



## Original Article

## Association of Quadriceps Femoris Muscle Weakness with Symptomatic Osteoarthritis of Knee

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## ABSTRACT

The most widely recognized kind of joint sickness, osteoarthritis, influences in excess of 30 million individuals in the United States alone. It is the biggest reason for tireless handicap in more established people, with a yearly expense of \$185 billion. Degenerative circumstances coming about because of the biochemical breakdown of articular (hyaline) ligament may be considered. Osteoarthritis, the most widely recognized outer muscle problem, is a drawn-out ongoing sickness portrayed via ligament diminishing in joints. **Objective:** The aim of this study was to evaluate the association of quadriceps femoris muscle weakness with symptomatic osteoarthritis of knee. **Methods:** A cross sectional study was conducted on 196 participants from the general population of Lahore. Non probability Convenient Sampling was used. Knee injury and osteoarthritis outcome criteria for knee osteoarthritis and MMT (manual muscle testing) for quadriceps weakness. **Results:** The result exhibited that the p-value for association of quadriceps weakness with symptomatic knee osteoarthritis is 0.097 which shows that there is no association. P value explains there is no association between these two variables. **Conclusion:** In this study, there was not direct interactive association between quadriceps muscles weakness with symptomatic knee osteoarthritis among general population.

## INTRODUCTION

Both utilitarian knee joint dependability and knee joint stacking are supported by the quadriceps muscle. At the point when frail quadriceps muscles can't handle tibial interpretation during ambulation, dynamic knee joint dependability might be diminished, expanding the gamble of joint harm [1]. Besides, frail quadriceps muscles can promptly become exhausted, bringing about poor neuromuscular control and maybe permitting pathologic joint development. Proprioceptive tactile capacity plays a part in the planning of basic biomechanical occasions [2]. Quadriceps muscle reinforcing is suggested in clinical rules for the treatment of knee OA. Be that as it may, it's indistinct in the event that quadriceps muscle shortcoming expands

the possibility creating knee OA or propelling the illness. In spite of the fact that there is a rationale for supporting quadriceps muscle reinforcing in the people who have or are in danger of knee OA to decrease utilitarian limitations, more examination is expected to check whether such suggestions can really forestall disease [3]. accordingly, the objective of this paper is to survey the proof on the connection between quadriceps muscle debilitating and the beginning and movement of knee OA. Various cross-sectional examinations have demonstrated that quadriceps muscle shortcoming is clear in people who have knee OA even from the get-go in the periods of ligament diminishing and relates with Kellgren-Lawrence

(KL) grade of radiographic seriousness [4]. One exceptionally prominent cross-sectional examination, which has been referenced in excess of 400 papers as per Google Scholar, offered roundabout proof that quadriceps muscle debilitating may exist preceding the advancement of knee OA [5]. Because of its basic capacity in the transmission, retention, and rearrangement of stresses during everyday exercises, the knee has gotten a great deal of logical consideration. In ambulation across different territories, a solid knee empowers for joint steadiness. The versatility and strength of the lower appendage are seriously hampered by essential knee osteoarthritis [6]. Since there is no known remedy for this dynamic degenerative condition, exhaustive recovery is fundamental. Modifiable gamble factors like dreary joint developments, weight, contamination, and mishaps, among numerous others, may decrease the illness' defenselessness in individuals in danger. Aside from other pre-laid out factors affecting knee osteoarthritis, quadriceps muscle strength has been found to impact agony and hindrance in the lower appendages. Knee uneasiness is a significant clinical indication of knee osteoarthritis [7]. Muscle shortcoming exasperated or exacerbated knee OA. The objective of this study was to decide isometric quadriceps strength in subjects with suggestive osteoarthritis of the knee, to decide the connection between quadriceps strength and agony and handicap in knee osteoarthritis patients, and to contrast quadriceps strength in subjects and gentle, moderate, and extreme radiological knee osteoarthritis [8]. When contrasted with control people, individuals with knee osteoarthritis have powerless knee extensor muscles. Knee extensor muscle shortcoming has been distinguished as a gamble factor for knee osteoarthritis, especially in ladies, as per individual exploration. More prominent quadriceps solid strength was viewed as related with a diminished frequency of episode suggestive knee osteoarthritis, yet not radiographic knee osteoarthritis. Different investigations have investigated the meaning of unfortunate muscle work as a gamble factor for knee osteoarthritis, yet no conclusive ends have been reached [9]. It's pivotal to get a superior comprehension of whether knee extensor muscle shortcoming is a gamble factor for knee osteoarthritis, on the grounds that strong strength is a possibly modifiable gamble factor. There has been no precise review and meta-investigation as far as anyone is concerned to decide this [10]. Knee osteoarthritis (OA) is an essential wellspring of handicap in more seasoned people, and the predominance of this sickness is anticipated to soar in the following twenty years. Patients with knee OA have a more unfortunate utilitarian capacity, which can be connected with joint inconvenience, firmness, and a

deficiency of lower furthest point muscle strength. Thus, knee OA shouldn't be visible just as a ligament infection, and clinical treatment of the sickness should incorporate record for related muscle shortfalls. Patients with knee OA frequently have reduced force-creating capacity in the quadriceps because of solid decay and strong restraint, which is the failure to completely and volitionally enact the muscle [11,12]. Muscle debilitations in knee OA patients to explore the connection between muscle hindrances and actual capacity, to make sense of the likely job of muscle disabilities in the beginning and movement of knee OA, and to sum up the best proof looking at the adequacy of activities that target muscle impedances in knee OA patients [13]. There are 2 joints in the knee which are tibiofemoral and patellofemoral joint. Transmission of weight of body from femur to tibia is by tibiofemoral joint like hinge. There is small degree of tibial axial rotation take place in sagittal plane. Patellofemoral articulation is used for the extension mechanism. Quadriceps muscles are working eccentrically in some positions such as in gait, jumping or running position. For the extensor mechanism medial and lateral retinacular ligaments. These ligaments are distally attached to bones of tibia and anterior bones of menisci. Quadriceps muscles present on the anterior portion of the thigh [17]. In quadriceps muscle of thigh is present in the anterior side of leg, vastus lateralis is present outside portion, vastus medialis present on inner side and the vastus intermedius is present on the posterior of the thigh. Origin of femoris is from anterior superior iliac supine. Composition of rectus femoris consist of four muscles bellies [18]. For the treatment and improvement of knee osteoarthritis is such as: Decrease the pain and stiffness in the knee joint. Maintains of joint mobility is very important. Engage person in certain tasks for the improvement of daily life activities. Improvement in person daily activities related to health. Control the further damage of knee joint. Guide the patient about his problem and educate them how to manage their problems [19]. Some other interventions are using for the control of knee pain such as a narrow-woven fabric is used around the patella of knee, invigorating the patella of knee, these interventions are using for the improvement of knee pain, quadriceps strengthening is one of the best techniques which is used for the strengthening of the quadriceps muscles [20]. The aim of this study was to evaluate the association of quadriceps femoris muscle weakness with symptomatic osteoarthritis of knee.

## METHODS

A cross sectional study was conducted on 196 people from general population of Lahore. Non-Probability Convenient Sampling was used. After the consent was taken, MMT

grades will be used for the quadriceps weakness. Standardized questionnaire criteria were used for the knee osteoarthritis. For this current study KOOS knee injury and osteoarthritis outcome was used for the conformation of osteoarthritis and manual muscles testing used for muscles weakness.

## RESULTS

The results from this study were, the mean age of patient is 53.9 and S.D was 13.60. Maximum age was 83 and minimum age is 23 years. There were 103(103%) females and 93(93%) females in a sample size (n) of 196 participants. Table 1 shows that 56(28.6%) of people were in grade 2 and 9(4.6%) of participants out of 196 sample size were in grade 5.

MMT	Frequency	Percent
Grade 0	17	8.7
Grade 1	39	19.9
Grade 2	56	28.6
Grade 3	46	23.5
Grade 4	29	14.8
Grade 5	9	4.6

**Table 1:** Descriptive statistics of manual muscle testing for quadriceps weakness

There was no association between quadriceps femoris muscle weakness and symptomatic knee osteoarthritis (p value is 0.097), because P value is greater than 0.097, Table 2.

Knee osteoarthritis	Weak	Strong	Total
Yes	44	43	87
No	68	41	109
Total	112	84	196

**Table 2:** Knee osteoarthritis with quadriceps femoris muscle weakness

Chi square = 2.756, P value = 0.097

This table explains that there was no association between quadriceps femoris muscle weakness and symptomatic knee osteoarthritis (p value is 0.097).

## DISCUSSION

Sheila C O'Reilly directed this review, and as per him, volunteers with knee inconvenience had lower quadriceps strength than those without torment. The p esteem was (p0.005) on the grounds that there was a connection between quadriceps muscle debilitating and indicative knee osteoarthritis. As per this review, quadriceps initiation was additionally lower, albeit this didn't totally make sense of why quadriceps strength was decreased. Quadriceps strength is firmly connected to local area based hindrance and knee distress. (14) There was no connection between quadriceps femoris muscle debilitating and suggestive knee osteoarthritis in this ongoing examination. The ongoing review's P esteem was (p> 0.005). Men with more vulnerable quadriceps strength

didn't have a higher rate of knee torment, as indicated by this review. The ladies, then again, had a higher possibility weakening knee distress. Subjects were shown how to support routine quadriceps exercises that they might do at home consistently. In ladies, quadriceps shortcoming was connected to a higher probability of knee distress demolishing over the long run, yet not in men. The joint appendage was considerably more vulnerable, had lower volitional muscle initiation, and had a more modest LMCSA (fit muscle cross sectional region) than the contralateral, as indicated by this review. Quadriceps strong shortcoming is brought about by both decreased volitional muscle actuation and LMCSA (slender muscle cross sectional region) in those with knee OA. LMCSA (slender muscle cross sectional region) was uncovered to be the most grounded indicator of solidarity in the contralateral, illness free appendage, though volitional muscle actuation was viewed as the critical determinant of solidarity in the osteoarthritis appendage. Volitional muscle actuation shortages might lessen the viability of volitional fortifying regimens in OA patients with quadriceps shortcoming [15]. Those without radiographic osteoarthritis had a 22 percent higher quadriceps strength than ladies with osteoarthritis (P 0.05). When contrasted with ladies with Noyes' grades by and large utilizing fat immersed proton thickness groupings 2 and 3-5, quadriceps strength was comparatively higher in ladies with Noyes' average tibial and femoral ligament scores of 0 (P 0.05). Ladies with early indications of osteoarthritis showed lower quadriceps strength than ladies who didn't have osteoarthritis [16]. According to the discoveries of this ongoing examination, which incorporated an example size of 196 individuals, there was no connection between quadriceps femoris muscle shortcoming and suggestive knee osteoarthritis. Extra exploration ought to be led for the affiliation. The current investigations' p esteem is (p>0.097).

## CONCLUSION

In this study, there was no direct interactive association between the quadriceps femoris muscles with osteoarthritis of knee among the general population of Lahore. According to this study muscles weakness was not present. Further studies and investigations are required to assess the association between quadriceps weakness and knee osteoarthritis.

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