of the health care provided to the elderly, and many factors affect this attitude. For example, age, gender, ethnicity, cultural influences, geriatric education, or living with elderly individuals can change attitudes towards the elderly (3). In our country, undergraduate medical education was added to the core diseases/clinical problems section under the title of "Geriatric syndromes (fragility, sarcopenia, falls, etc.)" in The National Core Education Program in 2020 (4). Prior to this, there was no formal geriatric education program defined in undergraduate medical education. In medical faculties with a geriatrics department, geriatrics lecturers can give lectures and practices in internal diseases courses. However, there are medical faculties that do not have a geriatrics discipline, including our own faculty. Only persons who have qualified for internal medicine specialization; after three years of additional training, they can receive the title of "Geriatrician" (5).

Different training methods are recommended so that these pieces of training do not remain in theory but turn into attitudes and behaviors. For this purpose, anthropology, literature, philosophy, reli-

gion, history, and visual arts in medical education is increasing. Art is a good tool for doctors to understand themselves and their patients better, and it is also effective in adopting and gaining the attitudes and behaviors required by medicine. In 1979, Fritz and Poe published an article in *The American Journal of Psychiatry* entitled "The role of film seminar in psychiatry education" (6). As stated in a review, this article is the first scholarly report in the literature to discuss the use of cinema to facilitate a specialist training program (7). The authors found the method useful and tried to share their ideas with their colleagues through this article. Cinema uses video and sound, making it easy to integrate viewing and listening, audio-visual interaction into many medical applications (7). The film quickly conveys points learned directly with certain scenes; it integrates emotions with the image, enabling students to immediately understand and recognize the main idea (7).

This study aims to determine the attitudes of the 1st and 6th-grade students of the Faculty of Medicine towards the elderly and the change in their attitudes after watching a movie about old age.

## MATERIALS AND METHODS

In this interventional type study, the study population consisted of 280 first-year and 260 sixth-year students studying at the Faculty of Medicine in the 2018- 2019 academic year. The sample was not selected; it was tried to reach all of the students. Approval for the study was obtained from the regional ethics committee with the decision number 2018/1644. In addition, the purpose of the study was explained to the students, and their written consent was obtained.

**Pre-intervention form:** A questionnaire including sociodemographic information form, questions about aging, UCLA Geriatric Attitude Scale (UCLA-GAS), and Kogan's Attitudes toward Older People Scale (KAOPS) were applied to the participants

before the intervention (8-11). Every participant chose a nickname and wrote it to the pre-intervention form and was reminded not to forget it for the second form.

Questions about aging were asking the presence of an elderly person living together in the past or currently, at what age does aging being, where and with whom their grandparents live, and status of visiting a nursing home.

The intervention: The participants were shown a 50-minute short version of the 125-minute film "AMOUR (2012)", a semi-autobiographical film by Michael Haneke, which presents sections from the life of an elderly couple and also shows their difficult sides. This movie, which we think makes it easier for the audience to empathize with its presentation style, is an award-winning movie. In the educational sense, as stated below, it was chosen by the joint decision of the researchers among a few films that were determined because of the problems experienced by two elderly people, especially when one of them got sick, the illness process, family relations, as well as the striking end of the distress and the fact that it offers students subjects to think about on the film, as it does to all the audience.

Before watching the movie, the students were informed about the points to be considered in the movie;

- 1-Changes related to aging in individuals taking part in the film
- 2-The relationship of elderly people in the movie with their families
- 3-The relationship of the elderly couple in the movie with each other
- 4-The change in the relationships among the elderly individuals in the film with aging
- 5- Situations about the health of the elderly in the movie that caught your attention

At the end of the film, researchers gave time to students to reflect on the points above.

**Post-intervention form:** Afterwards, the post-intervention form, including nicknames, UCLA-GAS, and KAOPS scales, was applied again.

The Scales:

**UCLA Geriatric Attitude Scale (UCLA-GAS):**

The scale was developed by Reuben et al. (8). Its Turkish validity and reliability study was conducted by Şahin et al. (9). This five-point Likert-type scale, which consists of 14 questions, includes positive and negative attitude sentences.

**Kogan's Attitudes toward Older People Scale (KAOPS):** It is a two-dimensional scale consisting of 34 items, which was created to measure individuals' attitudes towards elderly people (10). The validated Turkish form of scale was used (11). The lowest and highest scores are 26 and 156 points.

The local ethics committee approved the study with the date of 21.12.2018 and the number 2018/1644.

**Statistical Analysis:** The Statistical Package for Social Sciences (SPSS) for Windows 20.0 program was used for statistical analysis. Normality distribution of the data was tested with Shapiro Wilk-W and Kolmogorov Smirnov tests. While descriptive statistics for continuous variables were expressed as mean and standard deviation, categorical data were frequency and percentage. Chi-square test, One-Way Analysis of Variance (One-Way ANOVA), and independent samples t-test were used for comparisons. Paired t-test was used for the comparison of the pre and post-intervention questionnaires data. Statistical significance was accepted as  $p < 0.05$ .

## RESULTS

There were 280 students in the first year and 260 students in the sixth year in 2018-2019. The data from 402 filled questionnaires were analyzed. The mean ages of 243 (86.7%) first and 159 (61 %) sixth-year students were  $18.40 \pm 0.4$  years and  $24.13 \pm 0.1$



years, respectively. Female ratio was 57.6% (n=103) in first year and 54.1% (n=73) in sixth year.

For the 29.1% (n=68) of the first-year students, aging began at 54 years and under, and just for the 33.3% (n=78) between 55-64 years. While the nursing home visit experience was 26.7% (n=65) in the first year, it was 40.3 % (n=64) in the sixth year (p=0.005).

The students' socio-demographic characteristics and the answers given about aging and their experiences of elderly people are shown in Table 1.

UCLA-GAS's internal consistency coefficient (Cra) was 0.55 for pre-intervention and 0.66 for post-intervention. Cra of KAOPS was 83.9 for pre-intervention and 87.2 for post-intervention. The participants' pre and post-intervention UCLA-GAS mean scores were  $48.12 \pm 5.19$  and  $46.37 \pm 5.86$ , respectively (p<0.001). While pre and post-intervention UCLA-GAS mean scores of females were  $48.61 \pm 4.79$  and  $46.96 \pm 5.30$  (p<0.001), that were  $47.49 \pm 5.62$  and  $45.61 \pm 6.45$  for males (p<0.001). Pre-intervention UCLA-GAS mean scores of students coming from nuclear families ( $47.91 \pm 5.23$ ) and large families ( $49.52 \pm 4.68$ ) were statistically different (p<0.038). Post-intervention UCLA-GAS mean score of participants who did not live with an elderly person in the past or present was  $45.94 \pm 5.99$ , while the score of those who lived was  $47.45 \pm 5.38$  (p=0.020). Table 2 shows the pre and post-intervention UCLA-GAS mean scores according to socio-demographic features and answers to aging questions.

Pre and post-intervention KAOPS mean scores were  $102.35 \pm 12.80$  and  $98.22 \pm 13.64$  (p<0.001). Students coming from large families had significantly higher scores in both pre ( $107.82 \pm 13.10$ ) and post-intervention ( $102.60 \pm 12.10$ ) questionnaires (p<0.001). There is a decrease in UCLA-GAS (p<0.001) and KAOPS (p<0.001) scores after the film compared to the pre-film scores. The comparison of the mean scores of the KAOPS scale before and after the intervention is shown in Table 3.

There was a strong positive correlation (r=0.648, p<0.001) between pre and post-intervention UCLA-GAS and a very strong positive correlation between pre and post-intervention KAOPS (r=0.758, p=0.001). The correlation of UCLA-GAS and KAOPS is shown in Table 4.

## DISCUSSION

The utilization of anthropology, literature, philosophy, religion, history and visual arts in medical education has increased in recent years. Art is a good tool for doctors to understand themselves and their patients better, and it is particularly effective in adopting and gaining attitudes and behaviors required by medicine. Many publications on art branches such as painting, music, theater, poetry, and cinema in medical education attract attention in the literature. Just as cinema is used in medicine, medicine is also used in cinema (12). For example, while the effect of Alzheimer's disease on human life is examined in the movie "The Separation (2011)", the movie "Memento (2000)" is about someone who has memory problems after an accident. It is stated that the empathy ability of medical faculty students declined in the 3rd grade, and films preserved the students' empathy (13).

Nowadays, the need for equipped and trained health workers about the characteristics of the elderly population, their needs, and problems, and who has empathy, compassion, and understanding for them is increasing. So, defining medical faculty students' attitudes towards the elderly is essential in terms of this need. Cultural differences, experiences, educational background, and beliefs; the attitudes and behaviors shown to the elderly person can be positive or negative (14). This study is a first in that it includes an educational intervention apart from previous studies issuing attitudes towards the elderly. In addition, due to the limited number of such studies in medical education, which has to plan for the increasingly elderly population, we believe that it makes significant contributions in

**Table 1.** The answers given by the students to the questions about their socio-demographic characteristics, old age and their experiences with the elderly.

Socio-demographic Characteristics		I* n (%)	VI** n (%)	TOTAL n (%)
<b>Gender</b>	Male	140 (57.6)	86 (54.1)	226 (56.2)
	Female	103 (2.4)	73 (45.9)	176 (43.8)
<b>Family income in Turkish Liras</b>	0-2000	38 (15.6)	22 (13.8)	60 (14.9)
	2001-4000	96 (39.5)	54 (34.0)	150 (37.3)
	4001-6000	66 (27.2)	52 (32.7)	118 (29.4)
	≥6001	43 (17.7)	31 (19.5)	74 (18.4)
<b>Mother's education level</b>	Literate-Primary school	84 (34.6)	48 (30.2)	132 (32.8)
	Middle school	29 (11.9)	16 (10.0)	45 (11.2)
	High school	61 (25.1)	54 (34.0)	115 (28.6)
	College and above	69 (28.4)	41 (25.8)	110 (27.4)
<b>Father's education level</b>	Literate-Primary school	34 (14.0)	19 (11.9)	53 (13.2)
	Middle school	18 (7.4)	11 (6.9)	29 (7.2)
	High school	53 (21.8)	30 (18.9)	83 (20.6)
	College and above	138 (56.8)	99 (62.3)	237 (59.0)
<b>Where the most of the life is spent</b>	Rural	23 (9.5)	13 (8.2)	36 (9.0)
	Urban	220 (90.5)	146 (91.8)	366 (91.0)
<b>Family type</b>	Nuclear family	213 (87.7)	138 (86.8)	351 (87.3)
	Large family	30 (12.3)	21 (13.2)	51 (12.7)
<b>At what age does aging begin</b>	≤54 years	68 (29.1)	19 (12.1)	87 (22.3)
	55-64 years	88 (37.6)	46 (29.3)	134 (34.3)
	≥65 years	78 (33.3)	92 (58.6)	170 (43.5)
<b>Presence of an elderly person living together in the past or currently</b>	Yes	67 (27.6)	47 (29.6)	114 (28.4)
	No	176 (72.4)	112 (70.4)	288 (71.6)
<b>Where and with whom their grandparents live</b>	With his spouse in his/her own home	112 (53.1)	54 (44.6)	166 (50.0)
	With his children in his/her own home	24 (11.4)	23 (19.0)	47 (14.2)
	Alone in his/her own home	41 (19.4)	27 (22.3)	68 (20.5)
	With his children in children's home	34 (16.1)	17 (14.0)	51 (15.4)
<b>Nursing home visit experience</b>	Yes	65 (26.7)	64 (40.3)	129 (32.1)
	No	178 (73.3)	95 (59.7)	273 (67.9)
<b>TOTAL</b>		243 (60.4)	159 (39.6)	402 (100.0)

I\*First academic year students, VI\*\* Sixth academic year (internship) students



**Table 2.** The pre and post intervention UCLA-GAS mean scores according to socio-demographic features and answers to aging questions.

Socio-demographic Characteristics		n	Pre-UCLA-GAS Mean±SD	Post -UCLA-GAS Mean±SD	P**
<b>Gender</b>	Male	176	47.49±5.62	45.61±6.45	<b>&lt;0.001</b>
	Female	226	48.61±4.79	46.96±5.30	<b>&lt;0.001</b>
P*			<b>0.032</b>	<b>0.021</b>	
<b>Family income in Turkish Liras</b>	0-2000	60	48.50±5.77	47.25±6.88	0.069
	2001-4000	150	48.37±5.12	46.14±5.24	<b>&lt;0.001</b>
	4001-6000	118	47.90±5.07	46.32±5.75	<b>&lt;0.001</b>
	≥6001	74	47.64±5.08	46.22±6.38	<b>0.018</b>
P*			0.687	0.654	
<b>Mother's education level</b>	Literate-Primary school	132	48.46±5.17	46.92±5.80	<b>&lt;0.001</b>
	Middle school	45	48.15±5.23	46.28±6.53	0.055
	High school	115	47.95±5.28	46.06±5.62	<b>0.001</b>
	College and above	110	47.87±5.15	46.07±5.93	<b>&lt;0.001</b>
P*			0.818	0.623	
<b>Father's education level</b>	Literate-Primary school	53	48.60±5.32	47.66±6.38	0.210
	Middle school	29	48.34±5.95	46.03±6.16	<b>0.018</b>
	High school	83	48.98±5.11	46.79±6.05	<0.083
	College and above	237	47.68±5.07	45.98±5.62	<b>&lt;0.001</b>
P*			0.212	0.249	
<b>Where the most of the life is spent</b>	Rural	36	49.13±4.16	47.47±6.94	0.118
	Urban	366	48.02±5.28	46.26±5.74	<b>&lt;0.001</b>

P*			0.219	0.240	
<b>Family type</b>	Nuclear family	351	47.91±5.23	46.25±5.78	<b>&lt;0.001</b>
	Large family	51	49.52±4.68	47.21±6.37	<b>0.006</b>
P*			<b>0.038</b>	0.274	
<b>At what age does aging begin</b>	≤54 years	87	48.35±5.38	46.63±5.96	<b>0.001</b>
	55-64 years	134	48.49±4.93	46.64±5.71	<b>&lt;0.001</b>
	≥65 years	170	47.47±5.29	45.94±5.83	<b>&lt;0.001</b>
P*			0.190	0.509	
<b>Presence of an elderly person living together in the past or currently</b>	Yes	114	48.72±5.23	47.45±5.38	<b>0.004</b>
	No	288	47.88±47.88	45.94±5.99	<b>&lt;0.001</b>
P*			0.141	<b>0.020</b>	
<b>Where and with whom their grandparents live</b>	With his spouse in his/her own home	166	47.92±5.24	46.48±5.80	<b>&lt;0.001</b>
	With his children in his/her own home	47	47.93±4.66	45.02±5.69	<b>&lt;0.001</b>
	Alone in his/her own home	68	48.44±5.63	46.61±6.04	<b>0.002</b>
	With his children in children's home	51	48.31±4.75	46.47±4.84	<b>0.009</b>
P*			0.894	0.425	
<b>Nursing home visit experience</b>	Yes	129	47.41±5.36	45.96±6.21	<b>&lt;0.001</b>
	No	273	48.45±5.08	46.57±5.69	<b>&lt;0.001</b>
P*			0.59	0.331	
<b>TOTAL</b>		402	48.12±5.19	46.37±5.86	<b>&lt;0.001</b>

\*\*Independent Samples-T Test and One-way Anova tests were used

\* Paired Samples-T test was used

UCLA-GAS: University of California Los Angeles-Geriatric Attitudes Scale



**Table 3.** The pre and post intervention KAOPS mean scores according to socio-demographic features and answers to aging questions.

Socio-demographic Characteristics		n	Pre -KAOPS Mean±SD	Post-KAOPS Mean±SD	P**
<b>Gender</b>	Male	176	102.16±13.55	98.19±14.79	<b>&lt;0.001</b>
	Female	226	102.50±12.21	98.23±12.71	<b>&lt;0.001</b>
P*			0.795	0.977	
<b>Family income in Turkish Liras</b>	0-2000	60	104.48±14.04	99.03±16.47	<b>&lt;0.001</b>
	2001-4000	150	102.00±11.56	96.95±12.29	<b>&lt;0.001</b>
	4001-6000	118	101.66±13.35	98.64±12.27	<b>&lt;0.001</b>
	≥6001	74	102.41±13.31	99.45±15.74	<b>0.017</b>
P*			0.552	0.528	
<b>Mother's education level</b>	Literate-Primary school	132	103.39±12.76	98.97±13.91	<b>&lt;0.001</b>
	Middle school	45	101.06±11.86	98.08±13.79	<b>0.045</b>
	High school	115	101.93±13.56	98.16±12.74	<b>&lt;0.001</b>
	College and above	110	102.06±12.47	97.42±14.28	<b>&lt;0.001</b>
P*			0.683	0.854	
<b>Father's education level</b>	Literate-Primary school	53	104.43±104.43	97.94±16.28	<b>&lt;0.001</b>
	Middle school	29	102.10±102.10	98.68±12.60	<b>0.022</b>
	High school	83	104.32±104.32	100.07±12.43	<b>&lt;0.001</b>
	College and above	237	101.22±101.22	97.57±13.55	<b>&lt;0.001</b>
P*			0.157	0.551	
<b>Where the most of the life is spent</b>	Rural	36	105.91±13.54	99.02±17.27	<b>0.003</b>
	Urban	366	102.00±12.69	98.14±13.26	<b>&lt;0.001</b>

p*			0.080	0.711	
<b>Family type</b>	Nuclear family	351	101.55±12.57	97.58±13.75	<b>&lt;0.001</b>
	Large family	51	107.82±13.10	102.60±12.10	<b>&lt;0.001</b>
p*			<b>0.001</b>	<b>0.014</b>	
<b>At what age does aging begin</b>	≤54 years	87	101.67±13.11	97.03±14.30	<b>&lt;0.001</b>
	55-64 years	134	102.13±11.75	98.55±12.41	<b>&lt;0.001</b>
	≥65 years	170	102.14±13.18	98.05±14.16	<b>&lt;0.001</b>
p*			0.957	0.719	
<b>Presence of an elderly person living together in the past or currently</b>	Yes	114	103.11±12.50	99.59±12.71	<b>&lt;0.001</b>
	No	288	102.05±12.92	97.67±13.98	<b>&lt;0.001</b>
p*			0.454	0.204	
<b>Where and with whom their grandparents live</b>	With his spouse in his/her own home	166	101.92±13.49	99.15±13.36	<b>&lt;0.001</b>
	With his children in his/her own home	47	104.40±11.74	98.87±14.23	<b>&lt;0.001</b>
	Alone in his/her own home	68	100.79±11.66	96.36±13.19	<b>0.003</b>
	With his children in children's home	51	102.64±11.01	96.88±12.84	<b>&lt;0.001</b>
p*			0.485	0.909	
<b>Nursing home visit experience</b>	Yes	129	100.95±12.16	97.19±13.41	<b>&lt;0.001</b>
	No	273	103.01±13.06	98.70±13.74	<b>&lt;0.001</b>
p*			0.132	0.300	
<b>TOTAL</b>		402	102.35±12.80	98.22±13.64	<b>&lt;0.001</b>

\*\*Independent Samples-T Test and One-way Anova tests were used

\* Paired Samples-T test was used

KAOPS: Kogan's Attitudes toward Older People Scale





**Table 4.** Correlation of pre and post intervention UCLA-GAS and KAOPS

		1	2	3	4
<b>1-Pre-UCLA-GAS</b>	r p	1			
<b>2-Post- UCLA-GAS</b>	r p	0.648** <0.001	1		
<b>3-Pre-KAOPS</b>	r p	0.535** <0.001	0.490** <0.001	1	
<b>4-Post- KAOPS</b>	r p	0.401** <0.001	0.598** <0.001	0.758** <0.001	1

\*\* Correlation is significant at the 0.01 level (2-tailed)

determining the situation and establishing medical education curricula.

Considering the average scores obtained from UCLA-GAS ( $48.12 \pm 5.19$ ) and KAOPS ( $102.35 \pm 12.80$ ) scales before watching a movie, it can be said that students have a positive attitude depending on the Turkish validity and reliability studies of each scale. Şahin et al. calculated the mean UCLA-GAS score as  $49.57 \pm 5.65$ , and Kılıç and Adibelli calculated the mean KAOPS score as  $97.76 \pm 11.18$  (9,11). Similarly, in a study at the University of Michigan medical faculty, students' positive attitude towards the elderly was dominant (15).

In the literature, studies measuring the attitudes of medical students and doctors towards the elderly are giving different results. Samra et al. stated that 14 out of 27 articles pointing a positive attitude change with education while 13 studies failed to turn their attitude into a positive one. The authors of that review claimed that the type and duration of the training or intervention did not affect the outcome (16). Eskildsen and Flacker observed that first-year medical students' attitudes changed positively after a one-week course (17). On the other hand, a study in Thailand that compared fourth-grade medical school students and internal medicine residents about the training effect noted no significant differ-

ence in attitudes (18).

Unfortunately, this study showed a significant decrease both in UCLA-GAS and KAOPS after the film. In other words, attitudes were affected negatively by the intervention. This may be since the students participating in the study are asked to fill the questionnaires immediately after watching the movie, which is called the hyper-arousal decision style in psychology. It is associated with an individual's ability with insufficient time to choose the alternative with the slightest negativity without careful research. The participant evaluates the immediate solution options to relax in a short time. Because of the time pressure, the individual who wants to experience emotional tension and get rid of the chaos may make hasty and illogical decisions. Another possibility that could explain the decline in scale scores may be the students' identification with the film's characters. The death scene was an expected ending in the film, and due to empathy with the characters, students who had grandparents at similar ages may think that the need for more care would be complicated by the caregiver. However, it should be considered that if the participants saw the characters in the film as their parents, they might not make the same decision (19). Similar to other studies, male students had lower scores than female students. National studies with the faculty

of pharmacy, physical therapists, and healthcare workers expressed female students' dominance for a positive attitude towards the elderly than male students (3,9,20). However, a study noted no difference in terms of gender in KAOPS scale scores (3). The perception of female students' attitudes as better may be related to the sense of responsibility attributed to women in general and the empathy of female students.

Another important result of this study is the significant decrease in both scale scores in both female and male students as the class in the education increases. Similarly, again in a study in Turkey, KAOPS scores in the second-grade medical students than third grade. In addition, according to UCLA-GAS, the attitude of 1st and 2nd-grade students was found to be more positive than others (21). The authors stated that this situation might be related to the lack of knowledge of the first-grade students about their roles concerning the elderly. Another effect may be the decrease in empathy mentioned in many studies that medical education causes. A decrease in the level of empathy in medical students makes their hearts petrified (22).

This study showed that other socio-demographic factors are not changing family type in favor of large family origin in pre-UCLA-GAS and the presence of an elderly person living together in the past or currently in post-UCLA-GAS attitudes of students. It is similar for pre and post-intervention KAOPS except for family type in favor of large family origin. Supporting these results in a national study via KAOPS with surgical nurses, nurses with large families have more positive attitudes towards elders (23), and this may be related to the fact that individuals who grow up and live in extended families are closer to elderly individuals and that their old age stages are experienced before their eyes. Studies in the literature show that parents' income and education level do not affect student attitude (3,20). Whereas; Yazıcı et al. stated that students who spent most of their lives in urban areas had a more positive attitude towards the elderly (20).

In this study, it is seen that the elderly in students' families mostly live in their own homes and with their spouses. Secondly, they reported being alone in their own homes. On the contrary, a nationwide study conducted by Assantachai and Maranetra in Thailand in 2003 showed that only 0.8% of the elderly live alone. The authors stated that most of the elderly live with their children (76.1%) and grandchildren (65.5%) (24), and this seems contrary to the presupposition that the Turks have a social structure depending on their traditions and elders. It may be due to urbanization, socioeconomic problems, and cultural change.

The first-year students of Leiden University Faculty of Medicine were asked about the age seen as old age, and 42.2% of the students answered as over 65 (25). In this study to the same question, first-grade students generally wrote between the ages of 55-64, while sixth-grade students mostly answered that it was 65 and over.

As researchers, the most important limitation of the study, in our opinion, is that it is a quantitative study, although there are also open-ended questions. Study designs to be made with focus group interviews instead of scales could be more suitable for social skills. In addition, it is known that the view of aging includes cultural differences, and it could have been more effective if it was a movie belonging to the same culture. However, we believe that this limitation is limited by the fact that there is a study conducted with medical students, who we think will experience the least cultural differences in terms of education level. Besides, we think that the fact that it is a film that contains all the educational goals determined by culture and that it is an award-winning film that affects many people limits the cultural impact of the film. It is important for the research, despite the cultural limitations of the research, that the most suitable for educational purposes is selected by watching the films among several films.



Two different scales have been used like many studies in the literature because measuring attitudes is complex and very difficult. Determining the factors that positively affect the attitude towards the elderly with more detailed and comprehensive studies is essential for raising healthcare workers who provide care to the elderly with sufficient knowledge and skills. This data will form the basics about how the education curriculum should be planned and practiced. Considering that a family physician may be the only physician to whom the elderly person applies at first and who will be diagnosed, treat-

ed, and followed-up regularly, the attitudes and behaviors of this physician towards the elderly are specifically important. Despite the increasing number of family medicine academicians, there are still limited academicians in geriatrics. Geriatric education and rotations should also be organized during undergraduate education, and more detailed studies are needed on the deficiencies and what can be done on this subject.

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#### RESEARCH

## THE RELATIONSHIP BETWEEN HEALTH LITERACY AND HEALTH PERCEPTION IN ELDERLY LIVING IN NURSING HOME IN TURKEY

### ABSTRACT

**Introduction:** Changes seen by ageing can affect the level of health literacy and the perception of health. This study was carried out to examine the relationship between health literacy and health perception in the elderly.

**Materials and Method:** This study was designed as a descriptive study. The sample consisted of 238 elderly individuals living in two nursing homes in Turkey between July and October 2018. The Health Literacy Scale, the Perception of Health Scale and a questionnaire form were used to collect data.

**Results:** In this study, the mean score of Health Literacy Scale was found to be  $47.08 \pm 13.38$ , and the Perception of Health Scale mean score was  $52.64 \pm 6.50$ . A low positive correlation was found between Health Literacy Scale and Perception of Health Scale ( $r = 0.341$ ,  $p < 0.001$ ). A statistically significant difference was observed among educational status, occupation, economical status, chronic disease, regular check-ups, participation in nursing home activities on a permanent basis and the Health Literacy Scale mean scores ( $p < 0.05$ ). A statistically significant difference was noted among educational status, occupation, chronic disease and the Perception of Health Scale mean scores ( $p < 0.05$ ).

**Conclusion:** While health perception was found to be moderate in the elderly participants, health literacy was determined as low. This study showed a relationship between health literacy and health perception in the elderly. This results could be used as evidence for designing and providing training programs for health literacy and the perception of health.

**Keywords:** Aged; Health Literacy; Nursing Homes.

## INTRODUCTION

Health literacy is an important topic as it contributes to the health and well-being of individuals and the community (1). Health literacy studies concerning elderly people in many countries have indicated that half of individuals aged 65 and over worldwide have below-average basic health literacy (2-4). Some studies conducted in Turkey on older age groups have found health literacy to be significantly lower in younger age groups (5,6). The literature indicates that age-related changes, in particular, influence health literacy. Cognitive and physical dysfunctions and psychological problems in the elderly may relate their ability to understand health knowledge (7).

Given the effects of health literacy on health status and utilization, health outcomes may be determined by disease knowledge, health behavior, and the use of preventive care (8). Disease can be defined as the recognition of factors threatening a person's health or the perception of the meaning and importance of a disease (9). Since the concept of disease has objective and subjective dimensions, persons suffering similar diseases may show different reactions. These reactions can be in different dimensions in the elderly. At this point, the concept of the perception of health comes to the fore. Health perception or perceived health status is an individual's opinion about his or her own health (10). The positive perception of the health status of an individual may positively relate the belief of controlling the future health status and healthy lifestyle behaviors (6). Since elderly people have the highest rates of chronic diseases, the management of health perception and increased health literacy in elderly people will facilitate more effective disease management. Given the increasing elderly population and chronic diseases, it is of great importance for elderly people to evaluate their health literacy and health perceptions. Enhancing health literacy may be an effective strategy to improve elderly people's health status (7). In addition, although the effect of

health literacy on health outcomes is an overemphasized issue, studies on elderly people related to this subject are few. Therefore the aim of this study was to investigate the relationship between the health literacy and health perception in elderly living in nursing home in Turkey. This study should increase healthcare professionals' awareness of this issue and will contribute to the related literature.

## MATERIALS AND METHOD

### Population and Sample of the Study

This research was planned as a descriptive study between 1/7/2018 and 1/10/2018 in the two Nursing Home Elderly Care and Rehabilitation Centers in Ankara. There were 119 elderly people in the first center. Of these elderly, 102 elderly who met the criteria of the study participated in the study. In the second center, there were 203 elderly people. Among these elderly, 136 elderly people who met the study criteria participated in the study. The population of this study consisted of 238 elderly in two nursing home elderly care and rehabilitation centers. Elderly persons  $\geq 65$  years old who were literate and had no visual or hearing problems, mental or cognitive disorders, active terminal conditions, or any psychiatric disorders diagnosed by a physician were included in this study.

In the each facility, there are doctors, nurses and caregivers in the care of elderly individuals. At the same time, there is a dietitian who organizes the nutrition program of the elderly and a physiotherapist who monitors their physical performance. There is also a social worker in the team.

### Data Collection Tools

#### Questionnaire

The questionnaire, which has 17 questions, was developed by the researchers after searching the literature. The questionnaire included questions about individuals' sociodemographic attributes and health/disease conditions (age, sex, education



status, marital status, number of children, occupation, level of income, health perception, social security, smoking status, chronic diseases, and the continuous use of drugs), as well as their status in terms of receiving information about their diseases, performing regular check-ups, and participating in nursing home activities).

### Data Collection

The data were collected by the researchers using the face-to-face interview technique. According to the Turkish validity and reliability study of the "Health Perception Scale", the scale was applied by self-administered. However, since the elderly in our study did not want to write due to weakness muscle-joint functions, the data were obtained by reading the scale items one by one. However it was thought that answering this scale with researchers, not self administration, might lead to a high measurement of health perception. So during the reading, attention was paid not to be guided the elderly. Data collection was carried out by three researchers with a master's degree in nursing. A general briefing was given by the researcher, who has the title of associate professor in nursing, regarding the data collection process.

### Health Literacy Scale

The Health Literacy Scale (HLS) was first developed by Sorensen with 47 items from the Health Literacy Survey in Europe; Toçi et al. then reduced the scale to 25 items, which were utilized to assess health literacy (11,12). The validity and reliability of this survey in Turkish Language were performed by Aras and Bayik Temel. The scale consisted of 4 subscales, including access (5–25), understanding (7–35), appraisal (8–40), and application (5–25) (13).

A minimum of 25 and a maximum of 125 points can be received from the scale. The internal consistency the Cronbach alpha coefficient, determined from the Health Literacy Scale and its subscales, differed between 0.90 and 0.94 points. The Cronbach alpha value of the scale was found to be

0.92, while the alpha values of the subscales varied between 0.62 and 0.79. The reliability coefficients between the subscale scores and the total scores were between 0.74 and 0.91. The health literacy level increased as the score obtained from the scale increased (13). In the present study, the Cronbach's alpha coefficient of the scale was found to be 0.886.

### Perception of Health Scale (PHS)

The Perception of Health Scale (PHS) was developed by Diamond et al. (14) in 2007. Its validity and reliability study in the Turkish Language was administrated by Kadioglu and Yildiz. The scale was designed with 5-point Likert questions consisting of 15 items and 4 subfactors. A minimum of 15 and a maximum of 75 points can be received from the scale. The Cronbach alpha value of the scale is between 0.82 and 0.91. While a high score obtained from the scale refers to good health perception, a low scale score shows poor health perception (15).

In this study, the PHS's KMO value was 0.714, and the Bartlett's test value was 936,447, which was statistically significant ( $p < 0.05$ ). In order for the sample size to be sufficient, the Kaiser-Meyer-Olkin (KMO) index value should be at least 0.60 (16). For this reason, it was seen that the sample size was sufficient and as a result of the exploratory factor analysis performed after KMO, the Health Perception Scale was collected in 4 dimensions and the rate of explaining the total variance was 55.305%. The internal consistency coefficient (Cronbach's Alpha) of the scale was found to be 0.663. For this study, the scale was found to be reliable because the Crohn's alpha value was between  $0.6 \leq \alpha < 0.8$  (17).

### Statistical Analysis

The data analysis was performed using the Statistical Package for Social Science (SPSS) version 15.0. The suitability of the data for normal distribution has been assessed with *Kolmogorov-Smirnov* test. A Mann-Whitney U test, a non-parametric test, was utilized to compare the scores of non-normally distributed two-group variables, and a Kruskal Wal-

lis test was administrated to compare the scores of three or more group variables. An independent samples T-test, a parametric test, was utilized to compare the scores of normally distributed two-group variables, and a one-way analysis of variance (ANOVA) test was administrated to weigh the scores of three or more group variables. A Pearson's correlation analysis was used to establish the correlations between HLS and PHS scales; and Tukey's Honestly Significant Difference (HSD) Test for normally distributed variables and Bonferroni (Dunn) Test for abnormally distributed variables were used for further analysis. A multiple regression analysis was utilized to determine the variables related the HLS mean score. The construct validity of the PHS was examined by exploratory factor analysis.

### **Ethical Considerations**

To collect the data, necessary approval was obtained from the Ethics Committee for Non-Medical and Medical Research of KTO Karatay University Faculty of Medicine (approval number and date: 41901325-0.50.99/ 03.05.2018/2018-008), and written permission was received from the Ministry of Family and Social Policies. Consent was received from the elderly who agreed to participate in this study to protect their rights; they were informed of the purpose of the study and were reminded that they had the right to refuse to participate or to withdraw from the study at any time.

### **RESULTS**

The mean age of the elderly persons included in the study was  $71.59 \pm 8.41$ . The distribution of each age range was as follows: 150 (63.0%) participants were 65-74 years of age, 68 (28.6%) were 75-84 years of age and 20 (8.4%) were aged 85 or older.

Of these 238 participants, 71.8% had been diagnosed with chronic diseases ( $n=171$ ). Of the participants, 79% stated that they went for regular check-ups, and 82.4% were continuously using drugs. Of all the participants, 73.5% had worked previously,

42% were found to permanently attend nursing home activities (Table 1).

In our study, the mean score of the HLS was found to be  $47.08 \pm 13.38$ , and the PHS mean score was determined as  $52.64 \pm 6.50$ . A low positive correlation was found between HLS and PHS ( $r = 0.341$ ,  $p < 0.001$ ) (Table 2).

The PHS mean score was higher in female ( $53.70 \pm 5.91$ ) than in male participants ( $51.86 \pm 6.81$ ). A statistically significant difference was observed among educational status, working status, chronic disease, and PHS mean scores ( $p < 0.05$ ) (Table 3). According to the Post Hoc analysis, the mean score of the literate respondents ( $46.72 \pm 5.07$ ) was statistically significantly lower compared to the primary school ( $51.76 \pm 5.67$ ), the secondary school ( $52.87 \pm 6.36$ ), the high school ( $53.75 \pm 5.66$ ) and university graduate ( $53.98 \pm 7.38$ ) ( $p < 0.05$ ).

In our study, It was found a statistically significant difference between HLS mean scores according to educational status. According to the Post Hoc analysis, the mean score of the literate respondents ( $38.20 \pm 14.99$ ) was statistically significantly lower compared to the primary school ( $44.18 \pm 11.46$ ), the secondary school ( $45.79 \pm 10.46$ ), the high school ( $48.12 \pm 13.72$ ) and university graduate ( $52.08 \pm 12.88$ ) ( $p < 0.05$ ). Also, a significant difference was noted between the HLS mean score of the participants and their working status ( $p < 0.05$ ), and the HLS mean score of those who had never worked ( $51.54 \pm 15.83$ ) was significantly higher than the scores of those who had worked previously ( $45.47 \pm 12.03$ ). The HLS mean score of individuals with a poor economical status was significantly lower than those with moderate or good economical status. The HLS mean score of respondents without chronic disease ( $48.30 \pm 13.63$ ) was statistically significantly higher than those with chronic disease ( $p < 0.05$ ). In addition, the HLS mean score of those going for regular check-ups ( $50.62 \pm 12.76$ ) was statistically higher compared to those not going for regular check-ups ( $p < 0.05$ ). Post hoc analysis was found that the





**Table 1.** Descriptive features of the participants (Ankara, Konya-Turkey 2018)

Age Mean±SD, Median (Min-Max)	71.59±8.41	72 (52 -92)
65-74	150	63.0
75-84	68	28.6
85+	20	8.4
<b>Sex</b>	<b>Number</b>	<b>%</b>
Female	101	42.4
Male	137	57.6
<b>Education Status</b>		
Literate	57	23.9
Primary school graduate	83	34.9
Secondary school graduate	39	16.4
High school graduate	34	14.3
University graduate	25	10.5
<b>Marital Status</b>		
Single	109	83.6
Married	39	16.4
<b>Having Children</b>		
Yes	190	79.8
No	48	20.2
<b>Number of Children (n=190) Mean±SD, Median (Min-Max)</b>	3.39±1.77,	3 (1-10)
1-2	74	38.9
3-4	66	34.7
>5	50	26.3
<b>Working status</b>		
Had not worked previously	63	26.5
Had worked previously	175	73.5
<b>Economical Status</b>		
Good	81	34.0

Moderate	140	58.8
Poor	17	7.1
<b>Diagnosed Chronic Disease</b>		
Yes	171	71.8
No	67	28.2
<b>Getting Knowledge About Disease (n=171)</b>		
Yes	171	100.0
No	0	0.00
<b>Source of Knowledge</b>		
Nurse	27	15.8
Physician	138	80.7
Other (friend. Another patient etc.)	6	3.5
<b>Attending to Regular Checks</b>		
Yes	188	79.0
No	50	21.0
<b>Continuous Use of Drugs</b>		
Yes	196	82.4
No	42	17.6
<b>Engagement in Nursing Home Activities</b>		
Always	100	42.0
Sometimes	51	36.6
Never	87	21.4

**Table 2.** Mean scores received from hls and phs scales of the participants (Ankara, Konya-Turkey, 2018)

SCALE	Mean±SD	Median(Q1-Q3)	Min	Max	r	p
HLS	47.08±13.38	46.00(37.75-55.25)	25	99	0.341	<0.001
PHS	52.64 ±6.5	51.00(48.00-56.00)	28	69		

<sup>a</sup>Pearson correlation analysis was used



HLS mean score participants permanently participating in nursing home activities ( $52.61 \pm 14.68$ ) was statistically higher than the scores of individuals who never ( $48.23 \pm 12.4$ ) or sometimes ( $43.25 \pm 12.42$ ) participated in these activities ( $p < 0.05$ ) (Table 3).

In the regression analysis conducted within the scope of this study, the model established by utilizing the variables that predict health perception was significant ( $F = 13.368$ ;  $p < 0.001$ ). Chronic disease and health literacy score were found to relate the total health perception score. Durbin-Watson test was used to test whether there were autocorrelation and multicollinearity problems in the research data and Variance Inflation Factor (VIF) values were used. Durbin-Watson coefficients, which are expected to be between 1.5 and 2.5, were found to be 2.082 in this study. In addition, it is stated that VIF values should be less than 10 so that there is no multicollinearity problem. In this study, VIF values were found below 10 (1.060-2.259). Thus, it was concluded that there is no autocorrelation and multicollinearity problem in the data set. This result indicates that the model was well established.

In Table 4 the variables of education status, sex, economical status, working status, chronic disease and health literacy score were transferred to the multivariable linear regression model. Overall, these variables predicted 23.8% of the change in health perception score was explained by the above-mentioned variables ( $r = 0.258$ ,  $r^2 = 0.238$ ). The study found two variables (chronic disease and health literacy score) that relate perception of health statistically significant.

## DISCUSSION

In our study, when the HLS total mean score of the elderly persons was evaluated, health literacy levels were found to be low. Previous studies in the literature have also found that elderly people have low or insufficient health literacy levels (2-5). The literature suggests that lower education level was among

the strongest predictors associated with insufficient health literacy. Our study revealed that as the educational level of elderly increased, the HLS mean scores also significantly increased, and university graduates had the highest scores. This result is consistent with many studies in the literature (18,19). This result may stem from the fact that education is a functional process that regulates different disciplines in human life and causes behavioral changes.

When the health literacy level of the participants was evaluated according to their occupations, housewives were found to have higher levels of health literacy. This finding is consistent with the study conducted by Cimen and Bayık Temel. However, Özdemir et al. (20) reported that housewives had low health literacy scores in their research. Another study conducted by Ansari et al. (21) reported that the health literacy level of older adults was not significantly related to occupation. In contrast, Liu et al. (19) reported a significant difference in health literacy scores among different factors related to occupation. The reason for the different levels of health literacy for occupational groups in different studies may originate from the socio-cultural differences of elderly people.

Economic status is another factor related the health literacy status of elderly. In our study, the elderly participants assessing their economic status as good had higher health literacy levels. This result is consistent with the results of the previous studies (19-21). It is an expected result that an individual with a good economical status would give more importance to their health and have a high level of health literacy.

Moreover, the health literacy levels of the participants without any chronic disease were higher in our study compared to those with chronic diseases. Similarly Liu et al. (22) reported that the prevalence of chronic diseases was significantly lower among a group with adequate health literacy. This result may be related to health-protective activities of the elderly without chronic diseases. In this study, the

**Table 3.** Mean PHS and HLS scores according to various descriptive characteristics of the participants (Ankara, Konya-Turkey, 2018)

Descriptive feature	PHS Mean±SD	HLS Mean±SD
<b>Age (Mean±SD) Median (Min-Max) 71.59±8.41 72 (52 -92)</b>		
65-74	52.06±6.37	45.92±13.57
75-84	51.78±6.73	49.28±12.86
85+	52.85±6.73	48.25±13.31
	$\chi^2=1.937$ p:0.380	$\chi^2=4.168$ 0.124
<b>Sex</b>		
Female	53.7±5.91	48.69±14.78
Male	51.86±6.81	45.88±12.16
	Z=-2.130 <b>p=.033*</b>	t=1.560 p=.120
<b>Education Status</b>		
University graduate	53.98±7.38 <sup>a</sup>	52.05±12.88 <sup>a</sup>
High School	53.75±5.66 <sup>b</sup>	48.12±13.72 <sup>b</sup>
Secondary School	52.87±6.36 <sup>c</sup>	45.79±10.46 <sup>c</sup>
Primary School	51.76±5.67 <sup>d</sup>	44.18±11.46 <sup>d</sup>
Literate	46.72±5.07 <sup>e</sup>	38.2±14.99 <sup>e</sup>
	F=7.267 <b>p&lt;0.001**</b>	$\chi^2=27.091$ <b>p&lt;0.001**</b>
<b>Marital Status</b>		
Married	52.61±7.46	51.87±17.48
Single	52.64±6.31	46.14±12.26
	Z=-.247 p=.805	t=1.957 p=.057
<b>Having Children</b>		
Yes	52.51±6.36	47.5±13.46
No	53.14±7.05	45.4±13.07
	Z=-.473 p=.636	Z=-.735 p=.463
<b>Workind status</b>		
Had not worked previously	50.17±5.80	51.54±15.83
Had worked previously	52.72± 6.59	45.47±12.03
	Z:-2.868 <b>p:0.004*</b>	t:-2.708 <b>p:0,007*</b>
<b>Economical Status</b>		
Poor	51.51±7.02	42.21±12.61
Moderate	53.03±6.16	48.59±12.93



Good	54.76±6.09	57.76±11.91
	$\chi^2=2.400$ $p=.093$	$\chi^2=26.211$ $p<0.001^*$
<b>Diagnosed Chronic Disease</b>		
No	53.39±6.31	48.3±13.63
Yes	50.71±6.6	43.94±12.26
	$Z=-2.676$ $p=.007^*$	$t=2.282$ $p=.023^*$
<b>Attending to Regular Checks</b>		
No	52.32±6.56	46.13±13.41
Yes	53.82±6.17	50.62±12.76
	$t=-1.444$ $p=.150$	$Z=-2.424$ $.015^*$
<b>Continuous Use of Drugs</b>		
No	52.77±6.31	47.67±13.37
Yes	52.02±7.36	44.29±13.25
	$Z=-.432$ $p=.666$	$Z=-1.647$ $p=.100$
<b>Engagement in Nursing Home Activities</b>		
Sometimes	51.99±6.36	43.25±12.42 <sup>a</sup>
Never	52.96±6.1	48.23±12.4 <sup>b</sup>
Always	53.39±7.36	52.61±14.68 <sup>c</sup>
	$\chi^2=1.862$ $p=.394$	$\chi^2=17.384$ $p<0.001^{**}$

\*The Mann-Whitney U test was used

\*\*The Kruskal-Wallis test was used

a>b>c>d>e According to education level, underlined groups that cause significant differences between groups.

a<b<c According to engagement in nursing home activities, underlined groups that cause significant differences between groups.

**Table 4.** Variables related to the health perception of the participants (Ankara, Konya-Turkey, 2018)

Variables	B	$\beta$	T	p	CI (95%)
Education status	0,277	0,055	0.851	0.396	-0.365-0.920
Sex	2.065	0.158	1.958	0.051	-0.013-4.143
Economical status	0.262	0.024	0.385	0.701	-1.079-1.603
Chronic disease	2.891	0.201	3.443	<b>0.001</b>	1.237-4.546
Working status	-0.681	-0.046	-0.545	0.586	-3.143-1.781
Health Literacy score	-0.190	-0.393	-6.309	<b>&lt;0.001</b>	-0.250-(-0.131)

<sup>a</sup>Multivariate regression analysis was used.

health literacy of elderly people regularly going for check-ups was higher than the ones who did not. Similarly Yoshida et al. (23) reported that individuals with limited health literacy had a low rate of regular medical check-ups. This is an expected result because going for regular check-ups enables an individual to get more information about health and to communicate more with healthcare professionals. Our study also concluded that the health literacy of the elderly respondents continuously participating in nursing home activities was higher compared to those who sometimes or never participated in these activities. This results from exchanges of more information in such social environments.

Perceived health status is often used in the evaluation of the health status of societies (24). In addition, an individual's health perception directly relates his or her healthy lifestyle behaviors (25). In our study, elderly health perception was at a moderate level. Also, a statistically significant difference was noted in our study among the health perception status of elderly and sex, education level, occupation, and the presence of chronic disease. Similarly, Çimen and Bayık Temel (6) reported that one-third of the elderly perceived their health at a moderate level in their study. However, Altay et al. (26) reported in their study that the elderly perceived their health as good and that age, family type, and chronic diseases related their perceptions of health. The reason for the different levels of health perception and the diversity of factors related it in different studies may originate from sociocultural differences in elderly people.

Health literacy and health perception are important health criteria that influence each other. In a study conducted in Turkey, the authors found that

as the perceived health level of older individuals increased, their health literacy levels increased (6). Also, Say Şahin et al. (27) reported that health literacy subdimensions are important determinants of the health perception dimensions. Some studies in the literature have also found a similar relationship between health literacy and health perceptions (28,29).

## CONCLUSION

In this study, while the health perception of elderly participants was at a moderate level, their health literacy was low. Variables of sex, education status, occupation, and the presence of diagnosed chronic disease were found to relate the health perception of elderly. In addition, the education status, occupation, economic status, the presence of diagnosed disease, regular check-ups and participation in nursing home activities were found to relate the health literacy level.

In line with these results, carrying out society-based awareness studies is recommended as a way to increase the health perception and health literacy of elderly people.

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### Declaration of Conflicting Interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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#### RESEARCH

## WHAT BOTHERED PATIENTS WITH PARKINSON DISEASE DURING THE COVID-19 LOCKDOWN? AN ANALYSIS OF TELEPHONE RECORDS

### ABSTRACT

**Introduction:** It has been suggested that patients with Parkinson's disease are more susceptible to the negative consequences of restrictions for Coronavirus pandemic regulations. We evaluated whether the lockdown caused a change in the subjective complaints of the Parkinson's disease patients.

**Material and Methods:** Telephone records of the Parkinson's disease patients in the 2.5 months of the lockdown in 2020 were categorized and compared to the records of the same period of 2018 and 2019.

**Results:** In total, 666 complaints/questions were categorized from 625 telephone calls of 391 patients. The percentage of motor-related complaints did not differ significantly across the years. In 2020, calls about administrative issues increased significantly compared to 2018 (OR= 3.7 95% CI:1.5-9.3; p= 0.004) and 2019 (OR= 2.1, 95% CI:1.0-4.5; p= 0.044). Moreover in 2020, the odds of calling due to behavioral/psychotic symptoms increased by at least 3 times compared to 2018 (OR=3.7, 95% CI:1.3-10.8 p= 0.014) and 2019 (OR=3.0, 95% CI:1.2-7.4 p= 0.018). Anxiety was also more frequent but only compared to 2019.

**Conclusions:** The results highlight the necessity of taking urgent action to improve the organizational and psychosocial needs of Parkinson's disease patients in times of humanitarian crises.

**Keywords:** Parkinson Disease; COVID-19; SARS-CoV-2; Telemedicine; Pandemic.

## INTRODUCTION

Starting from December 31<sup>th</sup> 2019, the world has been introduced to the COVID-19 which has rapidly spread across the world causing a pandemic (1). The exponential increase in infection and mortality rates across the world created a global crisis and forced many countries to take immediate actions, including closing the borders, schools, and shopping malls, restricting gatherings, or even imposing a curfew (2,3). These drastic measures have profoundly changed the daily life of almost everyone; however, the elderly with chronic diseases or disabilities may be the ones who have most suffered from these regulations, if not from the infection itself (4-6).

Most individuals with Parkinson's disease (PD) belong to this affected group. Since the beginning of the pandemic, the impact of the COVID-19 and the associated restrictions on the daily lives of patients with PD have been recognized and discussed (4,7). Concerning the difficulties that PD patients may encounter during this period, several negative physical and psychosocial outcomes such as increased anxiety, loneliness, depression, sleep problems, or reduced physical activity were highlighted (4,6-8). Indeed, studies reporting patient interviews showed an increase in anxiety and stress (9-11). Therefore, in this study, we aimed to contribute to the understanding of the impact of the lockdown on the lives of PD patients by comparing the telephone records of the same time-interval of the last three years.

## METHODS

### Review of the telephone records

In this retrospective study, the documentation of the telephone records of PD patients diagnosed according to the UK Brain Bank Criteria was evaluated. In Turkey, the pandemic started a couple of weeks following Europe, with the first case of COVID-19 reported on March 10, 2020. To limit the spread of

the virus, authorities implemented immediate restrictions for the rest of March, April, and May. Thus, the telephone calls and the patients' subjective complaints/questions noted covering the following 2.5 months of the strict lockdown, between March 15 and June 1, 2020, were subsequently reviewed. To compare the call reasons during the pandemic, telephone records of the same period of 2018 and 2019 were also evaluated (March 15, 2018/19 – June 1, 2018/19). The reason(s) of telephone calls were extracted and categorized as "motor symptom", "non-motor symptom" or "other reasons". The motor symptoms mainly consisted of slowness or tremor, and therefore were taken as a whole. Categories of "non-motor symptom" and "other reasons" were further divided into detailed sub-categories. The classification of the recorded complaints (or questions) was performed by a movement disorders specialist blinded to the year of call to avoid observer bias. The study was approved by the ethical committee of the University of Ankara School of Medicine, and all procedures were in accordance with the Declaration of Helsinki.

### Statistical analysis

In this study, telephone records from the last three years were compared regarding the subjective complaints of the patients. It should be mentioned that the analysis of the records revealed an overlap of 14.6% regarding the patients between the groups of years (same patient calling in different years). Such a situation is relatively rarely encountered in statistics that the groups of comparison are neither independent nor paired but partially overlapped. Although the overlap rate was modest in this case, it could potentially endanger the accuracy of the analysis by violating the assumption of independence of the conducted tests for the comparison of the categorized problems. Therefore, before the analysis, a reliability test using Fleiss Kappa was performed for this group of patients to detect any "agreement" or pattern between the years for the reason of calling ( $\kappa < 0.50$  was considered showing



independence). Having seen no agreement (see the results), further analyses were then performed.

Age, sex, disease duration, and the Hoehn and Yahr (H&Y) stage at the latest examination in the year of call were compared across the years after removing the overlaps using one-way ANOVA, Kruskal-Wallis, or Pearson's Chi-square ( $\chi^2$ ) as appropriate. The frequency of the classified complaints reported in the same interval of the last three years was compared with the Pearson's Chi-square or Fisher's exact test. For the comparison of the complaints/questions, the significance threshold was adjusted to  $p < 0.016$  ( $0.05/3$ ) according to Bonferroni for multiple comparisons. Then, logistic regression models were created for the complaints/questions that showed significant differences between years to determine whether these effects are independent of potential confounders, given the possible effect of increased age, disease duration, or severity in three consecutive years.

The data that supports the findings of this study are available in the supplementary material of this article.

## RESULTS

Descriptive data regarding the patients and the telephone calls are given in Table-1. A Tukey post hoc test of one-way ANOVA ( $F(2,327) = 3.21$ ,  $p = 0.042$ ) revealed a significantly higher mean age in 2019 compared to 2018 ( $p = 0.033$ ). Years did not differ significantly with regard to sex (Pearson's  $\chi^2$ ,  $p = 0.51$ ) and disease duration ( $F(2,326) = 0.357$ ,  $p = 0.700$ ). Disease severity (H&Y) compared by Kruskal-Wallis H test ( $\chi^2(2) = 6.615$ ,  $p = 0.037$ ) showed higher values in 2018 ( $p = 0.015$ ) and 2020 ( $p = 0.049$ ) opposed to 2019.

Overall, 666 complaints or questions were categorized from 625 telephone calls of 391 patients. Nine call-reasons could not be categorized and ex-

**Table 1.** Patient information and documentation of the telephone records.

	2018 (n=129)	2019 (n=148)	2020 (n=114)
<i>Patient information</i>			
Age, mean (SD)	62.8 (11.3)	66.9 (10.7) <sup>†</sup>	65.1 (10.8)
Male sex, n (%)	69 (53.5)	76 (51.4)	56 (49.1)
Disease duration, mean (SD)	7.6 (5.4)	7.9 (5.4)	8.1 (5.9)
Hoehn & Yahr, median (IQR)	2.0 (1) <sup>*</sup>	2.0 (0)	2.0 (1) <sup>*</sup>
<i>Telephone records, n</i>			
Number of patients	129	148	114
Frequency of calls for patients	1-4	1-7	1-14 <sup>t</sup>
Total number of calls	208	211	206
Average number of calls per patient (SD)	1.61 (0.78)	1.42 (0.87)	1.81 (1.5)
Total number of complaints	232	230	204
Average number of complaints per patient (SD)	1.80 (0.52)	1.55 (1.20)	1.79 (0.61)

SD, standard deviation

<sup>t</sup> In 2020 only one patient called more than 5 times

<sup>†</sup> Significant compared to 2018 (Tukey post hoc test of one-way ANOVA,  $p = 0.033$ )

<sup>\*</sup> Significant compared to 2019 (Kruskal-Wallis H test, 2018 vs. 2019  $p = 0.015$ ; 2020 vs. 2019  $p = 0.049$ )

cluded. The analysis of patient information yielded a modest overlap (n=57, 14.6% of all patients) between the years. Twenty-five (19.4%) and 11 (8.5%) of the patients called in 2018, also called in 2019 and 2020, respectively. Fifteen (10.1%) patients that called in 2019 also called in 2020. Six patients made a call in three years consecutively. The Fleiss Kappa for these patients showed poor reliability between the years ( $\kappa=0.18$  for 2018-2019,  $\kappa=0.04$  for 2018-2020, and  $\kappa=0.06$  for 2019-2020), indicating that the groups are independent of each other concerning the reason of calling.

Table-2 shows the comparison of the categorized complaints (motor symptoms, non-motor symptoms, and other reasons) and the further categorizations. No significant difference was detected

between years regarding the percentage of motor symptoms. An increase was found in 2020 for non-motor symptoms (29.9%), but that was significant only compared to 2019 (18.7%,  $p=0.005$ ) (Figure 1). The detailed classification of the non-motor symptoms showed no significant difference between 2020 and previous years for pain, depression, orthostatic hypotension, urinary dysfunction, sleep-related problems, memory loss, or other non-motor symptoms (comprised of constipation, erectile dysfunction, and sweating). Telephone calls due to anxiety were significantly increased in 2020 (19.7%) and 2018 (14.6%), in contrast to 2019 (0%,  $p<0.010$  for both). With regard to the psychotic or behavioral symptoms, year of 2020 peaked (31.1%) compared to 2018 (10.9%,  $p=0.008$ ) and 2019 (16.3%,  $p=0.085$ ) (Table-2, Figure 2).

**Table 2.** Categorization of the reported complaints/questions.

	2018 (n=232)	2019 (n=230)	2020 (n=204)
Motor symptoms, n (%)	113 (48.7)	92 (40.0)	102 (50)
Non-motor symptoms, n (%)	55 (23.7)	43 (18.7)	61 (29.9) *
Anxiety	8 (14.6) *	0	12 (19.7) *
Depression	2 (3.6)	0	2 (3.3)
Behavioral symptoms/psychosis <sup>1</sup>	6 (10.9)	7 (16.3)	19 (31.1) †
Sleep problems	4 (7.3)	7 (16.3)	9 (14.8)
Memory problems	6 (10.9)	2 (4.7)	4 (6.6)
Orthostatic hypotension	1 (1.8)	3 (7.0)	2 (3.3)
Urinary problems	2 (3.6)	4 (9.3)	1 (1.6)
Pain	14 (25.5)	12 (27.9)	7 (11.5)
Other non-motor symptoms	12 (21.8)	8 (18.6)	5 (8.2)
Other reasons, n (%)	61 (26.3) *	93 (40.4)	37 (18.1) *
Administrative/logistics issues	7 (11.5)	14 (15.1)	17 (45.9) **
Medication adverse effect	28 (45.9) *	20 (21.5)	11 (29.7)
Questions about PD	7 (11.5)	15 (16.1)	1 (2.7)
Non-PD problems <sup>2</sup>	19 (31.1)	44 (47.3)	8 (21.6) *
Unclassified, n (%)	3 (1.3)	2 (0.9)	4 (2.0)

\* Significant compared to 2019 in Pearson's Chi-square or Fisher's exact test ( $p < 0.016$ ).

† Significant compared to 2018 in Pearson's Chi-square or Fisher's exact test ( $p < 0.016$ ).

<sup>1</sup> This item includes behavioral and psychotic symptoms including, but not limited to irritability, agitation, hallucinations, delusions, disorganized speech and behaviors.

<sup>2</sup> This item includes questions about issues including, but not limited to non-PD medication, non-neurological symptoms or diseases.

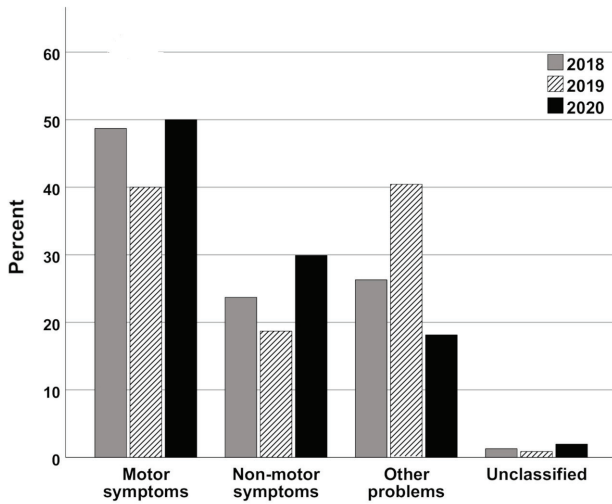


In 2020, calls unrelated with motor or non-motor symptoms (other reasons, 18.1%) were significantly fewer than 2019 (40.4%,  $p < 0.001$ ) but not 2018 (26.3%,  $p = 0.045$ ) (Table-2, Figure 1). The details of these calls revealed a significant boost in questions (45.9%) related to administrative or logistics issues such as clinic appointments or obtaining medication as opposed to 2018 and 2019 (11.5%, 15.1%;

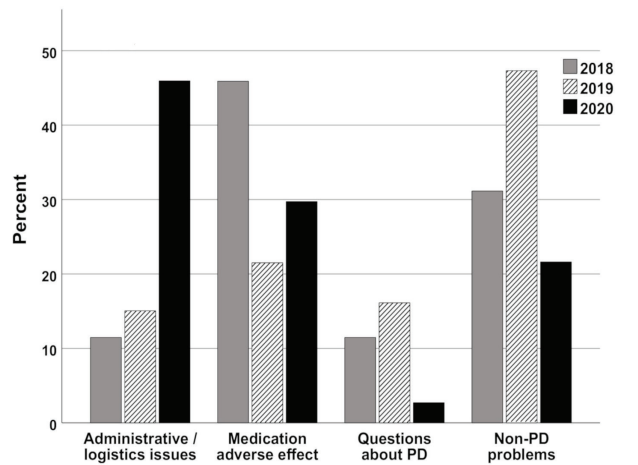
$p < 0.001$ ). Questions regarding medical problems other than PD (such as the interaction of a newly prescribed drug on PD medication or DBS management before an operation.) were significantly fewer in 2020 (21.6%) compared to 2019 (47.3%,  $p = 0.007$ ) but not in 2018 (31.1%,  $p = 0.306$ ) (Table-2, Figure 3).

For the variables that showed significant differences in 2020, we performed logistic regressions to

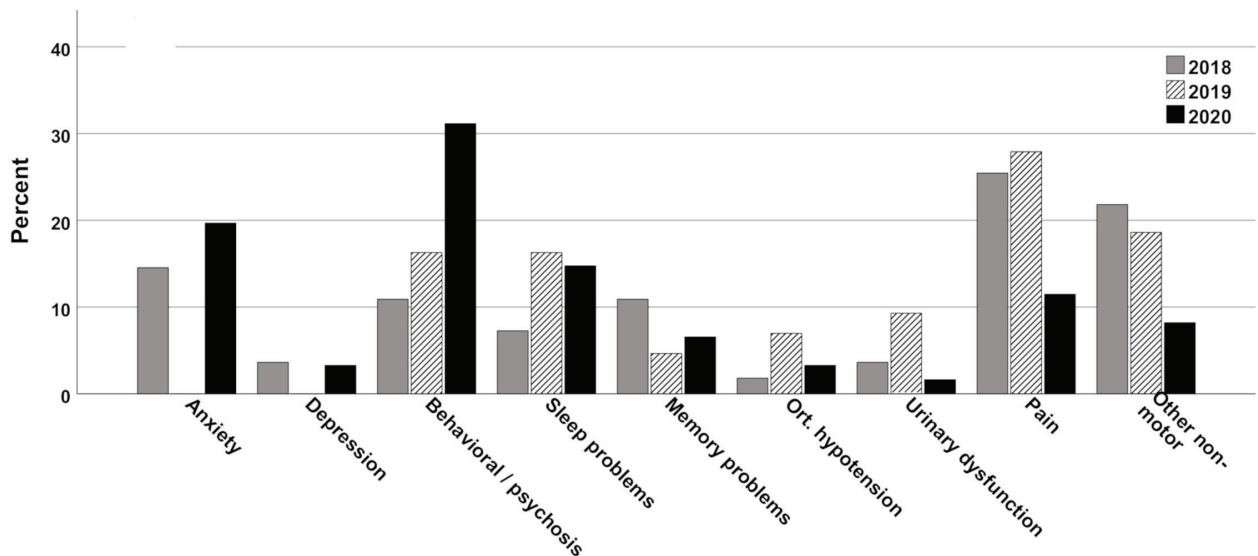
**Figure 1.** Categorization of the reported complaints/questions



**Figure 2.** Categorization of the reported complaints/questions (other reasons)



**Figure 3.** Medical problems other than Parkinson's disease



ascertain whether these are independent of potential confounding effects of age, sex, disease duration, or severity. For anxiety, the regression model (Nagelkerke  $R^2 = 19\%$ ,  $\chi^2(6) = 20.703$ ,  $p = 0.002$ ) showed no significant difference in 2020 against 2018 (OR= 1.3, 95% CI: 0.4-3.8,  $p = 0.638$ ). The regression model for the presence of behavioral/psychotic symptoms also showed a good fit (Nagelkerke  $R^2 = 11\%$ ,  $\chi^2(6) = 17.702$ ,  $p = 0.007$ ) and correctly classified 92% of the cases. In 2020, the odds of calling because of such symptoms was 3.7 and 3.0 times greater in comparison to 2018 (95% CI: 1.3-10.8  $p = 0.014$ ) and 2019 (95% CI: 1.2-7.4  $p = 0.018$ ), respectively. For administrative/logistics issues as the dependent variable, the regression model explained 6% (Nagelkerke  $R^2$ ) of the variance in group membership and correctly classified 89% of cases ( $\chi^2(5) = 11.473$ ,  $p < 0.075$ ). The year of 2020 was significantly associated with an increase in administrative/logistics questions compared to 2018 (OR= 3.7, 95% CI: 1.5-9.3;  $p = 0.004$ ) and 2019 (OR= 2.1, 95% CI: 1.0-4.5;  $p = 0.044$ ), independent of the effects of the confounders. And finally, for the non-PD-related questions, the regression model showed a good fit with a significant relationship (Nagelkerke  $R^2 = 9\%$ ;  $\chi^2(5) = 21.070$ ,  $p = 0.002$ ) between the predictors and the grouping. The model showed that in 2020, the odds of calling to ask about non-PD issues decreased by 77% compared to 2019 (95% CI: 0.10-0.52;  $p < 0.001$ ). Against 2018, the odds decreased by 55%, but showed no significant effect (95% CI: 0.19-1.1;  $p = 0.077$ ) (Table-3).

## DISCUSSION

In this study, we analyzed the telephone records of the PD patients within the 2.5-month-period of lockdown and compared them with the same interval of the two previous years. Our results showed an increase in calls related to administrative/logistics inquiries in 2020. Also, behavioral/psychotic symptoms were more frequently reported in 2020 compared to 2018 and 2019. Apart from these in 2020,

a decline in questions regarding non-PD-related issues and increased anxiety were also detected, but these were not decisive because a significant contrast was found only compared to 2019.

Starting from the first weeks of 2020, all the intense regulations against the pandemic limited everyone's routine lives significantly. Regulations during the pandemic compelled patients with PD to reduced physical activity, increased loneliness, depression, and stress. It has also been argued that PD patients constitute a more vulnerable group given the already existing impairment in physical, psychiatric, and cognitive domains in most patients (4). Besides, news in the media about the rapid spread of the virus and susceptibility of the elderly for COVID-19 (especially ones with chronic diseases) probably escalated the anxiety of the patients further, not to mention the concerns and uncertainties for reaching to medication or medical assistance when needed throughout the lockdown (12).

For complaints/questions other than motor or non-motor symptoms, administrative/logistic issues were significantly higher in 2020 than in previous years. This category included questions about appointments for the outpatient clinic or difficulties in obtaining PD medication. In March, the expiration date of all repeat prescriptions (for chronic diseases) was extended for three months in Turkey; however, some of the patients were not aware of this. It should also be mentioned that in the first months of 2020, there was a shortage of entacapone-containing drugs in the market due to an administrative issue, possibly unrelated to the pandemic, which may contribute to our finding regarding the increase in calls of administrative/logistic issues in 2020. Nevertheless, our findings agree with a recent large-scale survey performed by the Michael J. Fox Foundation, which showed that 62% of the 7200+ survey responses pointed out administrative problems such as canceled appointments and reduced home-care facilities or issues for obtaining medications (13).

Another expected problem under lockdown cir-

**Table 3.** Details of the logistic regression analyses.

	<b>B (SE)</b>	<b>OR</b>	<b>95% CI</b>	<b>P value</b>
<b>Anxiety*</b>				
Constant	-3.96 (1.6)	0.02	-	0.02
Age	-0.01 (0.02)	0.99	0.94 - 1.03	0.62
Sex	1.05 (0.61)	2.85	0.86 - 9.40	0.09
Disease duration	-0.03 (0.05)	0.97	0.87 - 1.08	0.62
Disease severity	-0.03	1.79	0.90 - 3.50	0.09
Year (2019 vs. 2018)	-	-	-	-
Year (2020 vs. 2018)	0.26 (0.55)	1.29	0.44 - 3.85	0.64
Year (2020 vs. 2019)	-	-	-	-
<b>Behavioral/psychotic issues*</b>				
Constant	-6.13(1.4)	0.00	-	0.00
Age	0.03(0.02)	1.03	0.99 - 1.07	0.20
Sex	0.68(0.42)	1.97	0.87 - 4.47	0.10
Disease duration	-0.001(0.04)	1.00	0.93 - 1.07	0.98
Disease severity	0.37(0.24)	1.45	0.90 - 2.32	0.12
Year (2019 vs. 2018)	0.23(0.59)	1.25	0.39 - 4.03	0.70
Year (2020 vs. 2018)	1.32(0.54)	3.75	1.31 - 10.77	0.01
Year (2020 vs 2019)	1.19(0.46)	3.01	1.22 - 7.42	0.02
<b>Administrative/logistics issues*</b>				
Constant	-2.15	0.12	-	0.06
Age	0.003(0.02)	1.00	0.97 - 1.03	0.85
Sex	0.01(0.34)	1.01	0.52 - 1.95	0.98
Disease duration	0.03(0.03)	1.03	0.97 - 1.20	0.37
Disease severity	-0.31(0.26)	0.73	0.44 - 1.23	0.24
Year (2019 vs. 2018)	0.56(0.49)	1.77	0.68 - 4.56	0.25
Year (2020 vs. 2018)	1.32(0.46)	3.76	1.51 - 9.32	0.004
Year (2020 vs. 2019)	0.76(1.17)	2.14	1.02 - 4.49	0.04
<b>non-PD related questions*</b>				
Constant	-1.32(0.97)	0.27	-	0.17
Age	0.006(0.01)	1.01	0.98 - 1.03	0.63
Sex	-0.19(0.28)	0.83	0.48 - 1.44	0.51
Disease duration	0.02(0.03)	1.02	0.96 - 1.07	0.52
Disease severity	-.40(0.24)	0.67	0.42 - 1.06	0.09
Year (2019 vs. 2018)	0.67 (0.32)	1.95	1.03 - 3.69	0.04
Year (2020 vs. 2018)	-0.79(0.45)	0.45	0.45 - 1.09	0.08
Year (2020 vs. 2019)	-1.46(0.42)	0.23	0.10 - 0.52	<0.001

\*predicted probability for each dependent variable is the presence of the given title compared to its absence used as reference. OR, odds ratio; CI, confidence interval

cumstances was increased anxiety in PD patients. This could not be confirmed in our study convincingly. Anxiety constituted around 20% of the non-motor complaints that were reported during the pandemic. This percentage is higher than 2019, in which no anxiety was mentioned in calls but was close to 2018 (14.5%). Previously, three studies implicated high prevalence (59-82%) for anxiety during the lockdown (8-10). These rates may be explained by the study design, i.e., these studies conducted telephone interviews or web-based questionnaires and addressed anxiety directly, which probably led to an elevated positive response. Indeed, in studies that the patients vocalized their complaints without being explicitly asked, reported anxiety rates were lower, analogous to our data (14-15) regular clinical services for Parkinson's disease (PD). Thus, it can be argued that while anxiety is probably boosted in the lockdown and may be confirmed when asked, it is severe enough only in a particular group of patients to prompt contact with the physician. Besides, mood problems are ambiguous and may present as diverse symptomatology such as fatigue, sleep problems, motor or behavioral symptoms, or be overshadowed by cognitive impairment (16). This overlap between the somatic and neuropsychiatric features may also partly explain the lack of expected peak in 2020. Therefore, our findings suggest that emotional problems such as depression, stress, or anxiety may not be revealed spontaneously and should be questioned actively for recognition.

Concerning other non-motor reasons of calling, disturbances such as constipation, sweating, and erectile dysfunction (grouped as other non-motor symptoms) as well as pain were disclosed half as much as the previous years in 2020, but the difference did not reach statistical significance. Additionally, an increase in sleep-related problems due to physical inactivity and stress may also be expected in 2020 (4), but no such difference was detected in our data. Again, this finding does not exclude the likely increase of sleep-related disturbances but in-

stead suggests that sleep problems were not the primary complaint of the patients or caregivers during the lockdown period. In one study, 79.6% of the 113 patients described a new symptom or worsening of slowness or stiffness (60.2% each) during the lockdown period than post-lockdown, during which Covid-19 infection continued contrary to our study that found no significant differences between the years. A worsening of non-motor symptoms like anxiety, depression, sleep disorders, aches, and pain was also found in this study similar to ours (17). In another study, a questionnaire was conducted on 100 patients revealing an equal number of patients suffering from motor and non-motor symptoms. However, the UPDRS-III scores did not differ significantly before and after the restriction, which may indicate underlying anxiety in worsening of motor symptoms without objective confirmation (18).

In our study, a notable distinction was in the high rate of behavioral symptoms/psychosis in 2020. These complaints doubled compared to 2019 and tripled compared to 2018 suggesting apparent distress over PD patients over the lockdown period. Of course, as mentioned, these symptoms are probably not isolated from other PD-related manifestations and may present as a consequence of a combination of motor, neuropsychiatric, and cognitive disturbances (6,16). For instance, it may well be that some of the behavioral symptoms have manifested themselves out of increased irritability due to an underlying unreported anxiety/stress. Therefore, it may be plausible to argue that among all non-motor symptoms, the increase in behavioral or psychotic symptoms in 2020 does not signify one distinct non-motor symptom but rather point to a negative overall neuropsychological effect of the lockdown on the lives of PD patients.

One limitation of the present study may be its design, i.e., evaluating the patients' self-reported complaints may cause some symptoms to get unnoticed. It is possible that despite experiencing a PD-related disturbance, the patient or the caregiver





might not have sought medical assistance thinking that they cannot be helped, or they might not have depicted the complete picture of the problem on the phone. This would imply that the rates we found could be underestimated, especially for less distressing symptoms. On the other hand, relying on patient-reported complaints may be superior to, e.g., telephone interviews in illustrating the patients' subjective perception under the lockdown. For instance, when asked, one can affirm increased anxiety, but this may not be her/his most important concern. Another strength of the current study is including the records of the previous two years, which enabled us to control the rates of 2020 against periods from "normal daily life" as previously suggested (4). Having the records of two "normal" previous years also allowed us to visualize the random fluctuations in patients' complaints as seen in anxiety or sleep problems (Figure 2). Blinded evaluation of the telephone records is also a strong point ruling out the observer bias towards the year of the telephone call. To our knowledge, this is the first study that

compared telephone records of PD patients between ordinary life and a period from a global crisis.

In conclusion, within the lockdown period of 2.5 months in 2020, we have found an increase in complaints/questions about administrative issues and behavioral/psychotic symptoms in patients with PD. These disturbances, notable as they may be, are influenced by several factors such as the length of the lockdown, access to medical care, or contact abilities of the PD patients with the caregiver or family members, all of which are more or less modifiable. On that account, our results provide evidence for the probable predicaments of the PD patients during the ongoing and future large-scale crises and suggest that taking preventive measures against organizational problems, providing rapid and sustainable health care and medication supply are crucial in such circumstances. Moreover, efforts should be directed towards finding ways to monitor and alleviate behavioral symptoms of PD patients that would help to maintain the quality of life in crisis periods.

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#### RESEARCH

## PROPOSAL OF A SET OF INDICATORS FOR PLANNING AND MANAGING ELDERLY CARE SERVICES IN TURKEY: A DELPHI-BASED CONSENSUS STUDY

### ABSTRACT

**Introduction:** For health administrators and policymakers in Turkey, there is great significance to be found in the measurement and analysis of the current situation. This research seeks to set indicators for a comprehensive plan, and it aims to forecast what steps the Turkish health system will need to take in regards to elderly care.

**Materials and Method:** This study adopted the Delphi method, a forecasting method that relies on the consensus of a panel of experts concerning a topic of interest. The research was conducted between August 1 and September 31, 2020. Data were collected using a set of indicators in the form of a questionnaire. The participants answered the questionnaire in all three rounds, and an interquartile range of less than 1.2 indicated a consensus on a given indicator.

**Results:** A consensus was reached by the experts, detailing that the set of indicators should consist of 78 items regarding the elderly population and their welfare status (15 items), elderly care institutions (six items), admission to elderly care (four items), elderly care recipients (three items), home care (12 items), caregivers (one item), healthcare expenditures (11 items), and health status (27 items).

**Conclusion:** Feasible and reliable indicators can assist in the planning and managing of elderly care services and their incorporation into health and social services. This study presented 78 fundamental indicators concerning elderly healthcare services in Turkey. It is recommended that public institutions use information systems to collect and publish data annually through the aforementioned indicators.

**Keywords:** Aging; Indicators; Health Services for the Aged; Turkey.

## INTRODUCTION

The elderly are a growing proportion of the world's population. The Turkish Statistical Institute (TSI) estimates that the population of individuals aged 65 and over will increase from 9.5 percent in 2020 to 16.3 percent in 2040 (1). This is a clear indication that authorities must focus on developing public policies and programs in regards to aging, both for today and for the near future (2).

The World Health Organization (WHO) and United Nations (UN) emphasize that systematic data collection, parsing, and analysis have become more important to better understand the challenges and opportunities faced by the elderly, specifically in assessing their socioeconomic, health, and cultural conditions. They also recommend that countries regularly record and publish comparable statistics on aging (3, 4). The Madrid International Plan of Action on Aging (MIPAA) urges governments to conduct research in collaboration to develop effective evidence-based policies and programs for the aging population (5).

The Turkish Ministry of Health has drawn up reports addressing access of the elderly to healthcare, healthy aging, improvement of elderly care, positive discrimination, and promotion of monitoring and evaluation standards. Evidence-based data is key to introducing successful healthcare reforms and monitoring policies (6). It is necessary to compile data to monitor and protect the health of the elderly, improve the quality of elderly care services, and promote their integration with social services. The goal is to ensure that Turkish authorities use statistical evidence to develop and implement policies while sharing the best practices with other countries (7).

Turkish health administrators and policymakers should assess the current situation to manage elderly care. All stakeholders must use accurate and up-to-date data. However, at present, there is no set of indicators for elderly care. This paper proposes indicators forecasting what steps the Turkish health system needs to take regarding elderly care.

## MATERIALS AND METHODS

**Aim:** This study aimed to develop a set of indicators needed to formulate and manage comprehensive policies on elderly care.

**Study design:** The study adopted the Delphi method, which allows a panel of between 10 and 18 experts to reach a consensus on a topic of interest (8, 9). The Delphi method is a mixture of qualitative and quantitative research design; on the one hand, it relies on expert opinion, and on the other hand, it evaluates data quantitatively. Another advantage of the Delphi method is that the panel consists of experts who do not know one another, and therefore, the topic of interest can be assessed without any pressure to the parties involved.

The study was conducted between August 1 and September 31, 2020. First, the researchers developed a draft based on international indicators on elderly care management. The researchers used the official sets of indicators from Japan, Australia, and the USA (10-12) due to their higher levels of experience in elderly care. The researchers translated the sets into Turkish. Following this process, an expert on both Turkish and English checked the draft for intelligibility and relevance. The researchers removed repetitive items and then used the Delphi method to reach a consensus on which items to include in the final set (questionnaire). The sample consisted of 14 academics who met the inclusion criteria and answered the questionnaire in all three rounds.

The inclusion criteria were as follows:

Working as an academic in universities in Turkey

Having a degree of expertise in internal medicine, health management, hospital management, and geriatrics and gerontology

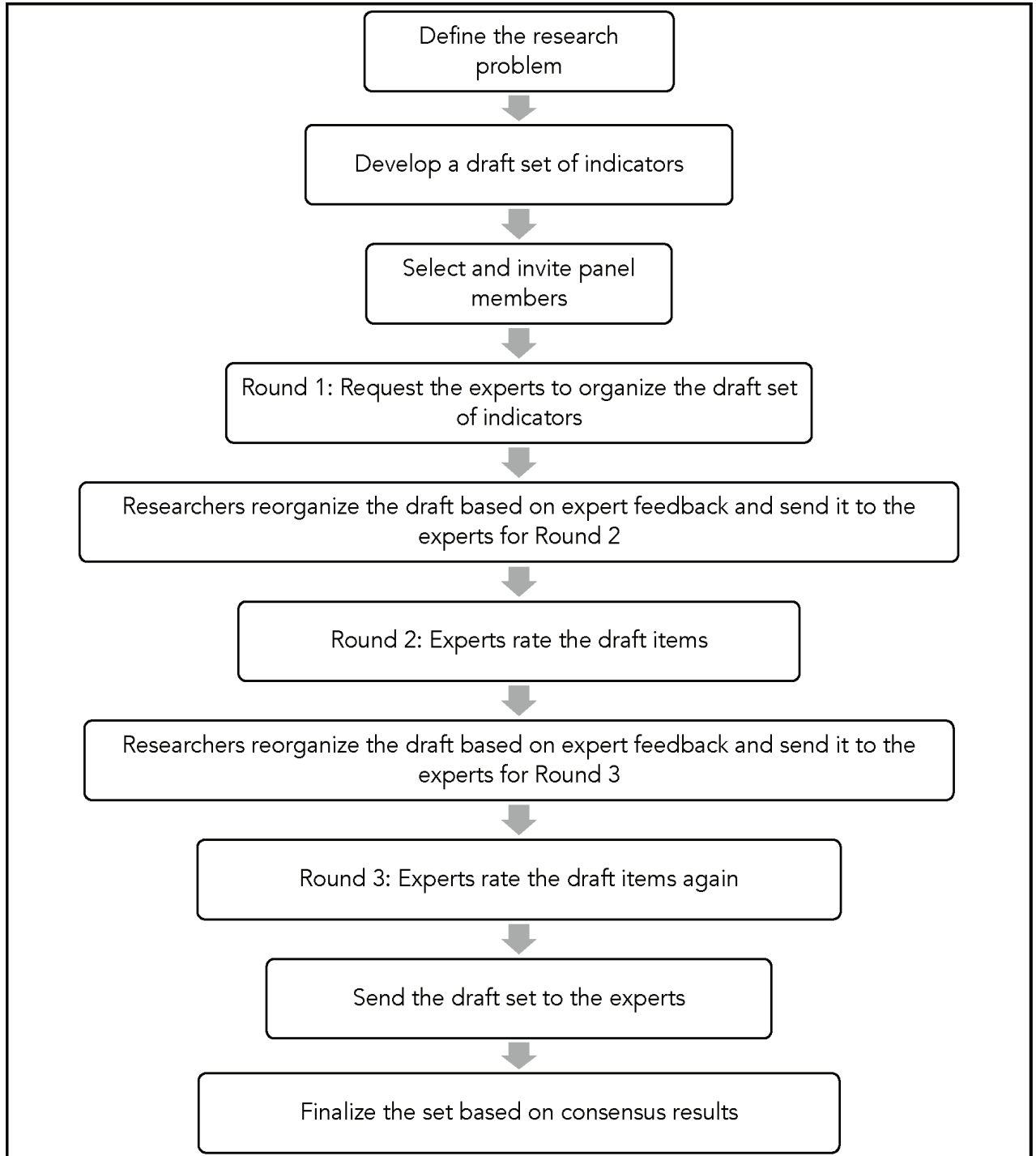
Having academic publications on elderly care services and/or policies

### Data Analysis

The draft consisted of items scored on a seven-point Likert-type scale. The researchers emailed



Figure 1: Steps of the Delphi Method (developed by the researchers)



it to the experts and asked them to assess and modify the items until they reached a consensus. This process was repeated three times (rounds). In each round, the researchers removed or reworded some items and added to others. A consensus was reached based on the quantitative analysis of the items rated by the experts. In this study, the Likert-type assessment involves the median (M), first quartile (Q1), third quartile (Q3), and interquartile range (IQR = Q3 - Q1) (13, 14). An interquartile range of < 1.2 indicates a consensus on an item (13). At the end of the third round, the researchers emailed each expert the questionnaire with the group decision and each expert's score. The data were analyzed. The items with an IQR of < 1.2 indicated a consensus, while those with an IQR of  $\geq 1.2$  indicated no consensus.

### **Ethical Approval**

The study was approved by the Ethics Committee of the Bandırma Onyedi Eylül University (03.07.2020/2020-32).

### **RESULTS**

Table 1 shows the indicators of elderly care and health as well as the consensus results on these indicators. The set of indicators consisted of 86 items under nine sections: the elderly population and their welfare status (15 items), elderly care institutions (six items), admission to elderly care (four items), elderly care recipients (four items), home care (12 items), caregivers (one item), healthcare expenditures of the elderly (11 items), and health status of the elderly (27 items). The experts reached a complete consensus on Items 1.1, 1.2, and 1.13 (IQR = 0) but did not reach a consensus on Items 1.8 and 1.17 (IQR  $\geq 1.2$ ) in Section 1. The experts also achieved a complete consensus on Items 2.1, 2.2, and 2.5 (IQR = 0) and achieved a consensus on all the other items (IQR < 1.2) with the exception of 2.6 in Section 2.

The experts achieved a complete consensus on all items in Sections 3 and 4 (IQR = 0). They also

achieved a complete consensus on Items 5.1 to 5.7, and 5.12 (IQR = 0). A consensus was reached on Items 5.8 to 5.11 (IQR < 1.2) in Section 5 as well.

The experts reached a consensus on Item 6.2 (IQR < 1.2) but not on Items 6.1 and 6.3 (IQR  $\geq 1.2$ ) in Section 6. The experts did not reach a consensus on any of the items in Section 7 (IQR  $\geq 1.2$ ).

The experts achieved a consensus on Item 8.7 (IQR < 1.2) and a complete consensus on all the other items (IQR = 0) in Section 8. They reached a complete consensus on Items 9.1, 9.2, 9.3, 9.6, 9.7, 9.10, 9.13, 9.16, 9.20, 9.24, 9.25, 9.26, and 9.27 (IQR = 0) and a consensus on the other items (IQR < 1.2) in Section 9.

### **DISCUSSION**

The number of elderly individuals in Turkey is increasing rapidly, causing numerous changes in social life. However, Turkey has been caught off guard and unprepared in regards to health and social policies for the elderly. Old age is a social risk causing a loss of income. Elderly individuals often face poverty and poor quality of life, as they must deal with additional expenses with limited employment opportunities. Therefore, we need to monitor changes in indicators concerning the population and welfare level of the elderly (15, 16).

Elderly care institutions are an essential part of holistic healthcare. There are different types of elderly care, such as home care, hospitals, retirement homes, nursing homes, palliative care, and so on (17). Elderly care in Turkey does not have an institutional structure. It comes mainly in the form of aging-in-place, home care, and alternative institutional models (18). Public institutions and private or non-profit organizations deliver health services to the elderly. There are live-in care agencies, as well as daycare facilities and senior living communities. What distinguishes them from boarding pensions is that they do not offer 24/7 care, and residents contact their families. However, the implementation of



**Table 1.** Indicators of Elderly Care and Health

Section	No.	Indicators (Items)	Q1	M	Q3	IQR
1. The elderly population and their welfare status	1.1	Year-by-year changes in the number and proportion of families with elderly members	7	7	7	0
	1.2	Year-by-year changes in the average income of families (household) with elderly members	7	7	7	0
	1.3	Year-by-year changes in the number and percentage distribution of households with elderly members living on a retirement pension	6	7	7	1
	1.4	Year-by-year distribution of the elderly population by the number of households	6	6.5	7	1
	1.5	Year-by-year changes in the number of the elderly living alone (households)	6	7	7	1
	1.6	Income type (one/two/more than two) of elderly family members and their average income by household	6	7	7	1
	1.7	The number and structure of elderly households by city (one/two/more than two)	6	6.5	7	1
	1.8	Year-by-year changes in the number of elderly associations and their members (under 65 and over 65)	5	6	7	2
	1.9	Year-by-year changes in the number of the elderly aged 65-74, 75-84, 85-99, and 100 years or more	6	7	7	1
	1.10	International comparison of the elderly population rate (2050)	6	7	7	1
	1.11	Distribution of the elderly population by marital status, age, and gender	6	7	7	1
	1.12	The education level of the elderly population	6.25	7	7	0.75
	1.13	The participation rate of the elderly population in the labor market by gender and age group	7	7	7	0
	1.14	Landlord and tenant status of the elderly	6.25	7	7	0.75
	1.15	Who makes the spending decisions? Who cashes in your pension?	6	6	6.75	0.75
	1.16	The evaluation of the quality of life	6.25	7	7	0.75
	1.17	The number and percentage of the elderly by gender for districts and neighborhoods	5	6	7	2

<b>2. Elderly care institutions</b>	<b>2.1</b>	The type, scope, and number of elderly care institutions	7	7	7	0
	<b>2.2</b>	The distribution of elderly care institutions by city and service type (hospitals and others separately) (number of beds per 1,000 the elderly)	7	7	7	0
	<b>2.3</b>	The distribution of elderly care institutions by type of management (public, private sector, non-profit organizations)	6	7	7	1
	<b>2.4</b>	The distribution and number of full-time employees in elderly care institutions by occupation	6.25	7	7	0.75
	<b>2.5</b>	The distribution of elderly care institutions by city and service type (hospitals and others separately) (number of beds per 1,000 the elderly)	7	7	7	0
	<b>2.6</b>	The distribution of full-time employees in elderly care institutions by type of degree	5.25	6	7	1.75
	<b>2.7</b>	The number of palliative care centers in hospitals	6	6	6.75	0.75
<b>3. Admission to elderly care</b>	<b>3.1</b>	The number of elderly care recipients by year and service type	7	7	7	0
	<b>3.2</b>	The type and number of elderly care services (per 1,000 elderly individuals)	7	7	7	0
	<b>3.3</b>	The distribution of elderly care recipients by age group	7	7	7	0
	<b>3.4</b>	The care type, age, and gender characteristics of first-time elderly care recipients	7	7	7	0
<b>4. Elderly care recipients</b>	<b>4.1</b>	The percentage distribution of elderly care recipients by care type (home support, home care, nursing home care, short-term social support)	7	7	7	0
	<b>4.2</b>	Who uses elderly care services more? Classification of users by type of care, age, sex, and dementia and other medical diagnoses	7	7	7	0
	<b>4.3</b>	Does the use of elderly care services differ by region? (rate of elderly care use by region)	7	7	7	0





<b>5. Care Needs of Home Care Recipients</b>	<b>5.1</b>	The number of home care recipients by sector and age group	7	7	7	0
	<b>5.2</b>	The distribution of elderly home care recipients by the level of care (low, medium, high)	7	7	7	0
	<b>5.3</b>	Year-by-year changes in the demand for home care in the elderly population	7	7	7	0
	<b>5.4</b>	The number and percentage distribution of the elderly in need of home care by the level of care	7	7	7	0
	<b>5.5</b>	What is the proportion of the elderly in need of home care, and what are their cognitive and behavioral traits by age and gender?	7	7	7	0
	<b>5.6</b>	The average duration of use of elderly home care services	7	7	7	0
	<b>5.7</b>	The average duration of use of short-term elderly home care services	7	7	7	0
	<b>5.8</b>	The number of home visits per elderly individual	6	6.5	7	1
	<b>5.9</b>	The classification of services in-home care units	6.25	7	7	0.75
	<b>5.10</b>	The classification of diagnoses of patients registered in in-home care units	6	6	7	1
	<b>5.11</b>	The degree of proximity of caregivers of the elderly registered in in-home care units	6	6	7	1
	<b>5.12</b>	The percentage of bedridden elderly patients registered in in-home care units	7	7	7	0
<b>6. Caregivers</b>	<b>6.1</b>	The percentage distribution (by age and gender) of family members or paid caregivers caring for the elderly at home (permanent caregiver)	5.25	7	7	1.75
	<b>6.2</b>	The percentage distribution of elderly home care recipients (permanent caregivers) by family structure and type of care use	6	7	7	1
	<b>6.3</b>	The turnover rate of caregivers	5.25	6	7	1.75
<b>7. Individuals Withdrawing from Elderly Care</b>	<b>7.1</b>	Year-by-year changes in the average duration of care for the elderly who withdrew from care	5	6	7	2
	<b>7.2</b>	Changes in reasons for elderly care recipients' withdrawal from care over time	5	6	6.75	1.75
	<b>7.3</b>	Changes by age group in the average duration of care received by the elderly before withdrawing from care	5	6	7	2

<b>8. Healthcare expenditures of the elderly</b>	<b>8.1</b>	What is the distribution of total elderly care expenditures by years and type (public sector, private sector, and paying out-of-pocket)?	7	7	7	0
	<b>8.2</b>	The distribution of elderly care expenditures by the institution (Ministry of Health, municipalities, ministry of family and social policies, private sector, and paying out-of-pocket)	7	7	7	0
	<b>8.3</b>	The percentage distribution of elderly care institutions by type of financial resources	7	7	7	0
	<b>8.4</b>	The yearly distribution of total social care expenditures for the elderly (write in parentheses what you mean by social care)	7	7	7	0
	<b>8.5</b>	Changes in elderly health and social care expenditures across regions	7	7	7	0
	<b>8.6</b>	The ratio of elderly care expenditures to the total elderly population	7	7	7	0
	<b>8.7</b>	Elderly healthcare expenditure per capita by age group (65-74, 75-84, 85 or more)	6	7	7	1
	<b>8.8</b>	Elderly healthcare expenditure by age group (65-74, 75-84, 85 or more), year, and type of treatment	7	7	7	0
	<b>8.9</b>	Elderly social care (long-term care) expenditure by age group (65-74, 75-84, 85 or more) and year	7	7	7	0
	<b>8.10</b>	Annual prescription drug expenditures of the elderly	7	7	7	0
	<b>8.11</b>	The percentage distribution of the health insurance status of the elderly (65 years or older) (general, private, or complementary health coverage)	7	7	7	0



<b>9. Health status of the elderly (9.1 - 9.18)</b>	<b>9.1</b>	The average life expectancy of individuals over the age of 65 and 80 by gender and year	7	7	7	0
	<b>9.2</b>	The causes of death of the elderly and their distribution over the years (cause of death)	7	7	7	0
	<b>9.3</b>	The rate of chronic diseases in the elderly and their change over the years	7	7	7	0
	<b>9.4</b>	Prosthesis rate in the elderly and its change over the years	6.25	7	7	0.75
	<b>9.5</b>	The distribution of satisfaction of the elderly with their health conditions by age and gender (proportion of those who describe it as bad, neither bad nor good, good, and excellent)	6	7	7	1
	<b>9.6</b>	The number of the elderly diagnosed with dementia and its ratio by age group (dementia)	7	7	7	0
	<b>9.7</b>	The rate of the elderly diagnosed with dementia by sex, age, and education (dementia)	7	7	7	0
	<b>9.8</b>	The rate of the elderly with symptoms of clinical depression by age group and gender (symptoms of depression)	6	7	7	1
	<b>9.9</b>	The distribution of the elderly in need of care by gender	7	7	7	0
	<b>9.10</b>	What is the functional status of the elderly (stool, urinary incontinence, etc.)? Are they self-sufficient?	6	6.5	7	1
	<b>9.11</b>	The rate of home-care elderly individuals receiving nutritional support	6	6	7	1
	<b>9.12</b>	The rate of the elderly who are on five (5) or more drugs	7	7	7	0
	<b>9.13</b>	The rate of falls in the elderly and their post-fall conditions	6	7	7	1
	<b>9.14</b>	The rate of the elderly with hearing and vision problems	6	7	7	1
	<b>9.15</b>	Use of aids (hearing aid, glasses, walking stick, etc.)	7	7	7	0
	<b>9.16</b>	The percentage of the elderly who got their flu and pneumonia shots (vaccines)	6	7	7	1
	<b>9.17</b>	The percentage of women aged 50-74 who have been screened for breast cancer and its distribution by age group (cancer screening)	6	7	7	1
	<b>9.18</b>	The percentage of people aged 50-74 who have been screened for colorectal cancer and its distribution by sex and age group (cancer screening)	6	6.5	7	1

<b>9. Health status of the elderly (9.19 - 9.26)</b>	<b>9.19</b>	The average total HEI-2015 (Healthy Eating Index-2015) scores of the elderly population (diet quality)	7	7	7	0
	<b>9.20</b>	The rate of physical activity in individuals over the age of 65	7	7	7	0
	<b>9.21</b>	The most common physical activity	6	7	7	1
	<b>9.22</b>	The most common activity in everyday life	6	7	7	1
	<b>9.23</b>	The percentage of overweight and obese (by BMI) elderly individuals by gender and age group (obesity)	7	7	7	0
	<b>9.24</b>	The rate of tobacco addiction in the elderly (depending on gender, age group, and duration of smoking)	7	7	7	0
	<b>9.25</b>	The percentage of alcohol consumption in the elderly by gender and age group	7	7	7	0
	<b>9.26</b>	The percentage of the elderly living in provinces with "bad weather conditions" (published by the Ministry of Environment and Urbanization) (air quality)	7	7	7	0

care models is less than ideal due to the fact that such institutions are uncommon, unaware of the social service model, and have limited access; another reason is the difficulty in accessing precise institutional data (19). The Ministry of Development aims to provide long-term, quality care in institutions for the elderly who may be difficult to care for at home or who may prefer institutional care (7). Therefore, it is anticipated that data is needed on elderly care institutions, people in need of elderly care, types of care, and age and gender characteristics of care recipients.

It is necessary for Turkey to develop care policies and diversify institutional and home care services (19). The increase in life expectancy worldwide has increased the number of people in need of home care (20). The Ministry of Development aims to organize and spread home healthcare throughout the country based on needs and demands. Authorities require detailed data on home care services and re-

cipients in order to do the following: develop home care models involving social care; integrate them into social security systems; manage resources effectively; set care standards, practice guidelines, and inspection criteria; and arrange home care budgets.

The elderly population continues to grow, meaning an inevitable increase in burdens for present caregivers. Therefore, more caregivers are required (21). It is anticipated that, in the near future, there will be reductions in the number of family members (informal caregivers) caring for older family members (22). This trend must be monitored, and more formal caregivers will be required. The USA, Japan, and Australia monitor indicators concerning people withdrawing from elderly care (10, 11, 12). However, this was not deemed necessary due to the current conditions in Turkey.

General health insurance in Turkey is mandatory and has universal coverage. The care expenses



of older people with no income are covered by the health insurance of those liable for their care (23). Aging results in a decrease in workforce participation, and hence tax revenues and an increase in dependency rates and healthcare spending (22). Therefore, it is concluded that the healthcare costs of the elderly should be monitored.

As individuals age, they experience deterioration in their physiological and psychological functions and present more health problems and disabilities. Old-age health problems make elderly individuals more in need of social care (24). The goal is to ensure that the elderly can access healthcare for disease prevention and treatment and rehabilitation, lead active and independent lives, and benefit from positive discrimination in healthcare. In the present study, the experts reached a consensus that the health status of the elderly should be monitored based on the following indicators: life expectancy by sex and year; chronic diseases; prosthesis use; perceived satisfaction with health; dementia; symptoms of depression; need for care; eating habits; medication; falling; using hearing and vision aids; influenza and pneumonia shots; cancer screening; physical activity; weight; tobacco and

alcohol use; living in bad weather conditions; and causes of death (25; 10).

## CONCLUSION

Successful care planning, monitoring, and evaluation should depend on evidence-based information. Indicators on aging affect all areas of health, social, and demographic statistics, as well as public finance and all public indicators. Feasible and reliable indicators can assist in planning and managing elderly care services, and it can also assist in their incorporation into health and social services. In addition, these indicators can pave the way for further scientific research and evidence-based interventions. Data should be regularly collected to evaluate the current situation of the elderly from a multi-dimensional perspective (biological, psychological, economic, social, and cultural) in order to increase their life satisfaction and quality of life, as well as to ensure that they lead active lives in society. This research identified 79 key indicators that should be used in Turkey. It is recommended that public institutions use information systems to collect and publish data annually through these indicators.

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