# Epidemiological and clinical characteristics of severely dependent gerontological patients

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# EPIDEMIOLOGICAL AND CLINICAL CHARACTERISTICS OF SEVERELY DEPENDANT GERONTOLOGICAL PATIENTS

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# ABBREVIATIONS

ICD - International Classification of Diseases

LOS - Length of Stay

TKA - Total Knee Arthroplasty

THA - Total Hip Arthroplasty

DVT - Deep Vein Thrombosis

PE - Pulmonary Embolism

VTE - Venous Thromboembolism

NRS - Numeric Rating Scale

SARC-F - Strength, Assistance with walking, Rising from a chair, Climbing stairs and Falls.

# 1. INTRODUCTION

## 1.1. Background

The aging population is a global phenomenon with wide-ranging implications for healthcare systems worldwide. Data from the United Nations projects that the global population of individuals aged 65 years or older will surpass 1.6 billion by 2050, more than double the number recorded in 2019 (1). This demographic shift is driven by declining fertility rates and increased life expectancy. Decreased birth rates lead to a smaller number of children being born, resulting in a shift towards an older population. In conjunction with advancements in healthcare, lower mortality rates, especially among older adults, contribute to the overall increase in the aging population. Improved living standards, enhanced access to healthcare, and advancements in medical technology have also played significant roles in prolonging life and expanding the number of older adults.

The aging population presents a multitude of challenges for healthcare systems, giving rise to profound ramifications for the health and well-being of individuals, encompassing not only the elderly. A primary concern of utmost significance pertains to the escalated prevalence of chronic diseases and age-related conditions. Coming into 2020, the global population of individuals aged 65 years or older was estimated to approximate 703 million, constituting approximately 9% of the total population(2). The United Nations report signifies that Europe currently harbours the highest proportion of older individuals, with approximately 25% of its population falling into the 65 years or older category. This figure is followed by North America (17%), Latin America and the Caribbean (14%), Asia (12%), Oceania (11%), and Africa (5%) (1, 2). Older adults are particularly predisposed to a wide array of conditions, including cardiovascular disease, cancer, dementia, osteoporosis, mobility impairments, and injuries. Addressing these conditions necessitates the implementation of specialised care interventions, long-term disease management strategies, and comprehensive rehabilitation services, all of which exert a substantial strain on existing healthcare resources.

Effectively attending to the unique healthcare needs of the aging population is of paramount importance in order to ensure their overall well-being and sustain a fully functional healthcare system. The challenges posed by the aging population mandate targeted research initiatives and the formulation of strategic approaches aimed at addressing the intricate health-related implications. It is of utmost significance to devise comprehensive frameworks that promote healthy aging, preventive healthcare practices, and efficient management of chronic conditions. Furthermore, healthcare systems must allocate sufficient resources, including a well-equipped healthcare workforce, state-of-the-art facilities, and cutting-edge technologies, to adequately accommodate the escalating demands arising from the aging demographic. Collaborative endeavours involving healthcare providers, policymakers and researchers play an integral role in forging sustainable solutions that augment the quality of life for older adults while concurrently upholding the long-term viability and efficacy of healthcare systems amidst the backdrop of this transformative demographic shift. Addressing the unique healthcare needs of the aging population is crucial to ensure their well-being and maintain a functioning healthcare system. The aging population poses significant challenges for healthcare systems, requiring targeted study and strategies to address the health implications.

Thus, healthcare systems should prioritise time and research for the development of geriatric care programs and specialised services for the elderly to effectively manage the complex health needs of older adults.

## 1.2. Injury

In the realm of geriatric medicine, injuries occurring among adults aged 65 and above present formidable challenges attributed to the physiological changes associated with the aging process. This vulnerable demographic encounters an elevated susceptibility to injuries, with falls emerging as a prominent hazard, carrying substantial repercussions for their overall health and well-being. The advancing years manifest diverse physiological alterations that render this population more prone to harm. Notably, the decline in muscle mass and strength, referred to as sarcopenia, contributes to a compromised equilibrium and coordination, thereby escalating the propensity for falls. Moreover, the aging phenomenon entails a reduction in bone mineral density, osteoporosis, leading to an increase in susceptibility to fractures even from trivial trauma (3). The Centres for Disease Control and Prevention (CDC) reports that roughly one out of every four adults aged 65 and above experiences a fall annually. Such falls often culminate in fractures, including the particularly devastating hip fractures, which exact a heavy toll on older individuals (4,5).

### 1.2.1. Musculoskeletal Injury

Musculoskeletal injuries, including fractures, sprains, strains, and dislocations, exert a profound influence on the physical health and overall well-being of the geriatric population. Epidemiological findings have uncovered a worrisome surge in both the occurrence and prevalence of such injuries within this demographic (6). Recent investigations have established a substantial 24% surge in the frequency of fractures among individuals aged 65 years and older over the past decade. In addition, there has been a reported 37% increase in visits to emergency departments for musculoskeletal injuries among the elderly, indicating a growing demand for healthcare services in this population (4).

Musculoskeletal injuries in older adults have far-reaching and profound consequences, often leading to long-term disability, compromised functional independence, and reduced quality of life. Older adults who experience musculoskeletal injuries are three times more likely to encounter mobility limitations and require assistance with daily activities compared to their uninjured counterparts. These injuries impose a substantial economic burden, with healthcare costs surpassing billions of dollars annually (4).

The aetiology of musculoskeletal injuries in older adults is intricate, involving a combination of intrinsic and extrinsic risk factors. Intrinsic factors encompass age-related changes, such as decreased bone mineral density, sarcopenia (loss of muscle mass), impaired balance, and visual impairments. These factors predispose older adults to falls, subsequently leading to musculoskeletal injuries. There is a significant correlation between reduced muscle strength, impaired balance, and an increased risk of falls and fractures among the elderly population. Furthermore, extrinsic factors, including environmental hazards and insufficient safety measures, further contribute to the vulnerability of older adults to musculoskeletal injuries (7).

Musculoskeletal injuries represent a notable and increasing threat to the elderly population, resulting in significant morbidity, functional deterioration, and economic strain. It is crucial to gain a comprehensive understanding of the underlying factors contributing to this heightened vulnerability. This understanding is essential for the development of effective prevention strategies and targeted interventions aimed at alleviating the burden of musculoskeletal injuries in older adults. Further research is warranted to unravel the complex interplay between intrinsic and extrinsic risk factors and to implement evidence-based interventions aimed at reducing the occurrence and impact of musculoskeletal injuries in the aging population.

### 1.2.2. Sarcopenia

Sarcopenia is a complex and multifactorial condition influenced by various intrinsic and extrinsic factors. This leads to a progressive and generalised skeletal muscle disorder, that's a significant health concern in the aging population. It is characterised by the loss of muscle mass, strength, and function, leading to compromised physical performance and increased vulnerability to adverse health outcomes (8,9). The incidence and prevalence of sarcopenia have gained attention due to its impact on the overall health and well-being of the elderly population. The underlying mechanisms involve a combination of age-related changes in muscle protein metabolism, hormonal alterations, chronic inflammation, mitochondrial dysfunction, and impaired neuromuscular signalling. This leads to an imbalance between protein synthesis and breakdown, anabolic resistance, and impaired satellite cell function contribute to the progressive loss of muscle mass and strength observed in sarcopenia. Sarcopenia has far-reaching consequences beyond muscle wasting. It is associated with increased functional decline, physical disability, falls, fractures, and decreased quality of life in the elderly. Sarcopenia is associated with higher healthcare utilisation, including hospitalisations and institutionalisation, leading to substantial economic burdens (9,10).

Estimates suggest that the prevalence of sarcopenia increases with age, ranging from approximately 5-13% in individuals aged 60-70 years to 11-50% in those aged over 80 years. Furthermore, the incidence of sarcopenia is influenced by factors such as gender, physical activity levels, and comorbidities, with higher rates observed in women and individuals with sedentary lifestyles or chronic diseases (9,10).

### 1.2.3. Hip Injuries

Hip injuries pose a considerable health risk to the elderly population, with severe consequences for functional independence, quality of life, and mortality rates. The aging process brings about physiological changes, such as decreased bone density, diminished muscle strength, impaired balance, and coordination, making the elderly more susceptible to hip injuries (11,12).

Hip fractures are a leading cause of morbidity and mortality among the elderly. The incidence of hip fractures increases with age, with a sharp rise observed after the age of 65. According to the International Osteoporosis Foundation it is estimated that approximately 1.6 million hip fractures occur worldwide each year, and this number is projected to increase due to the aging population. In terms of prevalence, studies have reported that 17-30% of hip fracture patients will experience a subsequent fracture within 5 years (11).

Hip fractures are classified based on their anatomical location, with the most common types being intracapsular (femoral neck) fractures and extracapsular fractures. Intracapsular fractures involve the femoral neck and are further categorized as subcapital, transcervical, or basicervical fractures. Extracapsular fractures, on the other hand, occur below the femoral neck and include intertrochanteric and subtrochanteric fractures. Femoral neck fractures, which occur within the proximal part of the femur, are a prevalent type of hip injury among the elderly. They account for approximately 50% of all hip fractures. These fractures are commonly associated with osteoporosis. Hip fractures can be classified using two common systems: the Garden classification and the Pauwels classification. The Garden classification categorises fractures based on the degree of displacement and integrity of the femoral neck, with types I to IV indicating varying levels of stability and displacement. The Pauwels classification focuses on the angle of the fracture line in relation to the horizontal axis of the femoral neck, with types I to III indicating increasing instability and risk of displacement. These classification systems aid in treatment planning and predicting patient outcomes for hip fractures (12-15).

Dementia has been identified as a major risk factor for hip fracture and is associated with increased mortality risk after hip fracture and is linked to increased postoperative complications following hip fracture repair dementia and T2D are associated with increased mortality risk irrespective of fracture (16,17).

Between 2000 and 2010, significant changes occurred in the trends of total hip replacements among inpatients aged 45 and over. The annual number of these procedures more than doubled, increasing from 138,700 in 2000 to 310,800 in 2010. The percentage increase varied by age, with a 92% increase for those 75 and over and a 205% increase for those aged 45–54. During this period, the percentage of total hip replacements for the 45–54 age group increased from 12% to 17%, and for the 55–64 age group, it rose from 24% to 29%. The average hospital stay following these surgeries reduced however, decreasing from nearly 5 days in 2000 to just under 4 days by 2010 (18).

Older adults have a 5- to 8-fold increased risk for all-cause mortality during the first 3 months after hip fracture. Excess annual mortality persists over time for both women and men, but at any given age, excess annual mortality after hip fracture is higher in men than in women (19,20).

While hip fractures are the most common type of hip injury, the incidence of hip dislocations and soft tissue injuries is relatively lower. Hip dislocations are often associated with high-energy trauma, such as motor vehicle accidents or falls from significant heights. Their occurrence in the elderly is less frequent but can result in severe morbidity and functional impairment. Soft tissue injuries around the hip joint, including muscle strains, tendonitis, and bursitis, can be caused by repetitive overuse, degenerative changes, or sudden forceful movements. The incidence of these soft tissue injuries varies depending on the specific activity levels and lifestyle factors of the elderly population (6,7).

Hip dislocations are less common than hip fractures in the elderly but can result in significant morbidity and functional impairment. Posterior hip dislocations are the most frequent type, often occurring due to high-energy trauma or falls onto the flexed hip. Anterior dislocations are rarer and usually associated with sporting activities or direct trauma to the hip. Soft tissue injury while less prevalent than fractures and dislocations, soft tissue injuries around the hip joint, such as muscle strains, tendonitis, and bursitis, can also occur in the elderly population. These injuries are commonly related to repetitive overuse, degenerative changes, or sudden, forceful movements (6).

### 1.3. Surgery

The primary and most crucial step in the management and fixation of challenging fractures is achieving anatomic reduction. When dealing with patients above the age of 65, who exhibit a higher incidence of physiological complications, the consideration of prosthetic replacement becomes pertinent for the treatment of displaced fractures. In the case of patients with comorbidities, limited community ambulation, or residing in nursing homes, with a projected post-injury life expectancy of less than 5 years, the use of a hemiprosthesis is indicated. Conversely, for active elderly patients aged 65 and older, who possess a physiological capacity to survive beyond 5 years after the injury, total hip replacement stands as the preferred and recommended treatment approach.

### 1.3.1. Internal fixation

Internal fixation is a commonly employed surgical technique for the treatment of hip fractures in the elderly. It involves the use of screws, plates, or nails to stabilise the fractured bone segments and promote healing. The choice of implant depends on factors such as fracture type, bone quality and surgeon experience. Cannulated screws are often used for stable fractures, while sliding hip screws or dynamic hip screws provide stability in unstable or intertrochanteric fractures. Intramedullary devices, such as intramedullary nails, are another option for certain types of hip fractures. Internal fixation aims to achieve anatomical reduction and early mobilisation, allowing for improved functional outcomes (12,21).

### 1.3.2. Hemiarthroplasty

Hemiarthroplasty entails the replacement of the femoral head with a prosthetic implant with the preservation of the patient's acetabulum. This procedure is frequently employed for displaced femoral neck fractures in elderly patients who exhibit compromised bone quality or pre-existing arthritis. Hemiarthroplasty serves to alleviate pain, restore hip joint function, and enable early weight-bearing. The type of prosthesis used can be either cemented or uncemented, with the selection influenced by factors such as patient age, bone quality, and surgeon preference. Current scientific literature strongly advocates for cemented hemiarthroplasty as the preferred treatment option for elderly patients with diminished bone quality, as it offers immediate stability and pain relief (21,22).

### 1.3.3. Total Hip Arthroplasty

Total hip arthroplasty (THA), also known as total hip replacement, is a more extensive surgical intervention that involves replacing both the femoral head and the acetabulum with prosthetic components. It is indicated for elderly patients with complex hip fractures, such as intracapsular fractures with significant displacement, fractures associated with pre-existing arthritis, or fractures in the presence of hip joint pathology. THA offers superior pain relief, improved hip function, and long-term durability. The choice of implant fixation, such as cemented, uncemented, or hybrid, depends on various patient factors and surgeon expertise (23).

### 1.3.4. Minimally Invasive Surgery

Minimally invasive techniques, such as percutaneous screw fixation or mini-incision approaches, have gained popularity in the treatment of hip fractures in the elderly. These techniques aim to minimise surgical trauma, reduce blood loss, and expedite recovery. Percutaneous screw fixation involves the percutaneous insertion of screws under fluoroscopic guidance, avoiding extensive soft tissue dissection. Mini-incision approaches utilise smaller incisions to access the fracture site while still allowing for anatomical reduction and stable fixation. Minimally invasive surgery may have potential advantages in terms of reduced post-operative pain, shorter hospital stays, and faster rehabilitation; however, careful patient selection and surgeon expertise are crucial for successful outcomes (24).

In conclusion, surgical intervention plays a critical role in the treatment of hip injuries in the elderly. Internal fixation, hemiarthroplasty, and total hip arthroplasty are the main surgical approaches, tailored to the specific fracture type and patient characteristics. Minimally invasive techniques offer potential benefits but require careful patient selection. The choice of surgical intervention should consider factors such as fracture type, bone quality, patient age, functional status, and surgeon expertise, with the ultimate goal of restoring hip function, minimising pain, and optimising the overall outcomes for elderly patients with hip injuries.

## 1.4. Outcomes and Complications

Hip and femoral injuries in the elderly are associated with numerous complications that can significantly impact patient outcomes. Besides re injury he most common complications include postoperative infections mainly surgical site infections, deep vein thrombosis (DVT), pulmonary embolism (PE), pressure ulcers, and delirium. Infection rates following hip fractures range from up to 10%, with surgical site infections being the most frequent type. DVT and PE are serious complications that can occur due to immobility during hospitalisation and surgical procedures. Hip injuries can cause long-term functional decline, leading to difficulties in activities of daily living and reduced mobility, these can include but are not limited to functional decline, pain, discomfort and delirium, increased mortality risk, post-traumatic arthritis, complications from surgical procedures, respiratory complications, pressure ulcers and hospitalisation.

### 1.4.1. Functional Decline, Pain, Discomfort and Delirium

Hip injuries in the elderly can lead to a significant decline in functional abilities. Fractures, particularly hip fractures, often result in reduced mobility, decreased independence in activities of daily living, and an overall decline in functional status. The loss of mobility can further contribute to muscle weakness, balance issues, and a higher risk of subsequent falls, perpetuating a cycle of functional decline and further injury.

Patients often experience severe pain and discomfort, which can have a negative impact on overall well-being and quality of life. Hip injuries in the elderly can cause severe pain and discomfort. Fractures, especially those involving the hip joint, often result in intense pain that limits mobility and interferes with daily activities.

Delirium, characterised by acute confusion and cognitive impairment, is prevalent among hip fracture patients and is associated with increased morbidity and mortality rates. The incidence of delirium in this population ranges from 20% to 62% (25).

### 1.4.2. Increased Mortality Risk

The presence of a hip fracture is associated with increased mortality rates, primarily due to complications such as pneumonia, thromboembolism, and immobility-related complications. Hip injuries in the elderly are associated with an increased risk of mortality. Studies have shown that hip fractures in older adults are linked to higher mortality rates, particularly in the first year following the injury. Complications such as pneumonia, deep vein thrombosis, and surgical site infections can further contribute to the increased mortality risk associated with hip injuries. The overall relative risk mortality during the first year after the fracture shows nearly two-fold increase compared to individuals without hip fractures. The elevated risk persisted over the long term, up to ten years after the fracture. The reported 1-year mortality of geriatric patients with hip fracture is 26~ 29%, and the 2-year mortality is 38% (17).

### 1.4.3. Post-Traumatic Arthritis:

Hip injuries, especially fractures and dislocations, can increase the risk of developing post-traumatic arthritis, leading to chronic pain and joint dysfunction. Hip injuries in the elderly can lead to the development of post-traumatic arthritis. Fractures or injuries to the hip joint can disrupt the articular surfaces, causing long-term joint damage and subsequent arthritis. Post-traumatic arthritis can result in chronic pain, reduced range of motion, and functional limitations, further impacting the individual's quality of life (26).

### 1.4.4. Complications from Surgical Procedures:

In elderly individuals with hip injuries, surgical procedures such as hip replacement or fixation may be necessary. However, these procedures carry their own set of complications. Surgical site infections, implant-related complications, and adverse reactions to anaesthesia are potential risks associated with hip surgeries in the elderly population(35). These complications can prolong hospital stays, require additional medical interventions, and adversely affect the overall outcome and recovery process. The median length of stay for patients undergoing primary THR, hemiarthroplasty and revision THR was approximately doubled in those who developed a SSI (27).

### 1.4.5. Respiratory Complications:

Elderly individuals with hip injuries are prone to respiratory complications. Prolonged bed rest, immobility, and reduced lung function due to age can lead to respiratory infections like pneumonia and atelectasis. These complications can significantly impact the recovery process, increase healthcare utilisation, and contribute to a decline in overall health status(28).

### 1.4.6. Pressure Ulcers:

Immobility resulting from hip injuries in the elderly population can lead to the development of pressure ulcers, also known as bedsores. Prolonged pressure on specific body areas, such as the buttocks, side, or heels, can cause tissue damage, open wounds, and increase the risk of infection. The prevalence of pressure ulcers in hip fracture patients ranges from 3%

to 34%, depending on various factors such as age, comorbidities, and the duration of hospitalisation (28).

### 1.5. Hospitalisation

Hip injuries frequently require hospitalisation, with management and length of stay varying depending on the severity and type of injury. Surgical intervention, including internal fixation or joint replacement, is commonly performed to stabilise fractures and reduce the risk of complications. Rehabilitation programs involving physical therapy and mobility training play a crucial role in maximising functional recovery.

The outcomes of hip injuries in the elderly are variable and depend on several factors, including age, pre-existing comorbidities, fracture type, type and time of surgical intervention, and post-operative rehabilitation. While some patients achieve good functional outcomes and regain independence, others may experience long-term disability, reduced mobility, and increased dependence on caregivers (28,29).

Early surgery was not associated with improved function or mortality, but it was associated with reduced pain and a shorter hospital stay.

# 2. OBJECTIVES

The primary objective of this investigation is to delve into the epidemiological and clinical characteristics of gerontological patients with a high degree of dependency, who are admitted to the Department of Physical Medicine at University Hospital Split.

With the main objective being to identify various factors, including age, gender, and underlying medical conditions, that may be intrinsically linked to such severe dependency. Additionally, the study aims to thoroughly document the types and prevalence of medical conditions these patients typically face. To get a comprehensive grasp of their physical capabilities, the research employs specific tools designed to assess pain levels, measure mobility restrictions, gauge grip strength, and identify potential muscle loss. Beyond the physiological aspects, there's a keen interest in understanding the broader impact of this severe dependency on the patients' overall quality of life. This includes their physical day-to-day functionality, emotional well-being, and the quality of their social interactions.

In addition to these objectives, this investigation also incorporates a hypothesis related to the potential influence of rehabilitation duration on the amount of pain perceived by gerontological patients with severe dependency. It is hypothesized that the duration of rehabilitation may have a significant influence on the amount of pain perceived by these patients. Specifically, the hypothesis suggests that a longer duration of rehabilitation interventions may lead to a reduction in the perceived pain levels among these patients. This hypothesis is based on the assumption that extended rehabilitation periods may allow for more comprehensive physical therapy and pain management strategies, potentially resulting in improved patient outcomes.

# 3. MATERIALS AND METHOD

This research was conducted in KBC Split, a tertiary hospital affiliated with the University of Split, between June 1, 2021, and January 30, 2023, with a retrospective case control method. The study protocol was reviewed and approved by the institutional review board of KBC Split and the University of Split.

This study aims to comprehensively evaluate the impact of specific medical conditions on the mobility, recovery, and patient satisfaction among a subgroup of patients at KBC Split, with a focus on severely dependent gerontological patients. We conducted a comparative analysis of pre and post-operative health conditions, documenting occurrences of common conditions and any specific treatments or surgeries received. We analysed data from patient records to investigate the relationship between exposure to particular factors, such as injury, and the subsequent outcomes, including recovery. Our assessments covered various parameters: mobility differences between admittance and discharge, levels of pain throughout the hospital stay, and overall patient satisfaction with care. Additionally, we utilized validated tools to measure functional impairments and disabilities, including pain intensity on standard scales, mobility restrictions, grip strength with dynamometers, and the presence of sarcopenia (loss of muscle mass and strength). By meticulously documenting these aspects, we gained a holistic view of the functional challenges faced by these patients. Further, we explored the impact of severe dependency on their quality of life, evaluating physical function, pain, emotional well-being, and social interactions using validated instruments. The overarching goal of this research is to understand the key areas requiring attention in order to devise effective interventions that enhance the overall well-being of these patients.

The study is a retrospective case-control study with data collected over the duration of one year, from June 2021 to June 2022. It was set in the KBC Split, specifically within the Department of Physical Medicine and Rehabilitation with Rheumatology. This investigation is a part of the study titled "Improvement of access to physical therapy for immobile or severely immobile gerontological patients at the Institute for Physical Medicine and Rehabilitation" (OZS-IP-2020-1 „Poboljšanje dostupnosti fizikalne terapije nepokretnom ili teško pokretnom gerontološkom pacijentu u Zavodu za fizikalnu medicinu i rehabilitaciju“).

3.1. Ethics Approval:

The study protocol adhered to the Patient Rights Protection Act (NN169/04, 37/08), the General Data Protection Regulation Implementation Act (NN 42/18), the Medical Ethics and Deontology Code (NN55/08,139/15), and the Helsinki Declaration WMA 1964 - 2013 referenced by the Code. It was reviewed and approved by the ethical committee of KBC Split under resolution number 500-03/20-01/86, in line with the regulations set by the University of Split and KBC Split.

### 3.2. Sample Selection:

The present investigation encompassed a cohort of 60 male and female individuals, aged 65 years and above, who were subjected to an extensive examination. The participants were carefully selected from a group of geriatric patients with severe dependency who had been admitted to the esteemed Department of Physical Medicine at University Hospital Split - KBC Split. Inclusion criteria were based on the presence of medically relevant conditions as indicated by their International Classification of Diseases (ICD) codes. Exclusions encompassed patients below the age of 65, individuals with comorbidities that exerted a substantial impact on mobility or surgical outcomes, and those who lacked the capacity to provide informed consent.

### 3.3. Data Collection:

Baseline demographic, anthropometric, laboratory data of the included patients were retrieved from the medical records and assessed with pre and post care with questionnaires and interviews. These data points were collected and correlated to provide a comprehensive overview of the patients' characteristics and health status during the pre, during and post hospital care at the commencement of the study.

### 3.4. Inclusion Criteria:

The inclusion criteria for the study specify that candidates should be male or female and aged 65 years or older. Additionally, these individuals must have been diagnosed with specific conditions represented by here by ICD codes, pointing to specific surgical intervention and thus rehabilitation. The study is focused on patients of KBC Split.

3.5. Exclusion Criteria:

Patients who are younger than 65 years of age are not considered for the study. Furthermore, those with comorbidities that have a substantial impact on mobility or on the outcomes of the surgery are also excluded. Furthermore, any patients who is unable to provide informed consent will not be eligible for consideration.

3.6. Data Collection Procedure:

The data collection process involved the administration of a Numerical Rating Scale (NRS) to assess pain levels reported by patients. Simultaneously, the Barthel Index was utilised to record functional independence, and the SARC-F score was measured to assess sarcopenia risk. Patients were instructed to choose the number that most accurately represented their pain intensity at the time of assessment. Trained medical professionals evaluated and documented the SARC-F score, Barthel Index, and degree of contracture. The recorded ratings were subsequently compiled for subsequent analysis and comparative examination.

3.7. The Number Rated Scale (NRS):

The Number Rated Scale (NRS) provides a standardised approach for medical professionals and patients to rate intensity on a numbered scale, allowing the gather of reliable and consistent data. The NRS is a unidimensional assessment scale comprising a numerical scale. For example, in pain assessment ranging from 0 to 10. It enables patients to rate their pain intensity, with 0 indicating no pain and 10 representing the most severe pain imaginable. The scale offers a common language to describe and quantify pain levels, facilitating data collection and analysis. Patients are introduced to the NRS and instructed on how to use the scale to rate their level. They are informed that they will be asked to choose a number on the scale that aligns with their current underlying situation.

3.8. Consistency and Reliability:

The utilisation of established scoring indices, such as the Numerical Rating Scale (NRS), and standardised data collection methods ensures a consistent and reliable approach in gathering information. This standardisation enables uniform pain assessments across various patients and healthcare providers within the hospital setting. Consequently, the collected data can be subjected to analysis to detect emerging trends and patterns, providing valuable insights for further study and clinical decision-making.

### 3.8.1. Baseline Assessment (Pre-Operative):

The study collected demographic information, medical history, and comorbidity details of the patients. Mobility assessments were conducted using the SARC-F score to evaluate sarcopenia risk and the Barthel Index to assess activities of daily living and mobility. Additionally, contracture levels. NRS data collection methods and assessors were standardised to ensure consistency.

### 3.8.2. Intervention and Post-Operative Assessment:

Patients underwent the scheduled operation, and post-operative assessments were performed at predetermined intervals, including discharge and follow-up visits. The SARC-F score, Barthel Index, and contracture level assessment were repeated to measure post-operative mobility levels. The study also examined the difference in mobility between admittance and discharge. Pain levels throughout the hospital stay were measured using validated pain scales. Overall patient satisfaction with hospital care was evaluated using patient satisfaction surveys or questionnaires.

## 3.9. SARC-F

The SARC-F is a tool designed to assess the risk of sarcopenia and osteoporosis in older adults. Sarcopenia refers to the age-related loss of muscle mass and strength, while osteoporosis is characterised by reduced bone density and increased fracture risk.

The SARC-F questionnaire consists of five simple questions, each addressing specific aspects related to sarcopenia.

Questions included:

1. Strength: "Do you have difficulty rising from a chair?"
2. Assistance in walking: "Do you need assistance to walk?"
3. Rise from a bed or chair: "Do you feel that your legs are weak when you get up from a chair or bed?"
4. Climb stairs: "Do you have difficulty climbing a flight of stairs?"
5. Falls: "Have you fallen in the past year?"*

The above SARC-F questionnaire is designed to pinpoint individuals potentially at risk for conditions like sarcopenia and osteoporosis. Participants provide insight into their risk level by responding to its questions with either a "yes" or "no." The interpretation of these scores is simple: a tally of 0 is synonymous with a low risk, scores between 1 and 2 are indicative of an intermediate risk and achieving a score of 3 or beyond denotes a high risk.
** obtained from A Simple Questionnaire to Rapidly Diagnose Sarcopenia* (30)

## 3.10. Barthel Index

The Barthel Index is a widely used assessment tool to measure an individual's functional independence in activities of daily living (ADL). It was developed by Mahoney and Barthel in 1965 and has since become a standard measure in healthcare settings, particularly in rehabilitation and geriatric care.

The Barthel Index consists of ten ADL items, including feeding, bathing, grooming, dressing, toileting, bladder, and bowel control, transferring (e.g., moving from bed to chair), mobility (e.g., walking or using a wheelchair), ascending and descending stairs, and dressing. Each item is scored based on the person's ability to perform the task independently, with scores ranging from 0 to 100. A higher score indicates greater functional independence[31].

### 3.11. Contracture Measure

Categorising contracture levels on a NRS scale from no effect (level 1) to profound contracture (level 5).

Contracture refers to the abnormal shortening and tightening of muscles, tendons, or ligaments, resulting in a reduced range of motion in the affected joints. It can have a significant impact on an individual's functional abilities and quality of life. This aims to elucidate the different levels of contracture severity and their corresponding effects on joint mobility.

Level 1: No Effect (No Contracture):

At level 1, individuals experience no contracture, meaning their joints maintain a full range of motion without any restriction. This level indicates the absence of abnormal shortening or tightening of muscles, tendons, or ligaments.

Level 2: Mild Contracture (Injured/1 Joint Affected):

Level 2 contracture involves mild limitations in joint mobility, typically affecting a single joint. Individuals at this level may experience slight tightness or stiffness in the affected joint, leading to a slightly reduced range of motion. However, their overall functional abilities remain largely unaffected, and they can perform daily activities without significant difficulty.

Level 3: Moderate Contracture (2-3 Joints Affected):

Level 3 contracture represents a moderate level of joint restriction, impacting two to three joints. Individuals at this level may encounter noticeable difficulty in achieving the full range of motion in multiple joints. They might experience increased stiffness, reduced flexibility, and limitations in performing certain activities that require extensive joint movement.

Level 4: Severe Contracture (4-5 Joints Affected):

Level 4 contracture denotes a severe limitation in joint mobility, affecting four to five joints. Individuals experiencing this level of contracture face significant challenges in their daily activities due to restricted joint movement. The range of motion is greatly impaired, leading to considerable stiffness, limited flexibility, and reduced functional independence. Adaptive equipment or assistive devices may be required to perform tasks that involve affected joints.

Level 5: Profound Contracture (More than 5 Joints Affected):

Level 5 contracture represents the most severe form of joint restriction, surpassing five joints. Individuals at this level experience profound limitations in joint mobility, resulting in significant impairments in daily activities and functional independence. Multiple joints are affected, leading to extreme stiffness, minimal or no range of motion, and substantial disability. Intensive rehabilitation and specialised medical interventions are often necessary to manage this level of contracture.

### 3.12. Pain Index

Pain was measured with application of the Numeric Rating Scale (NRS) as a data collection tool for assessing pain levels in a hospital setting. Patients are introduced to the NRS and instructed on how to use the scale to rate their pain intensity. They are informed that they will be asked to choose a number on the scale that aligns with their current pain level.

Numeric Rating Scale (NRS) represented in numbered format for a hospital setting involving injury and surgery:

1. No Pain
2. Mild Discomfort
3. Moderate Pain
4. Substantial Pain
5. Intense Pain

6. Severe Pain
7. Very Severe Pain
8. Extreme Pain
9. Very Severe Pain
10. Unbearable Pain

## 3.13. HAQ

Health Assessment Questionnaire (HAQ) has a purpose in assessing functional ability and disability in healthcare. The HAQ is a widely used instrument that was developed by James F. Fries and colleagues in the 1970s. It was originally designed to evaluate patients with rheumatoid arthritis, but it has since been adapted for use in other chronic conditions as well.

The HAQ consists of a series of questions that inquire about a patient's ability to perform various activities of daily living. These activities typically cover eight categories: dressing and grooming, arising, eating, walking, hygiene, reach, grip, and activities related to daily living (such as chores and errands). Each category contains two to three questions that assess different aspects of the activity.

Patients are asked to rate their level of difficulty in performing each activity using a four-point scale:

0 - Without any difficulty
1 - With some difficulty
2 - With much difficulty
3 - Unable to do

The responses are then scored, and an overall score is calculated by summing the scores for each category. This score ranges from 0 to 3, with higher scores indicating greater difficulty and impairment in performing activities of daily living.

The HAQ has been widely validated and used in research and clinical practice to assess the functional status of patients with various chronic conditions, including rheumatoid arthritis, osteoarthritis, systemic lupus erythematous, and other musculoskeletal disorders.

### 3.14. Data Analysis

Descriptive analysis was performed to evaluate the demographic data and baseline characteristics of the study population, stratified by injury, sex and age.

Statistical tests such as paired t-tests were used to compare pre- and post-operative mobility scores, considering the distribution of the data. The difference in mobility between admittance and discharge was analysed using paired t-tests. Correlation analysis or regression analysis were employed to assess the correlation between mobility scores, contracture levels, pain levels, and patient satisfaction. Effect sizes and their confidence intervals were calculated to determine the magnitude of improvement in mobility post-operation. Patient satisfaction scores were analysed to identify areas for improvement in hospital care. A comparative analysis was conducted to examine the pain levels between male and female patients at different time points.

The statistical analyses were performed using IBM SPSS Statistics v.29 (IBM Corp., Armonk, NY, USA) software for Mac. The results obtained from the Student t-test were interpreted, taking into account the means, standard deviations, *P* values, and any other relevant statistical measures. P values considered statistically significant at ($P<0.05$).

The study also employed pre-post comparisons to investigate the effects of interventions or treatments on various outcome measures, including movement ability, SARC-F scores, Barthel Index and pain levels at 0 hours, 1 day, and 7 days. For example, this approach involved measuring the participants' baseline scores on these measures before the treatment (pre) and comparing them with their scores after the treatment (post). By calculating the differences between the pre and post scores, the study aimed to quantify the changes in movement ability, SARC-F scores, Barthel Index scores, and pain levels that occurred as a result of the treatment. The pre-variables involved measuring the participants' initial scores on these measures prior to the intervention, while the post-variables captured their scores after the intervention.

To analyse the data based on ICD numbers, the following method was implemented. Initially, the dataset was examined to identify the frequency of each unique ICD number. If a particular ICD number occurred more than two times (>2), it was treated as a separate category, and its instances were analysed individually. However, for those ICD numbers that appeared less than or equal to three times, they were grouped together under the category "Other." This approach allowed for a focused analysis of ICD numbers with significant representation while ensuring that cases with limited occurrences were still considered in a consolidated manner.

# 4. RESULTS

Among the various conditions or injuries examined, fractures of the femur (S72) exhibited the highest occurrence with 29 cases, accounting for 48% of the total cases. Fractures of the lumbar spine and pelvis (S32) and the presence of other functional implants (Z96) both had similar frequencies, each comprising 15% of the total cases with 9 cases reported for each. Additionally, paraplegia (complete) (G82), hemiplegia (complete) (G81), other specific joint derangements (M24), and fractures of the lower leg, including the ankle (S82) each had 4 cases reported, making up 7% of the total cases for each condition. These findings, derived from the data presented in Table 1.

The analysis of age distribution reveals that the mean age is 77, with the largest proportion of subjects belonging to the 75-84 age range (32%), followed by the 85-94 age group (23%). The 65-74 age group shows a relatively higher representation (17%) compared to the 65-64 age group (3%), as indicated by the data obtained from Table 2.

**Table 1** IDC Codes Frequency of Patients tested

| ICD Code (N=60) | Total n (%)† |
|---|---|
| S72 - Fracture of the femur | 29 (48%) |
| S32 - Fracture of the lumbar spine and pelvis | 9 (15%) |
| Z96 - Presence of other functional implants | 9 (15%) |
| G82 - Paraplegia (complete) | 4 (7%) |
| G81 - Hemiplegia (complete) | 4 (7%) |
| M24 - Other specific joint derangements | 4 (7%) |
| S82 - Fracture of lower leg, including ankle | 4 (7%) |
| M96 - Postprocedural musculoskeletal disorders | 3 (5%) |
| S06 - Intracranial injury | 3 (5%) |

*Note.* ICD codes with N<3 not shown, Patients present can have more than one IDC code.

**Table 2**. Patient Age Groups

| Age Group (N=60) | | N | (%) |
|---|---|---|---|
| 65 - 69 | | 6 | (8.1%) |
| 70 - 74 | | 13 | (28.3%) |
| 75 - 79 | | 15 | (25.3%) |
| 80 - 84 | | 9 | (13.1%) |
| 85 - 89 | | 14 | (20.2%) |
| 90 | | 1 | (1.0%) |
| | Mean | Std. Dev. | Variance |
| | 77.400 | 7.353 | 54.073 |

*Note.* 3 patients did not provide age

**Table 3.** Patient Summaries of Showing the Change in Measured Parameters Measured Between Admission and Discharge

| Sex | | PrPM | PtPM | C | SF | GRH | GLH | PA0 | PA1 | PA7 | PHr | PD0 | PD1 | PD7 | BA | BD | H |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| f | N | 42 | 34 | 40 | 39 | 39 | 39 | 41 | 41 | 40 | 38 | 33 | 33 | 31 | 38 | 38 | 40 |
| | % | 70.0% | 70.8% | 69.0% | 68.4% | 68.4% | 68.4% | 70.7% | 70.7% | 70.2% | 71.7% | 70.2% | 70.2% | 70.5% | 71.7% | 71.7% | 69.0% |
| | Mean | **3.29** | **2.88** | **2.13** | **7.46** | **16.82** | **15.51** | **3.29** | **4.10** | **5.35** | **4.26** | **2.12** | **2.30** | **2.10** | **35.53** | **57.11** | **2.61** |
| | ±StDev | 0.60 | 0.59 | 0.88 | 1.67 | 9.05 | 8.49 | 2.70 | 2.83 | 2.90 | 4.34 | 2.51 | 2.31 | 2.84 | 17.37 | 26.86 | 0.59 |
| m | N | 18 | 14 | 18 | 18 | 18 | 18 | 17 | 17 | 17 | 15 | 14 | 14 | 13 | 15 | 15 | 18 |
| | % | 30.0% | 29.2% | 31.0% | 31.6% | 31.6% | 31.6% | 29.3% | 29.3% | 29.8% | 28.3% | 29.8% | 29.8% | 29.5% | 28.3% | 28.3% | 31.0% |
| | Mean | **1** | **3.14** | **2.17** | **6.44** | **20.56** | **18.78** | **2.47** | **3.18** | **4.18** | **3.73** | **1.79** | **2.64** | **4.31** | **29.60** | **44.00** | **2.38** |
| | ±StDev | 0.59 | 0.53 | 1.15 | 2.57 | 12.69 | 12.25 | 2.43 | 2.72 | 3.26 | 4.55 | 2.22 | 2.76 | 6.83 | 14.55 | 22.95 | 0.38 |
| Total | N | 60 | 48 | 58 | 57 | 57 | 57 | 58 | 58 | 57 | 53 | 47 | 47 | 44 | 53 | 53 | 58 |
| | Mean | **3.30** | **2.96** | **2.14** | **7.14** | **18.00** | **16.54** | **3.05** | **3.83** | **5.00** | **4.11** | **2.02** | **2.40** | **2.75** | **33.85** | **53.40** | **2.54** |
| | ±StDev | 0.59 | 0.58 | 0.96 | 2.03 | 10.37 | 9.84 | 2.63 | 2.80 | 3.03 | 4.36 | 2.41 | 2.43 | 4.43 | 16.70 | 26.28 | 0.54 |

*Note.*: Pre procedure movement(PrPM), Pre procedure movement(PtPM), Contracture(C), SARC-F(SF), Grip RH(GRH), Grip Left Hand(GLH), Pain at admission(PA0), Pain at admission 1d(PA1), Pain at admission 7d(PA7), Pain Duration(PHr), Pain at discharge(PD0), Pain at discharge 1d(PD1), Pain at discharge 7d(PD7), Barthel Admission(BA), Barthel Discharge(BD), HAQ(H)

Table 4. shows correlation analysis was conducted to examine the relationships between various variables. Significant correlations were found between several variables. Pre-Procedure Movement was expectedly correlated with Post Procedure Movement (r = 0.544, $P < 0.01$) and negatively correlated with Barthel Index at Admission (r = -0.672, $P < 0.01$), while showing a positive correlation with HAQ1 (r = 0.300, $P < 0.05$). Post Procedure Movement showed a negative correlation with Barthel Index at Discharge (r = -0.692, $P < 0.01$). Contracture was positively correlated with SARC-F Score (r = 0.370, $P < 0.01$). Grip strength of the right hand (Din-RH) was positively correlated with Barthel Index Discharge (r = -0.529, $P < 0.01$). Similarly, grip strength of the left hand (Din-LH) was expectedly correlated with grip strength

of the right hand (Din-RH) (r = 0.742, $P < 0.01$) and Barthel Index Discharge (r = -0.692, $P < 0.01$).

**Table 4.** Correlation Relations Between Admission and Discharge in Patient Parameters

| | PrPM | PtPM | C. | S-F | GR | GL | PA0 | PA1 | PA7 | PHr | PD0 | PD1 | PD7 | BA | BD | H |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PrPM | | **.544**** | 0.174 | 0.086 | -0.058 | -0.147 | -0.224 | -0.170 | -0.030 | -0.041 | -0.070 | 0.047 | -0.040 | **-.672**** | **-.529**** | **.300*** |
| PtPM | | | -0.081 | 0.054 | **-.385**** | **-.329*** | -0.252 | -0.178 | -0.163 | -0.083 | -0.016 | -0.068 | -0.065 | **-.638**** | **-.692**** | **.328*** |
| C. | | | | **.370**** | -0.237 | **-.371**** | 0.183 | 0.204 | 0.139 | 0.101 | 0.201 | 0.152 | -0.043 | -0.157 | -0.196 | 0.010 |
| S-F | | | | | **-.265*** | **-.400**** | 0.175 | 0.163 | -0.131 | 0.117 | 0.232 | -0.107 | -0.138 | -0.212 | -0.210 | -0.065 |
| GR | | | | | | **.742**** | 0.072 | -0.062 | 0.003 | 0.139 | -0.157 | -0.011 | 0.189 | 0.215 | **.342*** | **-.282*** |
| GL | | | | | | | -0.100 | -0.151 | -0.006 | 0.019 | **-.298*** | -0.059 | 0.127 | 0.236 | **.434**** | **-.323*** |
| PA0 | | | | | | | | **.762**** | **.530**** | **.552**** | 0.151 | 0.140 | 0.010 | **.288*** | 0.025 | -0.105 |
| PA1 | | | | | | | | | **.742**** | **.451**** | 0.243 | 0.262 | -0.002 | 0.251 | 0.012 | -0.040 |
| PA7 | | | | | | | | | | **.514**** | 0.121 | 0.168 | -0.075 | 0.269 | 0.158 | 0.087 |
| PHr | | | | | | | | | | | **.360*** | .359* | -0.028 | 0.047 | -0.024 | -0.092 |
| PD0 | | | | | | | | | | | | **.738**** | **.481**** | 0.020 | -0.072 | 0.131 |
| PD1 | | | | | | | | | | | | | **.658**** | -0.060 | -0.126 | 0.071 |
| PD7 | | | | | | | | | | | | | | -0.049 | -0.054 | -0.018 |
| BA | | | | | | | | | | | | | | | **.879**** | -0.144 |
| BD | | | | | | | | | | | | | | | | -0.229 |
| H | | | | | | | | | | | | | | | | |

*Note* Pre procedure movement(PrPM), Pre procedure movement(PtPM), Contracture(C), SARC-F(S-F), Grip RH(GR), Grip Left Hand(GL), Pain at admission(PA0), Pain at admission 1d(PA1), Pain at admission 7d(PA7), Pain Duration(PHr), Pain at discharge(PD0), Pain at discharge 1d(PD1), Pain at discharge 7d(PD7), Barthel Admission(BA), Barthel Discharge(BD), HAQ(H)

*. Correlation is significant at the 0.05 level (2-tailed).

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

**Table 5.** Pain level for Patients with Hip & Pelvic Injuries Separated According to Age (ALL)

| Age Group | | Pain at Admission | Pain at Discharge | Pain 1d pre Admission | Pain 1d after Discharge | Pain 7d pre Admission | Pain 7d after Discharge |
|---|---|---|---|---|---|---|---|
| 65- 69 | N | 5 | 4 | 5 | 4 | 5 | 3 |
| | Mean | 2.80±1.92 | 2.50±3.31 | 3.20±2.38 | 4.50±3.69 | 4.80±3.70 | 12.00±12.00 |
| 70 - 74 | N | 13 | 10 | 13 | 10 | 13 | 10 |
| | Mean | 2.85±3.18 | 0.80±1.31 | 3.31±3.40 | 1.00±1.63 | **4.07±3.77*** | **0.85±1.38*** |
| 75 - 79 | N | 15 | 12 | 15 | 12 | 14 | 11 |
| | Mean | 3.27±2.63 | 2.42±2.68 | 4.27±2.79 | 3.25±2.42 | 5.07±2.89 | 3.50±2.88 |
| 80 - 84 | N | 9 | 8 | 9 | 8 | 9 | 8 |
| | Mean | 2.78±2.59 | 2.25±2.87 | 2.78±2.68 | 2.25±2.87 | 4.67±2.87 | 2.63±4.2 |
| 85 - 89 | N | 13 | 10 | 13 | 10 | 13 | 9 |
| | Mean | 3.61±2.57 | 2.30±2.45 | **4.15±2.33*** | **1.90±1.91*** | **5.53±2.50*** | **1.17±1.11*** |
| 90 - 95 | N | 1 | 1 | 1 | 1 | 1 | 1 |
| | Mean | 0 | 0 | 4.00 | 2.00 | 7.00 | 2.50 |
| Total | N | 58 | 47 | 58 | 47 | 57 | 44 |
| | Mean | 3.05±2.63 | 2.02±2.41 | 3.83±2.80 | 2.40±2.42 | **5.00±3.02*** | **2.75±4.43*** |

*Note.* Student t test comparison of Admission vs Discharge
*$P < 0.05$

**Table 6.** Pain level for Patients with Hip & Pelvic Injuries Separated According to Age (S72&S32)

| Age Group | | Pain at Admission | Pain at Discharge | Pain 1d pre Admission | Pain 1d after Discharge | Pain 7d pre Admission | Pain 7d after Discharge |
|---|---|---|---|---|---|---|---|
| 65 - 69 | N | 3 | 2 | 3 | 2 | 3 | 1 |
| | Mean | 3.66±1.53 | 1.50±2.12 | 4.33±2.08 | 5.50±3.54 | 4.67±1.52 | 12.00±0.00 |
| 70 - 74 | N | 2 | 1 | 2 | 0 | 2 | 0 |
| | Mean | 3.00± 4.24 | 0.00 | 3.00±4.24 | 0.00 | 2.50± 3.53 | 0.00 |
| 75 - 79 | N | 8 | 6 | 8 | 5 | 7 | 6 |
| | Mean | 3.00± 2.45 | 1.67± 2.58 | 3.63± 2.06 | 3.00±2.83 | 5.29± 2.56 | 3.17±2.73 |
| 80 - 84 | N | 6 | 6 | 6 | 6 | 6 | 6 |
| | Mean | 2.67± 2.34 | 2.50± 3.21 | 2.33± 2.42 | 2.50±3.21 | 5.00± 2.53 | 1.50±2.07 |
| 85 - 89 | N | 12 | 10 | 12 | **10** | **12** | 9 |
| | Mean | 3.58± 2.68 | 2.30±2.45 | 4.17± 2.44 | **1.90±1.91*** | **5.50± 2.61*** | 1.17±1.12 |
| 90 - 95 | N | 0 | 0 | 0 | 1 | 1 | 1 |
| | Mean | 0.00 | 0.00 | 0.00 | 2.00 | 4.00 | 2.50 |
| Total | N | 32 | 26 | 32 | 26 | 31 | 24 |
| | Mean | 3.13±2.5 | 1.96±2.45 | 3.63±2.41 | 2.50±2.52 | 5.22±2.48 | 2.21±2.86 |

*Note.* Student t test comparison of Admission vs Discharge
*$P < 0.05$

Table 6. shows the impact of a medical intervention on Hip and Pelvic in comparison to all patients as per Table 5.with regards topain levels in patients across various age groups (ranging from 65 to 95 years).

In a two-sample t-test, there was no statistically significant difference observed between the admission (3.13±2.5) and discharge (1.96±2.45), respectively, $t(56) = 1.07$, $P = 0.288$, suggesting that the two groups did not differ significantly in their means at the 0.05 significance level.

In the post-procedure period, pain levels one day after discharge (2.5±2.52) remained low and were comparable to those recorded seven days after discharge (2.21±2.86), t(48) = 0.3800, *P* = 0.7062. These results demonstrate no change and the stability of low pain levels suggesting the procedure's pain-reducing effects are maintained in the immediate week following discharge.

Number of cases varied across age groups and time points, affecting the reliability of some age-specific findings. The subgroup data for the 70-74 age group was quite limited, with number of cases.

**Table 7.** Patient Mobility with Hip Injuries Separated According to Age (ALL)

| Age Group | | Pre Procedure Movement | Post Procedure Movement | SARC-F Score | Barthel Index Admission | Barthel Index Discharge |
|---|---|---|---|---|---|---|
| 65- 69 | N | 6 | 3 | 6 | 6 | 5 |
| | Mean | 3.3±0.52 | 2.7±0.58 | 5.8±3.25 | 34.8±17.99 | 56.4±29.06 |
| 70 - 74 | N | 13 | 11 | 13 | **13** | **12** |
| | Mean | 3.23±0.60 | 3.00±0.63 | 6.46±2.18 | **34.85±17.49*** | **57.25±25.79*** |
| 75 - 79 | N | 15 | 13 | 13 | 12 | 14 |
| | Mean | 3.27±0.59 | 3.08±0.64 | 7.54±2.07 | 29.50±17.64 | 42.07±28.31 |
| 80 - 84 | N | 9 | 8 | 9 | **8** | **8** |
| | Mean | 3.33±0.50 | 3.00±0.53 | 7.44±0.53 | **34.13±15.91*** | **61.63±23.24*** |
| 85 - 89 | N | 14 | 10 | 13 | 11 | 11 |
| | Mean | 3.29±0.73 | 2.90±0.57 | 7.54±1.76 | 36.18±17.50 | 56.09±26.97 |
| 90 - 95 | N | 1 | 1 | 1 | 1 | 1 |
| | Mean | 4.00±0.00 | 3.00±0.00 | 7.00±0.00 | 18.00±0.00 | 31.00±0.00 |
| Total | N | **60** | **48** | 57 | **53** | **53** |
| | Mean | **3.30±0.59*** | **2.96±0.58*** | 7.14±2.03 | **33.85±16.70**** | **53.40±26.28**** |

*Note.* Student t test comparison of Admission vs Discharge
*$P < 0.05$
**$P < 0.001$

The current analysis on the functional capacity of patients, stratified across different age groups ranging from 65 to 95 years. In Table 7. across all age groups, it was found that the mean movement ability slightly decreased after the procedure (3.30±0.59 before; 2.96±0.58 after). However, the decrease was modest denoting minimal adverse effects of the procedure on the patients' movement abilities.

The Barthel Index was noted from admission to discharge (33.85±16.70 on admission; 53.40±26.28 on discharge). This improvement was observed despite the slight decrease in movement ability post-procedure and the high average SARC-F score.

The data for the 90-95 age group was limited to a single case.

From the two datasets across different age cohorts that were compare, both tables reveal a notable improvement in patients' condition following the procedure. In the combined dataset (ALL) a slight decrease in the mean movement scores was recorded post-procedure. However, the Barthel Index, assessing the ability to perform activities of daily living, showed improvement from admission to discharge across all age groups.

**Table 8.** Pain for Patients with Hip Injuries Separated by Sex (ALL)

| Sex | | Pain at Admission | Pain at Discharge | Pain 1d pre Admission | Pain 1d after Discharge | Pain 7d pre Admission | Pain 7d after Discharge |
|---|---|---|---|---|---|---|---|
| f | N | 41 | 33 | 41 | 33 | 40 | 31 |
| | Mean | 3.29±2.70 | 2.12±2.51 | 4.10±2.83 | 2.30±2.3 | 5.35±2.90 | 2.10±2.84 |
| m | N | 17 | 14 | 17 | 14 | 17 | 13 |
| | Mean | 2.47±2.43 | 1.79±2.23 | 3.18±2.72 | 2.64±2.76 | 4.18±3.26 | 4.31±6.83 |
| Total | N | **58** | **47** | 58 | 47 | **57** | **44** |
| | Mean | **3.05±2.63*** | **2.02±2.41*** | 3.83±2.80 | 2.40±2.43 | **5.00±3.03*** | **2.75±4.43*** |

*Note.* Student t test comparison of Admission vs Discharge
*$P < 0.05$

**Table 9.** Pain for Patients with Hip and Lumbar Injuries Separated by Sex (S72&S32)

| Sex | | Pain at Admission | Pain at Discharge | Pain 1d pre Admission | Pain 1d after Discharge | Pain 7d pre Admission | Pain 7d after Discharge |
|---|---|---|---|---|---|---|---|
| f | N | 23 | 18 | 23 | 18 | **23** | **17** |
| | Mean | 3.08±2.65 | 2.00±2.66 | 3.09±2.71 | 2.44±2.50 | **3.87±2.51*** | **1.47±1.75*** |
| m | N | 9 | 8 | 9 | 8 | 9 | 7 |
| | Mean | 2.98±2.03 | 1.63±1.92 | 2.89±2.03 | 2.63±2.72 | 3.56±2.40 | 3.36±4.21 |
| Total | N | 32 | 26 | 32 | 26 | 32 | 24 |
| | Mean | 3.03±2.47 | 1.88±2.42 | 3.03±2.51 | 2.50±2.52 | 3.78±2.45 | 2.02±2.74 |

*Note.* Student t test comparison of Admission vs Discharge
*$P < 0.05$

When comparing the two samples that of All Cases with the Hip and Lumbar (H/L) subgroup we find the following.

Analysis of the All-Cases group showed that at admission, females reported a higher mean pain level (3.29±2.704) compared to males (2.47±2.427). Similarly, at discharge, females reported a higher mean pain level (2.12±2.509) compared to males (1.79±2.225). These results suggest that, on average, females experienced higher pain levels than males at both admission and discharge.

Further analysis involved one-sample t-tests comparing the pain levels of each group to specific test values. In the All-Cases group at discharge, females had significantly lower pain levels (2.12, $P = 0.003$) compared to the test value with a mean difference of -1.030 (95% CI [-1.74, -0.32]). For males, the difference was not statistically significant (1.79, $P > 0.05$). This suggests that females experienced a more significant reduction in pain at discharge compared to males in the All-Cases group.

In the Hip and Lumbar subgroup, the analysis indicated that both females and males had significantly lower pain levels at discharge compared to the test value. Females had a mean difference of -24.54 (95% CI [-23.561, -24.54]), while males had a mean difference of -22.58 (95% CI [-22.58, -24.54]). This shows that both groups experienced a substantial reduction in pain at discharge, with females reporting slightly higher pain levels overall in the All-Cases group.

**Table 10.** Patients Mobility with Hip Injuries Separated by Sex (ALL)

| Sex | | Pre Procedure Movement | Post Procedure Movement | SARC-F Score | Barthel Index Admission | Barthel Index Discharge |
|---|---|---|---|---|---|---|
| f | N | **42** | **34** | 39 | **38** | **38** |
| | Mean | **3.29±0.60**** | **2.88±0.59**** | 7.46±1.67 | **35.53±17.37**** | **57.11±26.86**** |
| m | N | 18 | 14 | 18 | **15** | **15** |
| | Mean | 3.33±0.59 | 3.14±0.54 | 6.44±2.57 | **29.60±14.55*** | **44.00±22.95*** |
| Total | N | **60** | **48** | 57 | **53** | **53** |
| | Mean | **3.30±0.59**** | **2.96±0.58**** | 7.14±2.03 | **33.85±16.70**** | **53.40±26.28**** |

*Note.* Student t test comparison of Admission vs Discharge
*$P < 0.05$
**$P<0.01$

The average pre-procedure movement for males (3.33±0.594) was marginally higher than for females (3.29±0.596). Post-procedure, males (3.14±0.535) appeared to retain movement capabilities compared to females (2.88±0.591) although the differences are small.

The SARC-F score revealed a higher mean for females (7.46±1.668) than for males (6.44±2.572) however there is the disparity in the sample sizes, 42 females versus 18 males.

Barthel Index upon admission and discharge between sexes showed that females presented higher average scores than males both upon admission (females: 35.53±17.373; males: 29.60±14.549) and at discharge (females: 57.11±26.862; males: 44.00±22.950).

**Table 11.** Barthel Index Comparison Sepparated by Sex

| Sex | | All | | Hip and Pelvic Injuries | |
|---|---|---|---|---|---|
| | | Barthel Index Admission | Barthel Index Discharge | Barthel Index Admission | Barthel Index Discharge |
| f | N | **38** | **38** | **21** | **21** |
| | Mean | **35.53±17.37**** | **57.11±26.86**** | **35.14±17.36*** | **57.19±25.52*** |
| m | N | **15** | **15** | 10 | 9 |
| | Mean | **29.60±14.55*** | **44.00±22.95*** | 32.10±15.95 | 49.44±22.87 |
| Total | N | **53** | **53** | **31** | **30** |
| | Mean | **33.85±16.70**** | **53.40±26.28**** | **34.16±16.71**** | **54.87±24.62**** |

*Note.* Student t test comparison of Admission vs Discharge
**P* < 0.05
***P*<0.01

**Table 12**. Movements Score Comparison Sepparated by Sex

| Sex | | All | | Hip and Pelvic Injuries | |
|---|---|---|---|---|---|
| | | Pre Procedure Movement | Post Procedure Movement | Pre Procedure Movement | Post Procedure Movement |
| f | N | **42** | **34** | **24** | **19** |
| | Mean | **3.29±0.60*** | **2.88±0.59*** | **3.42±0.58*** | **2.95±0.52*** |
| m | N | 18 | 14 | 10 | 8 |
| | Mean | 3.33±0.59 | 3.14±0.54 | 3.60±0.52 | 3.00±0.54 |
| Total | N | **60** | **48** | **34** | **27** |
| | Mean | **3.30±0.59*** | **2.96±0.58*** | **3.47±0.56**** | **2.96±0.52**** |

*Note.* Student t test comparison of Admission vs Discharge
**P* < 0.05
***P*<0.01

**Table 13.** SARC-F Score Comparison Sepparated by Sex

| Sex | | SARC-F Score | |
|---|---|---|---|
| | | All | Hip and Pelvic Injuries |
| f | N | **39** | **22** |
| | Mean | **7.46±1.67*** | **1.05±0.21*** |
| m | N | **18** | **10** |
| | Mean | **6.44±2.57*** | **1.10±0.32*** |
| Total | N | **57** | **32** |
| | Mean | **7.14±2.03*** | **1.06±0.25*** |

*Note.* Student t test comparison of Admission vs Discharge
$^{*}P < 0.05$

Table 11. presents the Barthel Index (BI) at admission and discharge. Within the total sample and specific hip and pelvic injury subset, females consistently exhibit a higher mean BI score, despite their standard deviations indicating a wider spread of data points around the mean.

Table 12. presents the Movement Score (MS), representing mobility performance comparison.

Table 13. examines the SARC-F scores, the data shows that in the total sample, female patients have higher mean SARC-F scores than males. In the subset of patients with hip and pelvic injuries, the mean scores between the sexes are much closer.

A multiple regression analysis was conducted to investigate the effects of SARC-F, ICD code and Contracture variables on the amount of pain inn hours (HrsPain) as shown in Table 14. The Intercept demonstrated a mode and mean estimate of 5.175, with a 95% credible interval ranging from -3.650 to 13.999. SARCF = 5.00 exhibited the most substantial impact on HrsPain, with a mode and mean of 21.341, and a 95% credible interval of 4.596 to 38.086. Among the ICD codes, G20 and G25 displayed the most negative effect on HrsPain, with coefficient estimates of -16.443. In terms of the Contracture a level of 4.00 was associated with the largest positive effect, yielding a coefficient estimate of 6.474 and a 95% credible interval spanning from -4.001 to 16.949. This is shown in Table 14 below.

Table 14. - Regression Estimates of Hours of Pain vs SARC-F, ICD code and Contracture

| Parameter | Posterior | | | 95% Credible Interval | |
|---|---|---|---|---|---|
| | Mode | Mean | Variance | Lower Bound | Upper Bound |
| (Intercept) | 5.175 | 5.175 | 20.093 | -3.650 | 13.999 |
| SARCF = 1.00 | -6.030 | -6.030 | 30.471 | -16.897 | 4.837 |
| SARCF = 2.00 | 8.928 | 8.928 | 65.014 | -6.945 | 24.802 |
| SARCF = 3.00 | 4.844 | 4.844 | 42.396 | -7.974 | 17.662 |
| SARCF = 5.00 | 21.341 | 21.341 | 72.348 | 4.596 | 38.086 |
| SARCF = 6.00 | 5.149 | 5.149 | 43.383 | -7.818 | 18.115 |
| SARCF = 7.00 | 5.707 | 5.707 | 40.508 | -6.822 | 18.237 |
| SARCF = 8.00 | 5.567 | 5.567 | 41.957 | -7.184 | 18.319 |
| SARCF = 9.00 | 7.793 | 7.793 | 39.023 | -4.504 | 20.091 |
| SARCF = 10.00 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = D32 | -7.598 | -7.598 | 75.112 | -24.660 | 9.464 |
| ICD = G20 | -16.443 | -16.443 | 116.155 | -37.660 | 4.775 |
| ICD = G25 | -16.443 | -16.443 | 116.155 | -37.660 | 4.775 |
| ICD = G81 | -14.238 | -14.238 | 64.703 | -30.073 | 1.598 |
| ICD = G82 | -14.375 | -14.375 | 58.620 | -29.448 | 0.697 |
| ICD = G83 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = I63 | -13.738 | -13.738 | 72.725 | -30.526 | 3.051 |
| ICD = I70 | -13.567 | -13.567 | 66.025 | -29.564 | 2.429 |
| ICD = M05 | -7.742 | -7.742 | 79.652 | -25.312 | 9.828 |
| ICD = M06 | -5.649 | -5.649 | 45.167 | -18.880 | 7.582 |
| ICD = M16 | -4.806 | -4.806 | 59.290 | -19.965 | 10.352 |
| ICD = M17 | -8.707 | -8.707 | 64.575 | -24.527 | 7.113 |
| ICD = M24 | -6.878 | -6.878 | 56.353 | -21.657 | 7.900 |
| ICD = M35 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = M46 | -14.738 | -14.738 | 72.725 | -31.526 | 2.051 |
| ICD = M48 | -14.738 | -14.738 | 72.725 | -31.526 | 2.051 |
| ICD = M50 | -11.874 | -11.874 | 74.032 | -28.813 | 5.064 |
| ICD = M62 | -14.738 | -14.738 | 72.725 | -31.526 | 2.051 |
| ICD = M80 | -5.649 | -5.649 | 45.167 | -18.880 | 7.582 |
| ICD = M96 | -9.642 | -9.642 | 58.752 | -24.732 | 5.448 |
| ICD = M99 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = S06 | -14.458 | -14.458 | 64.066 | -30.216 | 1.299 |
| ICD = S22 | -14.179 | -14.179 | 73.449 | -31.051 | 2.693 |
| ICD = S32 | -13.999 | -13.999 | 59.863 | -29.231 | 1.233 |

| | | | | | |
|---|---|---|---|---|---|
| ICD = S33 | -14.179 | -14.179 | 65.427 | -30.103 | 1.745 |
| ICD = S42 | -9.190 | -9.190 | 65.326 | -25.101 | 6.722 |
| ICD = S72 | -7.443 | -7.443 | 51.975 | -21.635 | 6.750 |
| ICD = S82 | -5.649 | -5.649 | 45.167 | -18.880 | 7.582 |
| ICD = U07 | -14.644 | -14.644 | 63.089 | -30.281 | 0.992 |
| ICD = Z89 | -13.268 | -13.268 | 59.104 | -28.403 | 1.867 |
| ICD = Z96 | -6.629 | -6.629 | 50.657 | -20.641 | 7.383 |
| ICD = Z98 | .[d] | .[d] | .[d] | .[d] | .[d] |
| Contracture = 1.00 | 3.856 | 3.856 | 16.379 | -4.112 | 11.823 |
| Contracture = 2.00 | -0.278 | -0.278 | 11.808 | -7.043 | 6.486 |
| Contracture = 3.00 | 2.825 | 2.825 | 12.071 | -4.014 | 9.665 |
| Contracture = 4.00 | 6.474 | 6.474 | 28.312 | -4.001 | 16.949 |
| Contracture = 5.00 | .[d] | .[d] | .[d] | .[d] | .[d] |

a. Dependent Variable: HrsPain

b. Model: (Intercept), SARCF, ICD, Contracture

c. Assume standard reference priors.

d. This parameter is redundant. Posterior statistics are not calculated.

Multiple regression analysis was employed to examine the impact of SARCF, ICD, and Contracture variables on the The Health Assessment Questionnaire (HAQ1) as shown in Table 15. The Intercept exhibited a mode and mean estimate of 3.394, with a narrow variance of 0.099 and a 95% credible interval ranging from 2.775 to 4.012. SARCF = 5.00 had a negative effect on HAQ1 with a mode and mean estimate of -0.346 and a 95% credible interval of -1.508 to 0.815. For ICD codes, G20 and G25 were found to have a negative impact on HAQ1, with coefficient estimates of -1.392. Additionally, Contracture = 4.00 showed a modest negative effect on HAQ1, with a coefficient estimate of -0.188 and a 95% credible interval ranging from -0.921 to 0.546.

Table 16. - Regression Estimates of The Health Assessment Questionnaire (HAQ1) vs SARC-F, ICD code and Contracture

| Parameter | Posterior | | | 95% Credible Interval | |
|---|---|---|---|---|---|
| | Mode | Mean | Variance | Lower Bound | Upper Bound |
| (Intercept) | 3.394 | 3.394 | 0.099 | 2.775 | 4.012 |
| SARCF = 1.00 | -0.123 | -0.123 | 0.308 | -1.214 | 0.969 |
| SARCF = 2.00 | 1.060 | 1.060 | 0.321 | -0.055 | 2.176 |
| SARCF = 3.00 | 0.496 | 0.496 | 0.210 | -0.405 | 1.397 |
| SARCF = 5.00 | -0.346 | -0.346 | 0.349 | -1.508 | 0.815 |
| SARCF = 6.00 | 0.633 | 0.633 | 0.213 | -0.275 | 1.541 |
| SARCF = 7.00 | 0.362 | 0.362 | 0.200 | -0.517 | 1.241 |
| SARCF = 8.00 | 0.542 | 0.542 | 0.205 | -0.350 | 1.434 |
| SARCF = 9.00 | 0.686 | 0.686 | 0.194 | -0.182 | 1.554 |
| SARCF = 10.00 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = D32 | -1.132 | -1.132 | 0.357 | -2.308 | 0.044 |
| ICD = G20 | -1.392 | -1.392 | 0.572 | -2.880 | 0.097 |
| ICD = G25 | -1.392 | -1.392 | 0.572 | -2.880 | 0.097 |
| ICD = G81 | -1.078 | -1.078 | 0.308 | -2.170 | 0.015 |
| ICD = G82 | -0.471 | -0.471 | 0.280 | -1.513 | 0.571 |
| ICD = G83 | -0.343 | -0.343 | 0.483 | -1.710 | 1.025 |
| ICD = I63 | -1.203 | -1.203 | 0.348 | -2.364 | -0.041 |
| ICD = I70 | -1.167 | -1.167 | 0.325 | -2.289 | -0.044 |
| ICD = M05 | -1.060 | -1.060 | 0.389 | -2.287 | 0.167 |
| ICD = M06 | -0.706 | -0.706 | 0.218 | -1.625 | 0.214 |
| ICD = M16 | -0.987 | -0.987 | 0.290 | -2.046 | 0.072 |
| ICD = M17 | -1.112 | -1.112 | 0.320 | -2.225 | 0.000 |
| ICD = M24 | -1.127 | -1.127 | 0.270 | -2.150 | -0.104 |
| ICD = M35 | -0.840 | -0.840 | 0.340 | -1.988 | 0.307 |
| ICD = M46 | -0.703 | -0.703 | 0.348 | -1.864 | 0.459 |
| ICD = M48 | -0.703 | -0.703 | 0.348 | -1.864 | 0.459 |
| ICD = M50 | 2.263 | 2.263 | 0.357 | 1.088 | 3.438 |
| ICD = M62 | -1.203 | -1.203 | 0.348 | -2.364 | -0.041 |
| ICD = M80 | -0.706 | -0.706 | 0.218 | -1.625 | 0.214 |
| ICD = M96 | -1.079 | -1.079 | 0.282 | -2.124 | -0.035 |
| ICD = M99 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = S06 | -1.025 | -1.025 | 0.304 | -2.110 | 0.059 |
| ICD = S22 | -1.098 | -1.098 | 0.349 | -2.261 | 0.065 |
| ICD = S32 | -1.176 | -1.176 | 0.273 | -2.204 | -0.149 |
| ICD = S33 | -1.098 | -1.098 | 0.309 | -2.193 | -0.004 |
| ICD = S42 | -0.735 | -0.735 | 0.323 | -1.854 | 0.384 |
| ICD = S72 | -1.017 | -1.017 | 0.252 | -2.005 | -0.028 |
| ICD = S82 | -0.706 | -0.706 | 0.218 | -1.625 | 0.214 |
| ICD = U07 | -0.656 | -0.656 | 0.299 | -1.731 | 0.420 |
| ICD = Z89 | -1.123 | -1.123 | 0.293 | -2.188 | -0.059 |
| ICD = Z96 | -1.038 | -1.038 | 0.249 | -2.019 | -0.056 |
| ICD = Z98 | .[d] | .[d] | .[d] | .[d] | .[d] |
| Contracture = 1.00 | -0.553 | -0.553 | 0.078 | -1.102 | -0.005 |
| Contracture = 2.00 | -0.345 | -0.345 | 0.058 | -0.818 | 0.129 |
| Contracture = 3.00 | -0.519 | -0.519 | 0.059 | -0.995 | -0.042 |
| Contracture = 4.00 | -0.188 | -0.188 | 0.139 | -0.921 | 0.546 |
| Contracture = 5.00 | .[d] | .[d] | .[d] | .[d] | .[d] |

a. Dependent Variable: HAQ1

b. Model: (Intercept), SARCF, ICD, Contracture

c. Assume standard reference priors.

Multiple regression analysis was conducted to investigate the effects of the Intercept, SARCF, ICD, and Contracture variables on the Barthel Index at admission (Barthel1) as shown in Table 17. The Intercept had a mode and mean estimate of 4.980, with a large variance of 341.916 and a wide 95% credible interval spanning from -31.416 to 41.375. Among the SARCF levels, SARCF = 1.00 exhibited a mode and mean estimate of -53.247, with a high variance of 1054.914 and a 95% credible interval ranging from -117.176 to 10.683. For the ICD codes, ICD D32 demonstrated a mode and mean estimate of 80.133, with a variance of 1238.100 and a 95% credible interval ranging from 10.875 to 149.391. For the Contracture score = 4.00 showed a mode and mean estimate of -18.539, with a large variance of 475.987 and a 95% credible interval spanning from -61.482 to 24.403.

Table 17. - Regression Estimates of Barthel Index vs SARC-F, ICD code and Contracture

| Parameter | Posterior | | | 95% Credible Interval | |
|---|---|---|---|---|---|
| | Mode | Mean | Variance | Lower Bound | Upper Bound |
| (Intercept) | 4.980 | 4.980 | 341.916 | -31.416 | 41.375 |
| SARCF = 1.00 | -53.247 | -53.247 | 1054.914 | -117.176 | 10.683 |
| SARCF = 2.00 | .[d] | .[d] | .[d] | .[d] | .[d] |
| SARCF = 3.00 | -39.651 | -39.651 | 712.732 | -92.199 | 12.897 |
| SARCF = 5.00 | .[d] | .[d] | .[d] | .[d] | .[d] |
| SARCF = 6.00 | -49.320 | -49.320 | 729.053 | -102.466 | 3.826 |
| SARCF = 7.00 | -41.787 | -41.787 | 681.131 | -93.156 | 9.583 |
| SARCF = 8.00 | -47.175 | -47.175 | 703.155 | -99.369 | 5.018 |
| SARCF = 9.00 | -52.117 | -52.117 | 659.370 | -102.659 | -1.574 |
| SARCF = 10.00 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = D32 | 80.133 | 80.133 | 1238.100 | 10.875 | 149.391 |
| ICD = G20 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = G25 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = G81 | 71.744 | 71.744 | 1075.161 | 7.205 | 136.284 |
| ICD = G82 | 49.046 | 49.046 | 969.210 | -12.231 | 110.324 |
| ICD = G83 | 77.204 | 77.204 | 1690.944 | -3.734 | 158.143 |
| ICD = I63 | 80.744 | 80.744 | 1210.765 | 12.255 | 149.233 |
| ICD = I70 | 46.175 | 46.175 | 1109.967 | -19.401 | 111.751 |
| ICD = M05 | 56.196 | 56.196 | 1337.397 | -15.786 | 128.177 |
| ICD = M06 | 67.560 | 67.560 | 763.558 | 13.171 | 121.949 |
| ICD = M16 | 66.823 | 66.823 | 995.692 | 4.715 | 128.932 |
| ICD = M17 | 75.787 | 75.787 | 1087.943 | 10.864 | 140.709 |

| | | | | | |
|---|---|---|---|---|---|
| ICD = M24 | 77.192 | 77.192 | 933.491 | 17.054 | 137.330 |
| ICD = M35 | 80.327 | 80.327 | 1177.216 | 12.793 | 147.860 |
| ICD = M46 | 57.744 | 57.744 | 1210.765 | -10.745 | 126.233 |
| ICD = M48 | 57.744 | 57.744 | 1210.765 | -10.745 | 126.233 |
| ICD = M50 | 86.608 | 86.608 | 1232.205 | 17.515 | 155.701 |
| ICD = M62 | 52.744 | 52.744 | 1210.765 | -15.745 | 121.233 |
| ICD = M80 | 67.560 | 67.560 | 763.558 | 13.171 | 121.949 |
| ICD = M96 | 71.278 | 71.278 | 1091.637 | 6.245 | 136.310 |
| ICD = M99 | .[d] | .[d] | .[d] | .[d] | .[d] |
| ICD = S06 | 67.511 | 67.511 | 1066.273 | 3.238 | 131.784 |
| ICD = S22 | 72.278 | 72.278 | 1227.241 | 3.324 | 141.231 |
| ICD = S32 | 77.398 | 77.398 | 958.019 | 16.476 | 138.321 |
| ICD = S33 | 72.278 | 72.278 | 1091.637 | 7.245 | 137.310 |
| ICD = S42 | 43.268 | 43.268 | 1106.347 | -22.201 | 108.738 |
| ICD = S72 | 71.677 | 71.677 | 877.784 | 13.361 | 129.992 |
| ICD = S82 | 67.560 | 67.560 | 763.558 | 13.171 | 121.949 |
| ICD = U07 | 50.003 | 50.003 | 1040.049 | -13.474 | 113.481 |
| ICD = Z89 | 61.656 | 61.656 | 997.010 | -0.494 | 123.806 |
| ICD = Z96 | 72.171 | 72.171 | 859.933 | 14.451 | 129.891 |
| ICD = Z98 | .[d] | .[d] | .[d] | .[d] | .[d] |
| Contracture = 1.00 | 6.063 | 6.063 | 270.244 | -26.294 | 38.420 |
| Contracture = 2.00 | 3.869 | 3.869 | 196.984 | -23.757 | 31.494 |
| Contracture = 3.00 | 3.020 | 3.020 | 206.312 | -25.251 | 31.292 |
| Contracture = 4.00 | -18.539 | -18.539 | 475.987 | -61.482 | 24.403 |
| Contracture = 5.00 | .[d] | .[d] | .[d] | .[d] | .[d] |

a. Dependent Variable: Barthel1

b. Model: (Intercept), SARCF, ICD, Contracture

c. Assume standard reference priors.

# 5. DISCUSSION

The examination of the dataset derived from an aging population has offered vital insights into the correlation between various medical parameters and the impacts of medical interventions on hip and pelvic injuries. The most substantial representation was found in the 75-84 age group (32%), followed by the 85-94 age group (23%). A rigorous correlation analysis discovered several significant correlations.

Focusing on the procedure's effect on pain levels, pre-admission pain levels were significantly lower compared to the levels recorded at admission, indicating a potential escalation of pain prior to the procedure. Post-procedure, pain levels demonstrated a marked decline, especially in the hip and pelvic subset, signalling the treatments' efficacy in reducing pain. Even a week after discharge, these low pain levels were maintained, reinforcing the long-term benefits of the treatment.

It is plausible that the reduction in pain levels may contribute to the improved ability to perform daily tasks. Pain can limit mobility and interfere with a person's ability to carry out activities of daily living, so its management can facilitate functional improvements, even in the presence of other physical limitations (32)

Investigating the functional capacity of patients across all age groups highlighted a slight decrease in mean movement ability after the procedure. Nevertheless, this was only a modest decrease, demonstrating minimal adverse impacts on the patients' overall mobility and could be explained with immediate consequences of surgery.

The average SARC-F scores were generally high across all age groups (7.14±2.03). The high mean score indicates a pronounced risk or presence of sarcopenia among the patients, a result which aligns with the prevalence of sarcopenia in aging populations consistent with previous research (37). Despite these mobility challenges, the Barthel Index showed significant improvement from admission to discharge, suggesting a possible positive impact of the procedure on patients' ability to perform basic tasks. The Barthel Index from admission (33.85±16.70) to discharge (53.40±26.28). This improvement was observed despite the slight decrease in movement ability post-procedure and the high average SARC-F score, which may suggest that the intervention has a positive effect on the ability of patients to perform basic tasks, or it could reflect effective post-procedure care and rehabilitation.

For HAQ1, it was noteworthy that a SARC-F score of 5.00, ICD codes G20 and G25, and a Contracture level of 4.00 all negatively impacted HAQ1 scores. This implies that these factors could possibly contribute to decreased functional ability as measured by HAQ1. The negative relationship between these variables and HAQ1 might provide valuable information for developing targeted interventions to improve functionality and quality of life in patients.

Finally, the analysis concerning the Barthel index revealed that while a SARC-F score of 1.00 and a Contracture level of 4.00 could potentially decrease the functionality levels, an ICD code of D32 might conversely enhance them.

Previous research conducted illustrates an inverse relationship between pain, Barthel Index scores, and the duration of hospital stays in the elderly, indicating compromised functional outcomes. However further research also has shown evidence suggesting that a comprehensive physiotherapy regimen could mitigate this trend, even in the face of prolonged hospital stays. Building upon this, research has highlighted the beneficial impact of intensive post-discharge physiotherapy on Barthel Index scores, denoting improved functional recovery. This aligns with findings indicating that patients with a hip fracture exhibit considerable rehabilitation potential within the first six months post-event (33-36).

It's worth noting that the number of cases varied across age groups and time points, thereby affecting the reliability of certain age-specific findings, for example, the 90-95 age group was represented by a single case, which limits the extrapolation of findings for this age group.

The analysis also revealed sex-based differences in pain levels. Females generally reported higher pain levels than males although the magnitude of pain reduction at discharge differed between genders. The average pre- and post-procedure movement for males was marginally higher than for females but the differences were negligible. Of note being that the Barthel Index upon admission and discharge demonstrated that females had higher average scores than males indicating higher functional independence in this demographic.

The SARC-F score analysis showed a higher mean for females than for males indicating a higher risk of sarcopenia in females corroborated by other research (8). This disparity should be coupled with the reduced sample size for males possibly opening a further study option.

Also, of note that SARC-F of 5.00 had the most substantial impact on length of pain in hours suggesting individuals with this SARC-F score may experience longer periods of pain. This also combined with contracture level also showed a positive predictor of pain duration.

These findings underscore the intricate interplay between variables such as age, sex, pain levels, movement ability, sarcopenia risk, and functional independence. They highlight the potential benefits and challenges of the medical intervention under study and contribute to a more nuanced understanding of patient outcomes in the context of hip and pelvic injuries.

It is worth emphasizing that the degree of pain can significantly influence the recuperation process as it directly affects elderly patients' mobility, emotional state, and overall quality of life (37).

Hence, it becomes imperative to incorporate efficacious pain management strategies, encompassing both pharmacological and non-pharmacological approaches. The correlation between the length of hospitalization of a geriatric patient, the level of physiotherapy intervention, and the impact on the recovery trajectory warrants highlighting. This connection underscores the indispensable role of physiotherapy in shaping functional outcomes in the elderly, particularly those suffering from sarcopenia as it enhances muscle function and strength.

One of the main limitations of this study is its observational nature. This characteristic inherently restricts our capacity to conclusively determine a direct cause-and-effect relationship between the operation and the subsequent mobility outcomes or the satisfaction levels of the patients.

Furthermore, there's a concern regarding the generalizability of our findings. The results might be most applicable solely to the specific demographic and context studied at KBC Split. This could mean that extrapolating these outcomes to a broader or different group might not be accurate or relevant.

Another significant concern stems from the limitations in the dataset itself. The uneven distribution of cases across different age groups and between sexes is noteworthy. This imbalance should serve as a cautionary note when attempting to extrapolate these findings. It highlights the necessity for further research, ideally using larger and more balanced sample sizes to ensure more comprehensive and generalizable insights. Therefore, this restricted sample size made it particularly challenging to draw definitive or broadly conclusive results.

This thesis used some data from previously published thesis (38-40).

# 6. CONCLUSIONS

In conclusion, all patient groups exhibited enhancements in their ability to perform daily activities from admission to discharge, with female patients specifically those with hip and pelvic injuries experienced the most significant rehabilitation progress, as evidenced by the greater changes in Barthel Index scores and reduction in pain.

The age bracket of 75-84 years exhibited the highest representation in the data set, accounting for 32% of the total, followed by the 85-94 year age group which constituted 23%.

Considering the entire patient cohort, the average change in Barthel Index scores was found to be 19.55, denoting substantial overall improvement. The subset with combined hip and pelvic injuries showed a similar change magnitude of 20.71.

Female patients manifested a greater change (21.58) in Barthel Index scores from admission to discharge, with females with hip and pelvic injuries showed a marginally higher average change (22.05), suggesting noteworthy improvement within this particular cohort.

Male patients displayed a smaller average change (14.40), with males sustaining hip and pelvic injuries showing a slightly increased change (17.34), albeit still lower than their female counterparts. This pattern insinuates that males, on average, demonstrate lesser progress in rehabilitation compared to females.

SARC-F of 5.00 had the most substantial impact on length of pain in hours, this combined with contracture level also showed a positive predictor of with pain duration.

The SARC-F score analysis indicated a higher mean for females than for males,

Subsequent to the treatment, reported pain levels exhibited a significant reduction, underscoring the effectiveness of the intervention in pain alleviation. Remarkably, this decreased pain intensity persisted even a week following discharge, thereby accentuating the long-term benefits associated with the procedure.

Additionally, the study's limited sample size, encompassing only 60 patients, may have curtailed our capacity to discern expansive trends and draw universally applicable conclusions about the effectiveness of physiotherapy interventions and associated functional recovery as indicated by Barthel Index scores. Future research should consider extending the monitoring duration and enlarging the sample size, thereby facilitating more comprehensive insights into the impact of physiotherapy on geriatric patient recovery trajectories.

# 7. REFERENCES

1. United N. United Nations Department of Economic and Social Affairs, Population Division Department of Economic and Social Affairs, Population Division. World Population Ageing. 2015;United Nat.

2. United N. World Population Ageing 2019: Highlights (ST/ESA/SER.A/430)2019.

3. Sterling DA, O'connor JA, Bonadies J. Geriatric falls: injury severity is high and disproportionate to mechanism. Journal of Trauma and Acute Care Surgery. 2001; 50(1):116-9.

4. Kerrie MS, Geoffrey CN, Antony MU, Julie AP, Ego S, Mark AK. Health burden of hip and other fractures in Australia beyond 2000. Projections based on the Geelong Osteoporosis Study. Med J Aust. 1999; 170:459-60.

5. Bergen G, Stevens MR, Burns ER. Falls and fall injuries among adults aged≥ 65 years—United States, 2014. Morbidity and Mortality Weekly Report. 2016; 65(37):993-8.

6. Jellad A, Bouaziz MA, Salah S, Migaou H, Salah ZB. Epidemiological study of musculoskeletal injuries in elderly patients attending physical medicine and rehabilitation consultations. Annals of Physical and Rehabilitation Medicine. 2011(54):e93-4.

7. Ray M. Physical activity and hip fracture disability: A review. Journal of Aging Research. 2011; 2011.

8. Cruz-Jentoft AJ, Baeyens JP, Bauer JM, Boirie Y, Cederholm T, Landi F, Martin FC, Michel JP, Rolland Y, Schneider SM, Topinková E. Sarcopenia: European consensus on definition and diagnosis: Report of the European Working Group on Sarcopenia in Older People. Age and ageing. 2010; 39(4):412-23.

9. Petermann-Rocha F, Balntzi V, Gray SR, Lara J, Ho FK, Pell JP, Celis-Morales C. Global prevalence of sarcopenia and severe sarcopenia: a systematic review and meta-analysis. Journal of cachexia, sarcopenia and muscle. 2022; 13(1):86-99.

10. Kara M, Özçakar L, Kaymak B, Frontera W. A Neuromuscular Look" to sarcopenia: Is it a movement disorder?". Journal of Rehabilitation Medicine. 2020; 52(4):1-3.

11. Johnell O, Kanis JA. An estimate of the worldwide prevalence and disability associated with osteoporotic fractures. Osteoporosis international. 2006; 17:1726-33.

12. Lutnick E, Kang J, Freccero DM. Surgical treatment of femoral neck fractures: a brief review. Geriatrics. 2020; 5(2):22.

13. Garden RS. Low-angle fixation in fractures of the femoral neck. The Journal of Bone & Joint Surgery British Volume. 1961; 43(4):647-63.

14. Bartonícek J. Pauwels' classification of femoral neck fractures: correct interpretation of the original. Journal of orthopaedic trauma. 2001; 15(5):358-60.

15. Zhou Y, Zhang Y, Lu P, Chen H, Ni M, Rui Y. An overview on the treatment strategies of non-displaced femoral neck fracture in the elderly. Arthroplasty. 2022;4(1):1-7.

16. Zghebi SS, Steinke DT, Carr MJ, Rutter MK, Emsley RA, Ashcroft DM. Examining trends in type 2 diabetes incidence, prevalence and mortality in the UK between 2004 and 2014. Diabetes, Obesity and Metabolism. 2017; 19(11):1537-45.

17. Dimet-Wiley A, Golovko G, Watowich SJ. One-year postfracture mortality rate in older adults with hip fractures relative to other Lower Extremity Fractures: Retrospective Cohort Study. JMIR aging. 2022; 5(1):e32683.

18. Wolford ML, Palso K, Bercovitz A. Hospitalization for total hip replacement among inpatients aged 45 and over: United States, 2000-1010. US Department of Health and

Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; 2015.

19. Kurtz S, Mowat F, Ong K, Chan N, Lau E, Halpern M. Prevalence of primary and revision total hip and knee arthroplasty in the United States from 1990 through 2002. JBJS. 2005; 87(7):1487-97.

20. Kannegaard PN, van der Mark S, Eiken P, Abrahamsen BO. Excess mortality in men compared with women following a hip fracture. National analysis of comedications, comorbidity and survival. Age and ageing. 2010; 39(2):203-9.

21. Koval KJ, Zuckerman JD. Hip fractures: I. Overview and evaluation and treatment of femoral-neck fractures. JAAOS-Journal of the American Academy of Orthopaedic Surgeons. 1994; 2(3):141-9.

22. Parker MJ, Gurusamy KS, Azegami S. Arthroplasties (with and without bone cement) for proximal femoral fractures in adults. Cochrane database of systematic reviews. 2010(6).

23. Rogmark C, Leonardsson O. Hip arthroplasty for the treatment of displaced fractures of the femoral neck in elderly patients. The bone & joint journal. 2016; 98(3):291-7.

24. Cheng T, Feng JG, Liu T, Zhang XL. Minimally invasive total hip arthroplasty: a systematic review. International orthopaedics. 2009; 33:1473-81.

25. Mosk CA, Mus M, Vroemen JP, van der Ploeg T, Vos DI, Elmans LH, van der Laan L. Dementia and delirium, the outcomes in elderly hip fracture patients. Clinical Interventions in Aging. 2017:421-30.

26. Anderson DD, Chubinskaya S, Guilak F, Martin JA, Oegema TR, Olson SA, Buckwalter JA. Post-traumatic osteoarthritis: improved understanding and opportunities for early intervention. Journal of orthopaedic research. 2011; 29(6):802-9.

27. Edwards C, Counsell A, Boulton C, Moran CG. Early infection after hip fracture surgery: risk factors, costs and outcome. The Journal of Bone & Joint Surgery British Volume. 2008; 90(6):770-7.

28. Kim BH, Lee S, Yoo B, Lee WY, Lim Y, Kim MC, Yon JH, Kim KM. Risk factors associated with outcomes of hip fracture surgery in elderly patients. Korean journal of anesthesiology. 2015; 68(6):561-7.

29. Schnell S, Friedman SM, Mendelson DA, Bingham KW, Kates SL. The 1-year mortality of patients treated in a hip fracture program for elders. Geriatric orthopaedic surgery & rehabilitation. 2010 (1):6-14.

30. Malmstrom TK, Morley JE. SARC-F: a simple questionnaire to rapidly diagnose sarcopenia. Journal of the American Medical Directors Association. 2013; 14(8):531-2.

31. Mahoney FI, Barthel DW. Functional evaluation: the Barthel Index: a simple index of independence useful in scoring improvement in the rehabilitation of the chronically ill. Maryland state medical journal. 1965.

32. Jakobsson U. Statistical presentation and analysis of ordinal data in nursing research. Scandinavian journal of caring sciences. 2004; 18(4):437-40.

33. Mangione KK, Craik RL, Tomlinson SS, Palombaro KM. Can elderly patients who have had a hip fracture perform moderate-to high-intensity exercise at home?. Physical therapy. 2005; 85(8):727-39.

34. Unnanuntana A, Jarusriwanna A, Nepal S. Validity and responsiveness of Barthel index for measuring functional recovery after hemiarthroplasty for femoral neck fracture. Archives of Orthopaedic and Trauma Surgery. 2018; 138:1671-7..

35. Knauf T, Buecking B, Hack J, Barthel J, Bliemel C, Aigner R, Ruchholtz S, Eschbach D. Development of the Barthel Index 5 years after hip fracture: Results of a prospective study. Geriatrics & Gerontology International. 2019; 19(8):809-14..

36. Daly N, Fortin C, Jaglal S, MacDonald SL. Predictors of exceeding target inpatient rehabilitation length of stay after hip fracture. American journal of physical medicine & rehabilitation. 2020; 99(7):630-5.

37. Ann LH, Amanda FE, Michael M. Pain assessment in persons with dementia: Relationship between self-report and behavioral observation. Journal of the American Geriatrics Society. 2009; 57

38. Žurić A. epidemiološke karakteristike bolesnika koji su liječeni u zavodu za fizikalnu medicinu kbc-a split nakon operacijskog liječenja frakture bedrene kosti [Diplomski rad]. Split: Sveučilište u Splitu, Medicinski fakultet; 2021 Dostupno na: https://urn.nsk.hr/urn:nbn:hr:171:349382

39. Jurić N. Modaliteti fizikalne terapije u gerontološkoj populaciji koja gravitira u KBC-u Split [Diplomski rad]. Split: Sveučilište u Splitu, Sveučilišni odjel zdravstvenih studija; 2019 Dostupno na: https://urn.nsk.hr/urn:nbn:hr:176:152609

40. Gadžo M. Fizioterapeutska procjena i najčešći modaliteti fizikalne terapije u gerontološkoj populaciji - pregled literature [Diplomski rad]. Split: Sveučilište u Splitu, Sveučilišni odjel zdravstvenih studija; 2021

# 8. SUMMARY

**Objective**:

This study, conducted between June 1, 2021, and January 30, 2023, at KBC Split, a tertiary hospital associated with the University of Split, focused on examining the impact of specific medical conditions on patient mobility, recovery, and satisfaction. The primary objective of this investigation is to delve into the epidemiological and clinical characteristics of gerontological patients with a high degree of dependency, who are admitted to the Department of Physical Medicine in the Clinical Hospital Center Split, studying their recovery after 10 days of inpatient physical therapy.

**Methods**:

Utilising a retrospective case control method, pre and post-operative patient health statuses were compared by analysing data from medical records. Data analysis was specifically targeted at investigating the relationship between the whole cohort and the subset focusing on hip and lower lumbar injury. A cohort of 60 male and female participants aged 65 and above was selected for the study. These individuals were selected from a group of geriatric patients with severe dependency admitted to the Department of Physical Medicine at KBC Split. Selection criteria were based on the development of a patient's immobility following a disease coded with specific ICD codes. Patients younger than 65 years old and those unable to give informed consent were excluded from the study. During the study, patient conditions were analysed using several metrics, including SARC-F, Barthel Index, Contracture, and Pain levels.

**Results**:

Patients showed significant functional improvement after inpatient physical therapy. The group of patients with hip injuries achieved significant but somewhat smaller progress, which may require a longer rehabilitation period compared to other diagnoses. In contrast, patients with injuries to the lumbar part of the spine showed better progress, surpassing the improvement of the entire sample. Indicating particularly effective treatment for this group. Overall, while both groups improved, the progress of the group with lumbar spine injuries exceeded that of the hip injury group, highlighting the variable effectiveness of interventions among different patient groups.

**Conclusion**:

The results demonstrated substantial pain reduction following treatment, highlighting its efficacy and the vital role of pain management. Physiotherapy emerged as particularly beneficial for patients with sarcopenia. Women showed significantly greater improvements in daily activities and functional independence than men. However, due to the small sample size of the study, these findings require confirmation through larger, future studies.

# 9. CROATIAN SUMMARY

**Ciljevi:**

Ovo istraživanje, provedeno između 1. lipnja 2021. i 30. siječnja 2023. u KBC Split, tercijarnoj bolnici povezanoj sa Sveučilištem u Splitu, usmjereno je na ispitivanje utjecaja stacionarne fizikalne terapije na mobilnost pacijenata, oporavak i zadovoljstvo. Primarni cilj ove istrage je produbiti epidemiološke i kliničke karakteristike gerijartijskih pacijenata s visokim stupnjem ovisnosti, koji su primljeni na Odjel za fizikalnu medicinu u Kliničkom bolničkom centru Split proučavajući oporavak nakon stacionarne fizikalne terapije od 10 dana.

**Materijali i Metode:**

Koristeći retrospektivnu metodu kontrolnih slučajeva, preoperativni i postoperativni zdravstveni statusi pacijenata uspoređivani su analizom podataka iz medicinskih kartona pacijenata. Analiza podataka posebno je ciljala na istraživanje oporavak pacijenta s frakturom bedrene kosti i donjeg dijela kralježnice. U studiju je uključeno 60 muških i ženskih sudionika starijih od 65 godina. Ovi su pojedinci odabrani iz skupine gerijatrijskih pacijenata s teškom ovisnošću primljenih na Odjel za fizikalnu medicinu u KBC Split. Kriteriji odabira temeljili su se na razvoju nepokretnosti pacijenta nakon neke bolesti kodirane specifičnim ICD kodovima. Iz studije su isključeni pacijenti mlađi od 65 godina, te oni koji nisu bili u stanju dati informirani pristanak. Tijekom studije, stanja pacijenata analizirana su koristeći nekoliko validiranih upitnika, uključujući SARC-F, Barthelov indeks, mjerenje gibljivosti zgloba goniometrom i VAS skalu boli.

**Rezultati:**

Pacijenti su pokazali značajno funkcionalno poboljšanje nakon stacionarne fizikalne terapije. Grupa pacijenata s ozljedama kuka ostvarila je značajan, ali nešto manji napredak, što možda zahtijeva dulji period rehabilitacije nego druge dijagnoze. Suprotno tome, pacijenati s ozljedama lumbalnog dijela kralježnice pokazali su bolji napredak, nadmašujući poboljšanje cijelog uzorka. To ukazuje na posebno učinkovite intervencije za ovu grupu. Sveukupno, dok su obje grupe poboljšale, izvanredan napredak grupe s ozljedama lumbalnog dijela kralježnice nadmašio je onu grupe s ozljedama kuka, ističući varijabilnu učinkovitost intervencija među različitim skupinama pacijenata**.**

**Zaključci:**

Rezultati su pokazali značajno smanjenje boli nakon fizikalnog liječenja, ističući njegovu učinkovitost i vitalnu ulogu upravljanja boli. Fizioterapija se pokazala posebno korisnom za pacijente sa sarkopenijom. Žene su pokazale značajno veća poboljšanja u svakodnevnim aktivnostima i funkcionalnoj neovisnosti od muškaraca. Međutim, zbog malog uzorka studije, ovi nalazi zahtijevaju potvrdu kroz veće, buduće studije.