

Disability among Patients with Patellofemoral Pain Syndrome and Instability among Patients with Anterior Knee Pain

Saima Saddique^{1*}, Umair Ahmad² and Hafiz Muhammad Asim³

¹Department of Physiotherapy, University of Health sciences, Lahore, Pakistan

²Department of Physiotherapy, University of Lahore, Pakistan

³Program Director and Coordinator TDPT, University of Health Sciences, Lahore, Pakistan

*Corresponding author: Saima Saddique, Department of Physiotherapy, University of Health sciences, Lahore, Pakistan, Tel: 0092000123123; E-mail: saimasaddique786@gmail.com

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Abstract

Anterior knee pain is commonly occurring problem and it is mostly connected with middle aged people, who are involving strenuous activities and in young individuals involving in sports activities due to patellar instability. The individual with over using and repeated trauma leads to developing anterior knee pain.

The purpose of my study is to determine the proportion of Patellofemoral pain with malalignment and without malalignment and instability among patients with anterior knee pain.

The rational of this study is to determine the proportion of PFPS. By doing this study I will help the clinicians for correct decision making.

A case series study was done in different settings of Lahore and Multan. Convenience sampling technique was done to collect data from individuals. A well-structured Kujala score questionnaire was used to collect data from different patients regarding age gender, limp, support, walking, stairs, squatting, Running, jumping, prolonged sitting with knee flexed, pain, swelling, abnormal painful kneecap movements, atrophy of thigh and flexion deficiency.

Anterior knee pain is frequently found in females with ratio of 62 percent. The Kujala score was used to determine the disability. If the score is high than there is low disability and vice versa. The range I have found in my study is 85 with mean 61, minimum 10, maximum 95 and standard deviation 1.79. Thekujala score range 85 shows that individual having anterior knee pain is not related to some malalignment problems it may be due to other non-malalignment reasons. The patients who have score are in the range of 85 having no difficulty in performing their daily activities.

This study have concluded that anterior knee pain is commonly problem now a days. But it's not mainly due to some malalignment and instability problems. It would be due to some other reasons which lead to developing anterior knee pain. This is mostly in individuals with age between 40 to 50 age groups.

Keywords: Patellofemoral pain syndrome; Malalignment; Instability; Anterior knee pain

Introduction

Anterior knee pain is very commonly occurring problem in all ages. Pain around the anterior knee and patella or in the knee cap is all included in patellofemoral pain syndrome. It also called as runner's knee or jumper's knee. It's commonly occurs in athletes and in non-athletes as well pain and stiffness results difficulty in performing daily activities, climbing stairs, kneeling down. Following leads to the development of patellofemoral pain syndrome. Knee cap alignment problem, vigorous athletic training is significant factor and activities that puts stress on knee also leads to the anterior knee pain.

Classification of patellofemoral pain syndrome

Classification of patellofemoral pain syndrome is challenging unit among clinician. By improving, perceptive of biomechanics of the joint and explaining of these terms to describe patellofemoral pathology an improvement has been made for kind of these disorder.

There are three broad categories skeletally adult patients of patellofemoral pain syndrome.

- Patellofemoral subluxation.
- Patellofemoral pain with malalignment without instability.
- Patellofemoral pain without malalignment [1].

Rational

The rational of this study is to determine the proportion of PFPS. By doing this study I will help the clinicians for correct decision making.

Objective

This study will determine the proportion of Patellofemoral pain with malalignment and without malalignment and instability among patients with anterior knee pain.

Literature review

A study has been done to find the reason of patellofemoral pain progression which concluded that patellar malalignment is associated with PFP progression [2].

A study was done in which 50 patients (22 males, 28 females) with isolated patellofemoral disease were taken to find the Prevalence and clinical significance of chondromalacia which showed that a small percentage of patients with anterior knee pain have chondromalacia isolated to the anterior margin of the lateral femoral condyle [3].

A study was done to find the expected prevalence in female athletes from the differential diagnosis of anterior knee pain in which 688 patient's evaluation were performed. Anterior knee pain is present in 183 patients which is 26.6% and screened over three years. Onsets of symptoms persist over middle aged school years to high school with peak prevalence [4].

A study was done to find the prevalence in 18-35 year old females with anterior knee pain in which 724 with age 18 to 35 participants were participated. The prevalence rate which is estimated through this study is 12 to 13% and it is much less than commonly cited value 25% [5].

A systemic review was done to find out the risk factors of patellofemoral pain syndrome week extensor strength appear to be the risk factor based on meta-analysis. Other risk factors like body mass index have less evidence [6].

A study was done to find epidemiology of patellofemoral disorder in adulthood in which twelve PFP disorder diagnosed by general practioner. Which shows no specific diagnosis of anterior knee pain with (APCPR, 37.2/10 000). In order most prevalent is bursitis with (7.8/10000), patellofemoral osteoarthritis with (2.3/10 000) Age- and gender-stratified annual person consulting prevalence rates (APCPRs) for the remaining is between 0 and 1.6/10 000 [7].

A study was done to find the incidence and potential pathomechanics of patellofemoral pain in female athletes which shows that the increased knee abduction landing mechanics in the new PFP group indicate that frontal plane loads contribute to increased incidence of PFP [8].

A study was done to evaluate the biomechanical malalignment and the role of sports activity. This study doesn't find the any intrinsic factor although changes in Q angle may predispose to increased PFP. This study also proves that overload also significant phenomena to PFP [9].

A study was done on a group of adolescents aged 12-20 years in Hungary to evaluate the prevalence of patellofemoral pain syndrome and gain information on the relationship between the biomechanics anomalies of lower extremity and PFPS. 586 students were randomly selected. Different physical examinations, measurements stability tests and foot scan analysis were performed. In conclusion there was no difference in prevalence of PFPS in males and females. Changes in Q angle were found linked to increased prevalence [9].

PFPS is a multifactorial in origin. There is no single gold standard maneuver for this disorder. An atypical Q angle, ligamentous laxity, laxity of lateral patellar retinaculum, patellar tilt, decreased elasticity of quadriceps were most often correlated with PFPs [10].

A study was done on 1785 patients examined with knee problems, three hundred and seventy patients were diagnosed with PFPS. A systematic approach was used for examination and treatments. A conservative program consisting of 4 step progression was used. The results showed recovery was satisfactory [10].

A prospective study was done on 60 young patients with PFPS. Pain occurred in lateral retinaculum frequently and sometimes in association with medial patellar discomfort. The results showed that lateral tracking that cause overuse of retinaculum that leads to PFPS [11].

A systematic research was done. These studies include 20 patients with patellofemoral pain syndrome that examine one factor related with PFPS were included. 47 studies included 523 variables were also included. Larger Q angle, decreased hip abduction strength, peak torque and foot height index were most commonly variables found associated with PFPS [12].

This study describes the biomechanical overview of altered lower extremity mechanics influencing patellofemoral joint. This study revealed that PFPS is the result of abnormal tracking of the patella [13].

A systematic review was done to outline the risk factors of PFPS. Prospective studies and meta-analysis were included in review. In conclusion weak knee extensors strength was found to be risk factor of PFPS based on meta-analysis [6].

A study was done to determine the association of gender and incidence of patellofemoral pain 1.525 thousand Participants from naval academy United States were included in the study. Regression was applied to determine the association between gender and incidence of PFPS. In conclusion incidence rate of PFPS was higher in females than males [14].

A study was done to find out the lower extremities rotational deformities and patellofemoral alignment parameters leads to the anterior knee pain in which three groups were taken patients with unilateral symptomatic knees (n=35), asymptomatic contralateral knees in the same patients and a control group (n=40). Which concluded that morphology of unilateral symptomatic knee is similar with asymptomatic contralateral knee but different from healthy one and results shown that these deformities are not the reason of the anterior knee pain could be the risk factor [15].

A study was done by aksahin et al. who introduces new concept that sagittal malalignment of patellofemoral joint leads to the increased loading values in 30 to 60 degree knee flexion [16].

There is link between the patellofemoral pain syndrome and the reduced hamstring lengthening. The individual with reduced hamstring length leads to the patellofemoral joint stress due to increased patellofemoral joint reaction force and decreased patellofemoral joint contact area [17].

Many of the studies have be done which conclude that the delay in the activation of vastous medialis oblique as compared to the vastous lateralis, vastous medialis weakness and eventually faulty patellar tracking is the main developing cause of the patellofemoral pain [18,19].

Material and Methods

Data were collected from different physiotherapy ward of Lahore and Multan. Data were collected in Four months after the approval of synopsis. Sample size was calculated by the following formula

$$n_0 = \frac{Z^2 pq}{e^2}$$

- Where Confidence Interval=95%
 - For 95% Confidence Interval Z is 1.96
 - p(proportion)=25% [20,21]
 - Lankhorst, Bierma-Zeinstra et al.
 - q=1-p
 - e (proportion difference)=10%
- Sample size is 100 calculated from this formula

Inclusion criteria

All male and female patients who came with anterior knee pain with clinical symptoms of pain during ascending and descending stairs, pain on sitting squatting, crepitus, giving away and pseudo locking with informed consent.

Exclusion criteria

Patient with any neurological history, having intra articular injections at knee joint, pregnancy, simultaneous participation in any other clinical trial, musculoskeletal pathology, And surgical history of limb and missing of the written informed consent. Study design was Case series study. Convenient sampling technique was used.

A case series study was conducted in hospitals of Multan and Lahore. According to sampling technique, conveniently available patients were approached in different hospitals of Lahore and Multan. Total 100 questionnaires were taken. In both cities I personally collected data regarding anterior knee pain. The aim and nature of the study being conducted were briefly described to them. The written informed consent was signed by the willing participants. After taking consent form then data was taken next to finding their suitability as per inclusion and exclusion criteria that were included in my study.

Kujala scale is also known as the anterior knee pain scale. It has 13 questions in which six activities associated specifically with anterior knee pain syndrome which is running, jumping walking, climbing stairs, squatting and prolonged setting with knee bent which correlate with knee pain without any malalignment. Symptoms which are limp, swelling, inability to bear weight atrophy of the muscles, and limitations of knee flexion which correlate with pain with some deformity or malalignment. The maximum score is 100 and lower score shows more disability and greater pain. The pain is assessed by the visual analog scale.

The data collected by the kujala score were entered into SPSS and then analyzed appropriately. Qualitative data were analyzed using frequency and pie charts/bar charts. Quantitative data were presented in form mean \pm S.D.

Results

In this study we have included 100 patients and there were more females who participated in this study with the ratio of 62% females and 38% males. Out of 100 patients 15 percent's were between 20 and

30 year of age, 22% were between 30-40 years of age, 27% were between 40-50 years of age, 20% were between 50-60 years of age and 15% were above 60 years. The patients with age of 50 to 60 years have more malalignment problem and patients with age of 20 to 30 years experiencing knee pain having malalignment problem with patellar instability. The patients with age between 30 to 40 and 40 to 50 years having knee pain mostly without any serious malalignment causes it's due to doing some sort of exertions activities and some other factors.

There were more females who were suffering from anterior knee pain and ratio is 62% females and 38% males. 64 percent patients have no limp with anterior knee pain 29 percent have slight or periodic pain and only 7 percent have constant limp. The patients who have limped have malalignment problem in knee joint. 54 percent patients have full support without pain, 39 percent painful and only 8 percent having their weight bearing impossible. 9% walk unlimited 19 percent with periodical pain and 33 percent patients could walk more than 2 km and 41 percent could walk 1-2 km with pain and only 6 percent were having serious malalignment problem and are unable to walk. 9% have no difficulty in stairs climbing, 14%having slight pain, 68% having pain both in ascending and descending and 9% were unable to climb stairs. 8 percent having no difficulty in squatting, 47% having painful repeated squatting, 21% having painful each time. In 10% only possible with partial weight bearing and 14 are unable to squat due to malalignment problem. 12% having no difficulty in running and they are mostly in young age groups, 17% having pain after more than 2km, 12% slight pain from start and 27% having sever pain and 32% were unable to do. 8% having no difficulty, 22% having slight difficulty, 25% having constant pain and 45% were unable to do. 16% having no difficulty, 28% having pain after exercise, 21% having constant pain, 28% having pain which forces to extend the knee and 6% were unable to do. 6% having no pain, 53% having slight and occasional, in 9% pain interfere with sleep, 29% having occasionally severe and 3% were having constant and severe pain. 29% having no swelling, 38% having after severe exertion, 16% having pain after daily activities, 11% having after every evening and only 6% having constant swelling. 61% having no abnormal painful kneecap movement, 11% having occasionally in sports activities, 17% having occasionally in daily activities, 9% having one documented dislocation and only 2% were having more than one. 73% having no atrophy of thigh, 21% having slight and only 7% having severe. 24% having no flexion deficiency, 59% having slight and 17% having severe.

Disability among the participants

Mean	61.3131
Std. Error of Mean	1.80677
Std. Deviation	1.797711
Range	85
Minimum	10
Maximum	95

Table 1: Participants values.

This Table 1 shows that mean score is 61.13/100 which mean patient who were having anterior knee pain having pain without malalignment problem.

Discussion

A case series study was done to determine the patellofemoral pain with malalignment without malalignment, instability in anterior knee pain among different hospitals in Lahore and Multan. We assumed that the anterior knee pain were mostly due to without malalignment problem rather than malalignment problems. We noted that patellofemoral pain was not due to malalignment problem in anterior knee pain. The kujala score I have found through my study is in the range of 85 which concluded that patellofemoral pain was due to some other causes not due to malalignment problem was like another study by (Erkocak, Altan et al.) which concluded that rotational deformities and alignment problems were not cause of anterior knee pain but would lead to anterior knee pain [22]. This study also showed that pain due to compression in patellofemoral joint not due to malalignment or trauma. The study by [16] in which patella sagittal plane malpositioning leads to alteration of patellofemoral joint biomechanics was opposite to my findings and study by [23] showed that patella femoral pain was due to slight malalignment.

In our study there were more females than males who were suffering from anterior knee pain with 62 percent and 38 percent males which were similar to the study conducted by [14] another study by [24] where females were more prone to develop anterior knee pain.

In our study we have found that individuals have slight flexion deficiency during anterior knee pain with kujala score mean 3 is similar like study done by valkering who concluded that Knee flexion is restricted due to anterior knee pain [25].

In our study which we have conclude that individuals feels difficulty in stair climbing with mean of kujala knee score is 5.4 is similar to the study done by de oliveira which concluded that individuals feels difficulty during stairs climbing and they flex their knee as strategy to reduce knee pain intensity [26].

In our study we have concluded that individuals with who have difficulty to jump with mean of kujala knee score 2 which were similar to study done by park which concluded that individual feels difficulty in jumping due to anterior knee pain [27].

In our study we have concluded that the pain which interfere with sleep is only in 9% individuals which were opposite to the study done by snoj et al. [28] that pain interfere with sleep.

In our study we concluded that individual with patellar subluxation is less only 9% were suffering anterior knee pain due to patellar subluxity and these individuals were mostly young and study done by which concluded that patellar instability leads to less flexion, squatting and stairs climbing difficulty [29].

In our study we have concluded that individuals with Atrophy of thigh with kujala knee score is less with mean of 4 and 73 percent individuals did not have Atrophy which is opposite to the study done by which concluded that quadriceps Atrophy involved in individuals with patellofemoral pain syndrome [30].

In our study we have concluded that the individual with patellofemoral pain without malalignment is in greater frequency which showed by the kujala knee score and its range of 85, if score were more it showed individual with lesser biomechanical issues. This pain is due to doing overuse and aging process this was similar to another study which is done by [31] which concluded anterior knee pain is more in active individuals with heavy weight and it's also related to the

age, sex, height, type of service and have more incidence in active population.

In our study the age group who has anterior knee pain is in the range of 40-50 is consistent to the study by [22] which determine that individuals suffering from anterior knee pain are above 40.

Our study was the first kind of study which determined about the patellofemoral pain with malalignment, without malalignment and instability in anterior knee pain. Other studies which have done before determined about prevalence and their causes not about the occurrence rate with the malalignment without malalignment and instability in anterior knee pain.

Kujala knee score were used to found the range in which we determined that score was high. So, it showed that there were some non-malalignment causes.

Conclusion

This study has concluded that patellofemoral pain is due to some non-malalignment causes. The kujala score range which we have found through my study is 85 which proved good score. So, it showed that patellofemoral alignment and instability were not the leading cause of anterior knee pain. Female gender, age and the active individuals were strongly associated with anterior knee pain. And knee pain results in difficulty in performing different daily tasks. Malalignment problems were not seen to be strongly associated with anterior knee pain.

Limitations

The sampling technique which we used was convenient sampling technique for collecting data which limits the generalization. The patients which we have collected were mostly middle aged groups with anterior knee pain who visited hospital for treatment. Time duration for collecting this study was too limited so less number of patients was subjected. Although with these limitations this study will give the ground basis for further studies to done in anterior knee pain. So individuals with the overuse are more prone to developing anterior knee pain.

Recommendations

It is recommended for further studies should be carried out to find the significant causes that leads to anterior knee pain, so the individuals are much aware about the leading causes of anterior knee pain. So they find proper guideline and preventive measure to avoid anterior knee pain.

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