PREVALNCE OF RISK OF FALL AND HAMSTRING FLEXIBILITY IN PATIENTS WITH OSTEOARTHRITIS OF KNEE JOINT.

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Abstract.

Background: Osteoarthritis (OA) is a degenerative joint disease that commonly affects weight-bearing joints, such as the knee, leading to pain, stiffness, muscle weakness, and decreased mobility. These factors contribute to impaired balance and increased fall risk, particularly in older adults. This study aims to assess the relationship between fall risk and hamstring flexibility in individuals with knee OA.

Methods: A total of 80 participants (both males and females) with unilateral or bilateral knee pain due to OA were selected for this study. Participants were assessed using the Berg Balance Scale (BBS) to determine fall risk and the Sit-and-Reach test to evaluate hamstring flexibility. Statistical analysis was performed using IBM SPSS-26 and Microsoft Excel.

Results: The mean age of participants was 51.31 ± 5.2 years, with a BMI of 23.63 ± 0.5 kg/m². The BBS results revealed that 70% of participants had a moderate fall risk, 30% had a mild fall risk, and none had a severe fall risk. Regarding hamstring flexibility, 15% of participants demonstrated mild flexibility, 49% showed moderate flexibility, and 36% had severe limitations.

Conclusion: The study found that individuals with knee OA exhibited moderate fall risk and varying levels of hamstring flexibility. Decreased hamstring flexibility was associated with increased fall risk, highlighting the importance of addressing both flexibility and postural stability in managing knee OA. Targeted interventions, including flexibility exercises and balance training, may improve functional outcomes and reduce fall risk in this population. Further research is needed to explore the effectiveness of specific rehabilitation strategies.

Keywords: osteoarthritis, hamstring flexibility ,berg balance scale, risk of fall, strength

Abbreviation: BBS- berg balance scale, OA- osteoarthritis

INTRODUCTION

The degeneration of cartilage and the creation of new bone at the joint surface are the hallmarks of osteoarthritis, a degenerative, non-inflammatory disease of the joints. It primarily affects weight-bearing joints like the knee and hip by affecting the synovial joint [1] One of the primary causes of discomfort in older adults is osteoarthritis (OA).[2] Among those aged 60 and above, the prevalence of progressive musculoskeletal disorders, including OA, is high. In males, the prevalence is 10%, while in females, it is 13%[3] Early morning stiffness, muscular atrophy, discomfort, stiffness, and inflammation are all signs of osteoarthritis.[4]The symptoms begin gradually and worsen with time, making it harder to carry out regular tasks.

The quadriceps that is (rectus femoris, vastus lateralis, and vastus medialis) and hamstring muscles (semimebranosis, semitendonis) are the muscles that extends and flex the knee joint. OA (patients are primarily observed to have weakness in the knee extensors) [5] Chondrocytes, cartilage cells, malfunction during the pathogenies of OA, which may likely impact muscle flexibility. The ability of muscles to lengthen and permit one joint to move through its range of motion is known as flexibility [6]

Falls are one of the most frequent causes of harm, reduced activity, and mortality among the elderly according to reports, the one-year fall incidence is roughly 30% higher in patients with osteoarthritis than in healthy older adults of the same age. [7] Loss of proprioception in individuals with knee OA may impact postural stability and fall risk. One of the causes of falls in older adults is impaired postural stability[8]

As people age, the frequency of falls among older adults rises gradually, research is necessary to evaluate the risk of falls and hamstring flexibility in patients with osteoarthritis of the knee and to improve balance in patients with OA knees because chronic medical conditions are also linked to falls, such as cognitive impairment and arthritis, which are more prevalent in older adults. One of the most common causes of pain, function loss, and disability in adults is osteoarthritis. Research on the extent of fall risk and flexibility is necessary because OA knee is most commonly observed in the elderly population, affecting postural stability, balance, and increasing the risk of falls. Muscle weakness is also frequently observed.

MATERIALS AND METHODS

The ethical clearance received from institutional ethical committee of Parul university. The study included total 80 participants who were selected based on inclusion and exclusion criteria. The inclusion criteria for the study were Subjects with OA knee joint**,** Patient unilateral or B/L knee pain**,** Females and male both, individuals with Any recent injuries to lower limb, Any recent surgery of lower limb Any neurological diseases affecting balance were excluded.

All the participants were informed about the study and consent was taken from each participants in the signature on the consent form. Privacy and confidentiality of the subjects should be maintained. Personal information such as name, age, address, was taken After those subjects were asses with sit and reach test and BSS berg balance scale

STATSTICAL ANALYSIS

Descriptive analysis of age, BBS and Sit and reach test interpreted by using statistical software IBM SPSS-26. The descriptive statistics including means and standard deviations were obtained.

RESULT:

In this study 80 participants were selected. The IBM SPSS-26 was used for analysis of data and Microsoft Excel was used for descriptive analysis. In which the mean and SD of age, BMI BBS and sit and reach was 51.31±5.2, 23.63± 0.5 and 44.70± 5.5, and 10.31± 2.9 respectively obtained

TABLE NO 1. TABLE SHOWING THE BASELINE DEMOGRAPHIC DATA OF THE

VARIABLES	MEAN±SD
Age	51.31±5.2years
BMI	23.63± 0.5kg/ m^2
HAMSTRING FLEXIBILITY	10.31± 2.9cm
BERG BALANCE SCALE	44.70± 5.5

TABLE NO.2 TABLE NO 2 SHOWING THE PERCENTAGE OF DISTRIBUTATION OF SUBJECTS RISK OF FALL ON THE BASIS OF BERG BALANCE SCALE SCORE.

MILD	30%
MODERATE	70%
SEVERE	0%

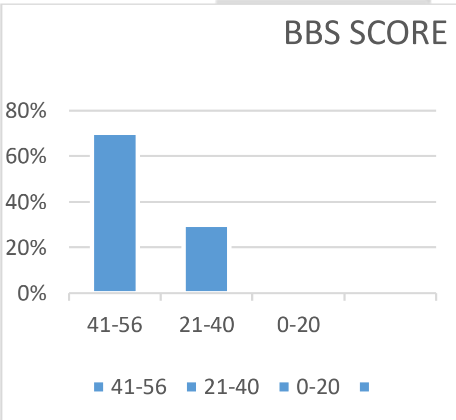
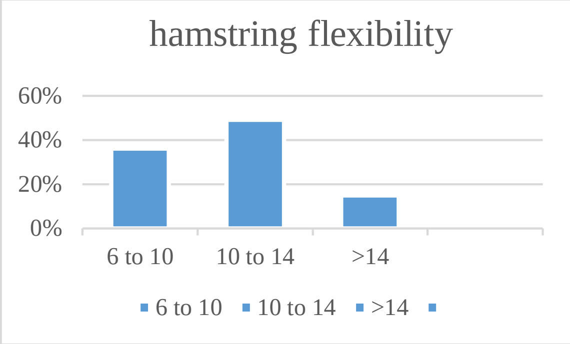


TABLE NO 3. TABLE SHOWING THE PERCENTAGE DISTRIBUTION OF THE SUBJECTS FOR HAMSTRING FLEXIBILITY USEINF SIT AND REACH TEST

MILD	15%
MODERATE	49%
SEVERE	36%



DISCUSSION

The purpose of present study was to find the prevalence of risk of fall and hamstring flexibility in osteoarthritis of knee joint total 80 participants were selected according to inclusion, exclusion criteria Berg balance scale was used to assess the risk of fall and sit and reach test used to assess hamstring flexibility. Osteoarthritis is degenerative, non -inflammatory disease of joints which characterized by destruction of cartilage and new bone formation at the surface of joints. it affects the synovial joints like more common in weight bearing joint like the knee, hip [1] people with old age, OA is one of the main cause for pain. The results of this study provide valuable insight into the relationship between knee OA, fall risk, and hamstring flexibility, shedding light on the implications for postural stability and mobility in older adults.

Fall Risk and Balance

According to the findings, the majority of participants (70%) exhibited a moderate fall risk based on the Berg Balance Scale (BBS), while 30% were categorized as having a mild fall risk. No participants were classified as having a severe fall risk. The BBS is a reliable tool for assessing balance and postural stability, both of which are crucial in the prevention of falls. The moderate fall risk seen in this study could be attributed to the weakened postural control often associated with knee OA. As discussed in the introduction, knee OA commonly leads to pain, stiffness, and muscle weakness, which can impair proprioception and, consequently, postural stability. The decline in proprioception, in turn, increases the likelihood of falls, which is a leading cause of injury and disability among older adults. In fact, people with knee OA are reported to have a 30% higher incidence of falls compared to healthy older adults, underscoring the need for interventions that address balance and stability in this population.[10]

OA of the knee is known to cause the weakening of key muscle groups, particularly the knee extensors (quadriceps), and often results in compensatory mechanisms that can further disrupt balance. The findings from this study reflect these concerns, as the participants' BBS scores indicate a moderate fall risk, likely resulting from the compromised muscle strength and proprioception in individuals with knee OA. Previous research supports this, highlighting the importance of interventions to address both muscle strength and balance to reduce fall risk in individuals with knee OA.

Hamstring Flexibility

The study also assessed hamstring flexibility using the Sit and Reach test, with 15% of participants showing mild flexibility, 49% moderate flexibility, and 36% severe limitations in flexibility. Flexibility is an important factor in joint mobility, and it is well documented that OA can impair the flexibility of muscles and surrounding tissues, including the hamstrings. In the case of knee OA, the flexibility of muscles surrounding the knee joint is crucial for maintaining a functional range of motion and avoiding compensatory movements that can further strain the joint and its supporting structures.

observed in OA patients. Reduced flexibility can result in difficulty performing activities of daily living and can contribute to postural instability, thereby increasing the risk of falls. The moderate flexibility seen in nearly half of the participants may suggest that while some individuals with knee OA retain some flexibility, it is often compromised compared to healthy individuals of the same age group.[11,12]

Relationship Between Fall Risk and Hamstring Flexibility

It is essential to consider the relationship between fall risk and hamstring flexibility. The results of this study suggest that participants with decreased hamstring flexibility may be at a heightened risk for falls. Limited hamstring flexibility can hinder the ability to achieve proper postural alignment and reduce the ability to recover from a loss of balance. This can create a vicious cycle where decreased flexibility contributes to poor balance, which in turn increases the likelihood of falls. Furthermore, muscle weakness, particularly in the knee extensors and flexors, can exacerbate the problem by making it more difficult to maintain proper posture and execute movement patterns that promote stability.[13]

Clinical Implications

The findings of this study highlight the importance of addressing both fall risk and muscle flexibility in managing knee OA. Interventions such as physical therapy, strength training, and flexibility exercises can play a key role in improving postural stability and reducing the risk of falls. Additionally, targeted interventions focused on enhancing hamstring flexibility may help alleviate some of the mobility limitations associated with knee OA, thereby improving the overall quality of life for these patients.[14]

It is essential for healthcare providers to monitor both fall risk and hamstring flexibility in individuals with knee OA, as these factors are critical for ensuring safety and mobility. By incorporating balance and flexibility training into treatment plans, patients with knee OA may experience better outcomes in terms of reduced fall risk, improved muscle function, and greater independence in daily activities.

Conclusion

In conclusion, this study reveals a moderate risk of falls and varying levels of hamstring flexibility in individuals with knee osteoarthritis. The findings suggest that impaired flexibility and weakened postural stability are key factors contributing to the increased fall risk in this population. Addressing these issues through targeted rehabilitation and exercise programs could significantly improve outcomes for individuals living with knee OA, enhancing their overall functional capacity and reducing the risk of falls. Future studies may explore more specific therapeutic interventions and their effectiveness in improving both fall risk and muscle flexibility in OA patients.

LIMITATIONS AND FUTURE SCOPE

LIMITATION:

Sample size small

Future scope:

This study can be done using a large sample size and affection gender on flexibility could be studied.

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