



RETRO PATELLAR PAIN AFTER TOTAL KNEE ARTHROPLASTY

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ABSTRACT

Occurrence of retropatellar pain or anterior knee pain has compromised the results of total knee arthroplasty (TKA). Despite the modification of prosthetic implants and patellar resurfacing, retropatellar pain is still a problem to be addressed. The objective of this study was to assess the frequency of retropatellar pain among the patients who underwent TKA, to determine the severity of their symptoms and the extent of their functional limitations. This case series study was conducted on 51 patients and duration of study was 6 months. The determination of frequency of retropatellar pain was done by patient reported measure: anterior knee pain questionnaire or Kujala score. Informed consent was taken from each patient and ethical considerations were addressed. This study diagnosed retropatellar pain among 7.8% of patients who had TKA at least 6 weeks prior to the study. There was no difference in the frequency of retropatellar pain in terms of gender. In this study it is concluded that still a significant proportion of patients experience retropatellar pain after TKA. Most of the patients had severe limitations in activities such as squatting, running and jumping respectively.

Key words: Retropatellar pain, total knee arthroplasty

INTRODUCTION:

Retropatellar pain or anterior knee pain is a painful condition appearing at front and central part of the knee after total knee arthroplasty.

Though the success of the total knee arthroplasty (TKA) from the beginning improved so far, retropatellar pain is still a challenge to be resolved. Total knee arthroplasty has been shown to be effective and successful procedure for treating patients with osteoarthritis (Breugem, 2014). But still a significant proportion of the patients experience retropatellar pain after surgery. Patients affected from retropatellar pain experience difficulty in standing up from a chair and climbing stairs (Breugem, 2014).

Several theories have been presented to explain the occurrence and cause of retropatellar pain. It is hypothesized that retropatellar pain is most frequently appearing due to the patellar compartment (Insall et al., 1976). Reports on the results of early prosthetic designs show a 40% to 58% rate of patellofemoral pain or retropatellar pain (Breugem and Haverkamp, 2014). They treated this residual pain initially by patellectomy and realignment of the soft tissues but then it was proposed that retropatellar pain occur due to patellar compartment and patellectomy is not a treatment for this complication (Breugem, 2014). The continuing high incidence of postoperative retropatellar pain led to the changes in the shape of the patellofemoral component of the TKA, such as modifying the femoral trochlea and adding a patella component (Motsis et al., 2009).

When looking back towards initial years of knee arthroplasty, only the patients who were diagnosed with severe arthritis were surgically operated and they show satisfaction if they can sleep and walk again for a few miles even if they still feel pain. The arthroplasty was considered better for the patients than living their lives with severe pain and significant functional limitations (Breugem, 2014). By time, through better surgical knowledge and modification of the components, TKA achieved greater success rates. The number of TKAs is believed to increase everyday due to significant pain relief and stability attained with survival rates of 90-98% after 10 to 18 years (Breugem, 2014).

As described already, retropatellar pain is still a significant problem to be addressed. Many studies have focused on the resurfacing of the patella, some demonstrating no difference (Bourne and Burnett, 2004). Some showing better results after resurfacing (Breugem and Haverkamp, 2014). Although numerous designs have been shown to reduce the incidence of retropatellar pain after TKA but there is still a proportion of patients experiencing pain after TKA. Approximately 5 to 10 % (ranging from 0.4% to 49%) of the patients undergone TKA experience anterior knee pain after few weeks (Motsis et al., 2009).

The complications of postoperative retropatellar pain are not only the pain, but also the risk of a re-surgery and the extra health care expenses (for example: hospital stay, operation costs and costs of implants) (Breugem, 2014). It is known that simply resurfacing the patella is not a universal solution for anterior knee pain, although it may solve the problem in selected cases (Breugem, 2014).

Other factors that contribute to occurrence of retropatellar pain are malrotation of the components, Q-angle deviation, patellar instability, soft tissue impingement, tendonitis, quadriceps insufficiency and dynamic valgus/varus instability (Breugem, 2014).

The rationale of this study is to describe the frequency of patients experiencing anterior knee pain after total knee arthroplasty in Ghurki Trust Teaching Hospital and will enable the future therapist to provide information and intervention to the patients about the pain management and to prevent excessive stresses to both knees to maximize their functional capabilities.

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LITERATURE REVIEW:

Retropatellar pain is still present in significant proportion of patients undergone TKA. There are a lot of factors that contribute to occurrence of retropatellar pain but patellofemoral component problems are the most common.

Metsna conducted a retrospective study on prevalence of retropatellar pain after TKA in 1778 knees and conclude the presence of retropatellar pain in 20.2% of patients. He also described the sources of retropatellar pain. He concluded that 33.6% of patients had pain from a source other than patellofemoral joint and 46.2% of patients didn't have any pain. He also concluded that patients without replaced patella have a high probability to experience retropatellar pain (Metsna et al., 2014).

Shervin conducted a study to describe the prevalence of retropatellar pain and the factors responsible for it to improve the functions and patients satisfaction. He assessed that incidence rate of retropatellar pain is 8% and factors that cause the pain include femoral component rotation, patellofemoral overstuffing, alteration of biomechanics due to prosthetic implantation and soft tissue impingement (Shervin et al., 2015).

D.G. Campbell along with his colleagues conducted a study in 2006 on two groups with each having 50 patients undergone TKA with and without patellar resurfacing. There was no significant difference found among patients of two groups both of them had same deterioration of scores with time, and no further patellofemoral complications were seen in either group (Campbell et al., 2006).

Helmy conducted a study whether to resurfacing the patella is effective in decreasing the proportion of patients having retropatellar pain after TKA. The probability

of occurrence of retropatellar pain after TKA with resurfaced patella reduced to 12% compared to the probability of 26% for patients without resurfaced patella. Primary resurfacing the patella was considered preferable than not resurfacing it (Helmy et al., 2008).

Breugem conducted a research whether mobile bearing TKA or fixed bearing TKA results in decreased ratio of retropatellar pain. 103 patients were randomly allocated into two groups. With 1 year follow up, 18.9% patients experienced retropatellar pain after fixed bearing TKA than 4.9% patients experienced retropatellar pain after mobile bearing TKA. Mobile bearing TKA thus proved beneficial than the fixed bearing TKA (Breugem et al., 2008).

Chen conducted meta-analysis of randomized controlled trials. 14 trials were included with 1725 knees found eligible. He concluded that primarily resurfacing the patella reduces the risk of reoperation. There was no difference between the two groups in terms of anterior knee pain, knee pain score, Knee Society score and knee function score. Patellar resurfacing patients may make a difference in long term but the benefits are limited (Chen et al., 2013).

Patel and Raut carried out a prospective cohort study to determine whether to resurface the patella or not specifically looking up to retropatellar pain. 60 patients were included in the study with bilateral knee arthroplasty with patellar resurfacing only on one knee. The mean duration of follow up was 4.5 years. There were significantly better scores found on resurfaced side than non-resurfaced side. Few patients who were experiencing constant and severe retropatellar pain on non-resurfaced patella side

underwent resurfacing surgery. Primary resurfacing the patella proved to reduce the risk of occurrence of retropatellar pain after TKA (Patel and Raut, 2011).

Shervin conducted a study that describes surgical and prosthetic techniques that influence occurrence of retropatellar pain. He concluded that different surgical components including tibial and femoral components rotation and size alter the natural biomechanics and effect Q-angle that can lead to higher probability of retropatellar pain to occur (Shervin et al., 2015).

Lei conducted a review study on effectiveness of resurfacing the patella with TKA. Randomized controlled trials and four meta-analysis were included in the study. He concluded that the patients with patella resurfaced have relatively low risk of experiencing retropatellar pain than the patients with non-resurfaced patella. The incidence of retropatellar pain among 1421 knees after TKA was 12.9% in resurfaced group and 24.1% in non-resurfaced group. The present evidence shows that resurfacing the patella has some lead over non-resurfacing the patella regarding occurrence of retropatellar pain (Li et al., 2011).

Swan conducted a review study to describe the effectiveness of resurfacing the patella and concluded that the existing evidence shows that there is increased risk of experiencing retropatellar pain in patients with non-resurfaced patella than with resurfaced patella and there is also decreased incidence of re-operation in patients with resurfaced patella (Swan et al., 2010).

Garneti conducted a retrospective study to compare the results of resurfacing vs. non- resurfacing the patella. Mean follow-up was 33 months in non-resurfaced group and 18 months in resurfaced group. There was 25% incidence rate of retropatellar pain in

non-resurfaced group than 7% in resurfaced group and the need of re-surgery was 10% in non-resurfaced group than zero in resurfaced group. This study suggested that resurfacing the patella results in low post-operative retropatellar pain risk than non-resurfacing the patella (Garneti et al., 2008).

OBJECTIVE:

To assess the frequency of retropatellar pain in moderate protection phase after
Total Knee Arthroplasty

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MATERIALS AND METHODS:

Study Design:

Case series

Duration of study:

6 months after submission of synopsis.

Place of study:

Ghurki trust and teaching hospital

Study population:

The study population belongs to the group of patients who underwent the procedure of total knee arthroplasty at least 6 weeks postoperatively.

Sample size:

Sample size was calculated by using World Health Organization (WHO) software under this formula with 5% prevalence and 95% confidence interval. The sample size was 51

$$\frac{Z^2 1 - \alpha \kappa P(1 - P)}{d^2}$$

Sampling technique:

Non-probability convenient sampling.

Sample selection criteria:

Inclusion criteria:

All the patients who have undergone total knee replacement surgery at least 6 weeks prior to study.

Exclusion criteria:

1. Patients with TKA not older than 6 weeks
2. Patients with some chronic medical illness.
3. Patients who have metastatic disease.
4. Patients with some serious infectious disease.

Data collection:

A sample of 51 patients was collected from out-patient orthopedic department Ghurki trust and teaching hospital from June-November 2016. Everyday 1-2 follow-up patients were evaluated. Patients who underwent TKA and were in moderate protection phase were included. Patients who had any serious infection or complication were excluded. Informed consent was taken from all the patients prior to study. The Anterior knee pain questionnaire (Breugem, 2014) was filled by each patient that has undergone TKA for the evaluation of retropatellar pain under the supervision of orthopedic surgeon and physical therapist. Patients filled their forms and those who were unable due to language unfamiliarity their forms were filled by their family member. All the information regarding patients had kept confidential.

Data analysis:

Data collected was analyzed with statistical package for social sciences (SPSS) version 21. The study variables were taken from each patient. Results were presented in a form of descriptive statistics (tables, graphs and percentages).

Ethical consideration:

Permission from ethical review committee of Lahore college of physiotherapy LMDC was obtained in order to conduct the study. Copy of the synopsis with the signature of supervisor was submitted to evaluation board of ethical review committee of Ghurki trust and teaching hospital. Physical risk and harm was minimized. Cultural and religious considerations were duly taken at the time of extracting data.

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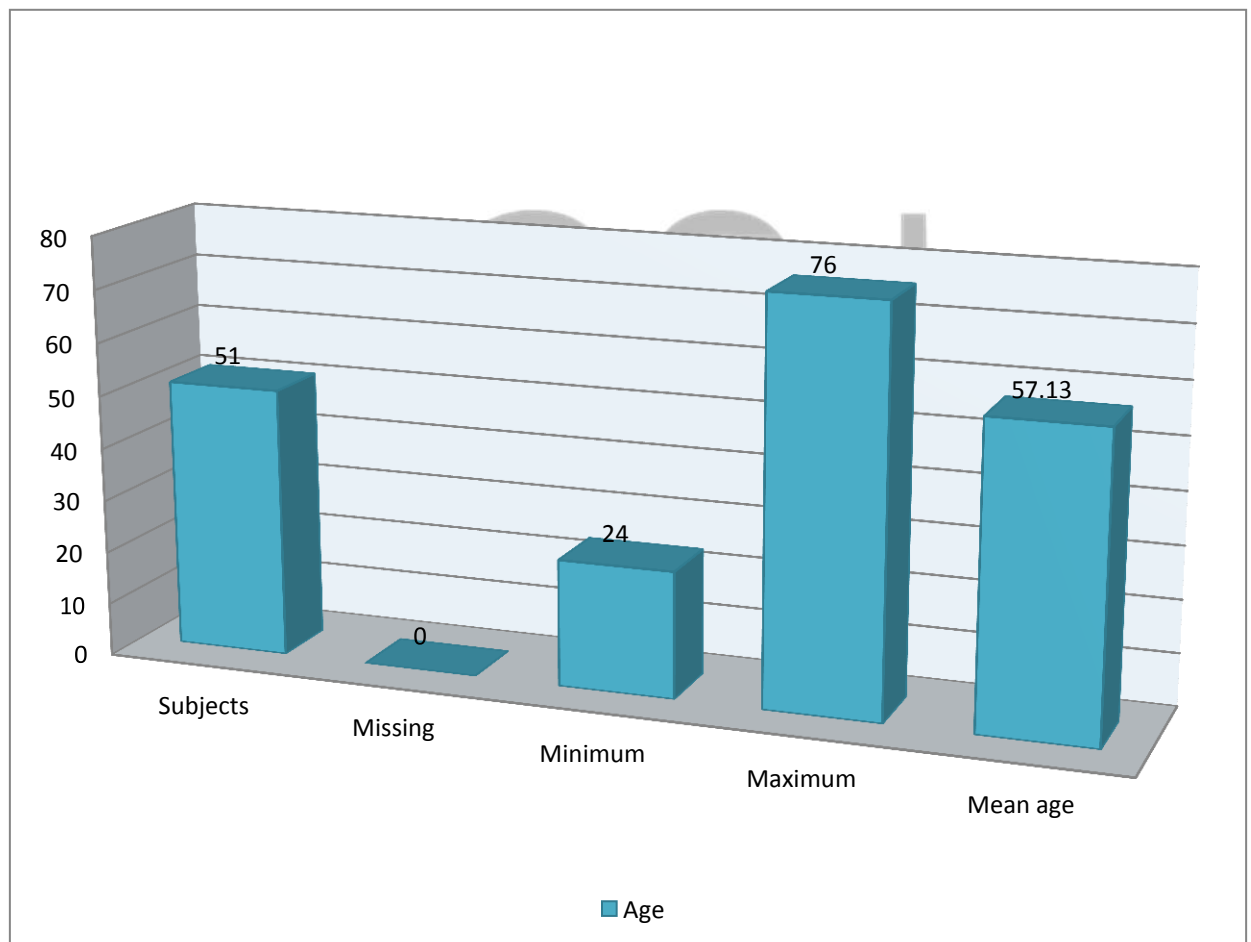
RESULTS

Sample of 51 patients who fulfilled the inclusion and exclusion criteria.

Age group

Figure 1 shows that the mean age of patients participated in the study was 57 (range: 24-76). Among them 45 patients were above the age of 50 and only 6 patients had age less than 50.

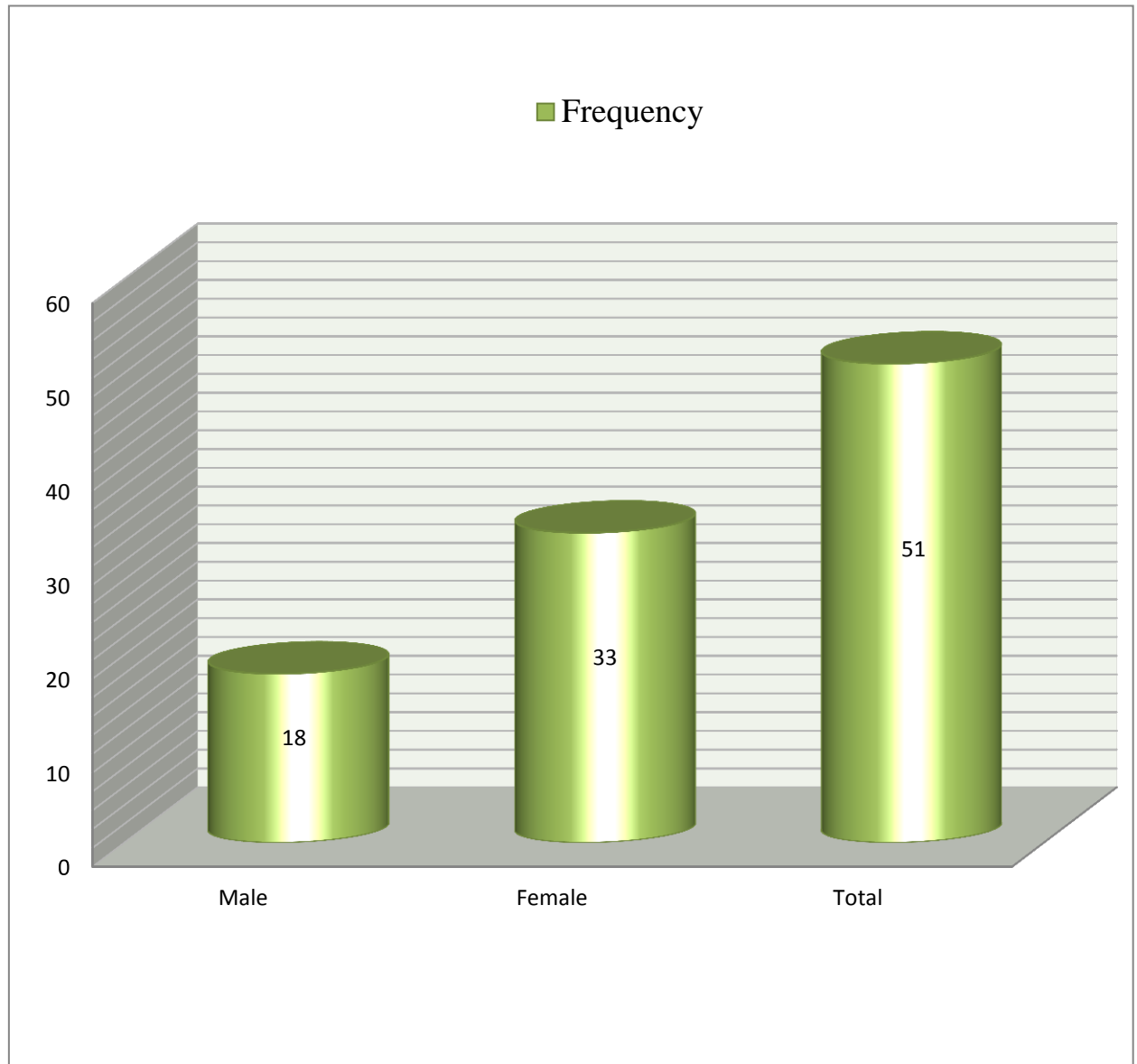
Figure 1



Gender

Figure 2 shows that among 51 patients, there were 18 males and 33 females.

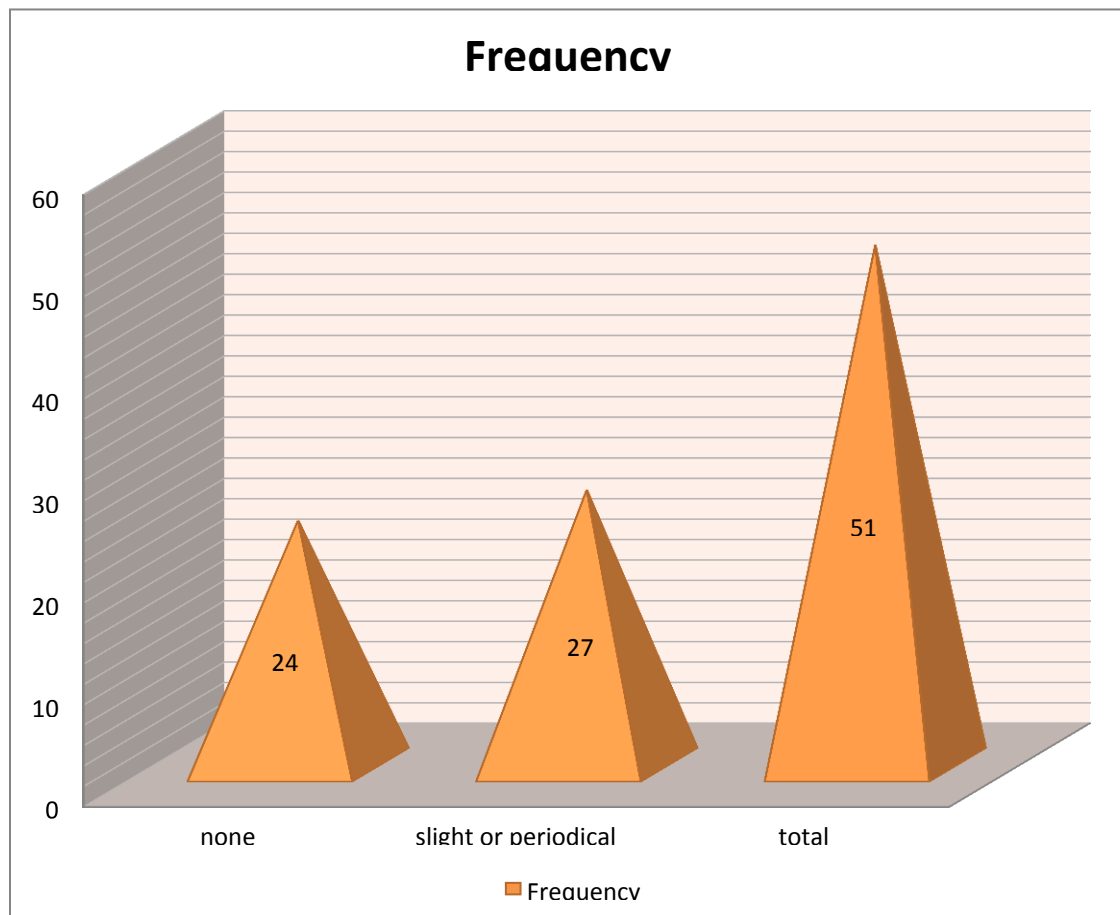
Figure 2



Limping

Figure 3 shows that 24 (47.1%) patients experience no limping and 27 (52.9%) patients experience slight or periodical limping while walking after total knee arthroplasty.

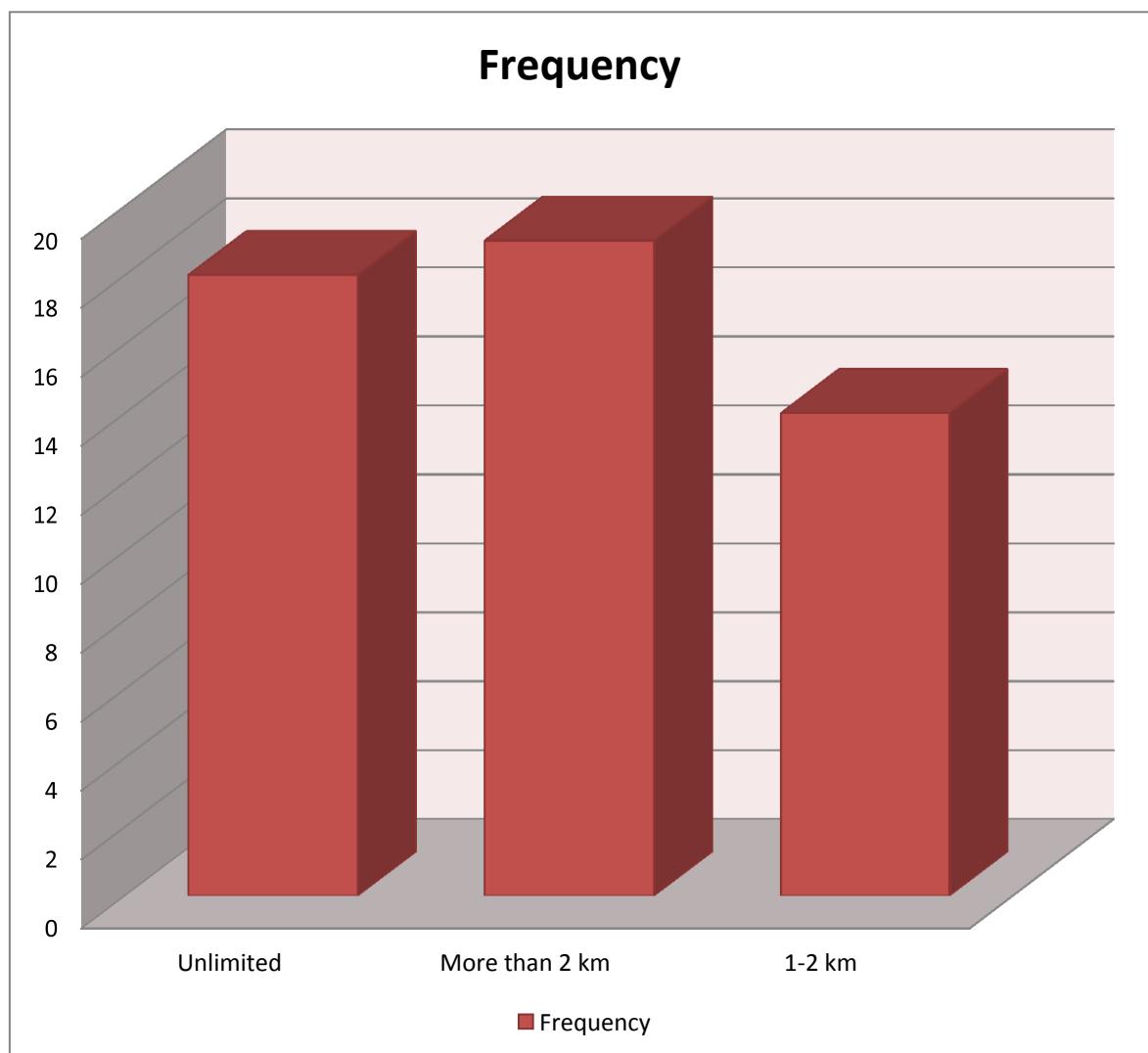
Figure 3



Walking

Figure 4 shows that among 51 patients 18 (35.3%) patients could do unlimited walk, 19 (37.3%) patients were able to walk for more than 2 kilometers (km) and 14 (27.5%) patients could walk for only 1-2 km and were unable to proceed due to pain and weakness.

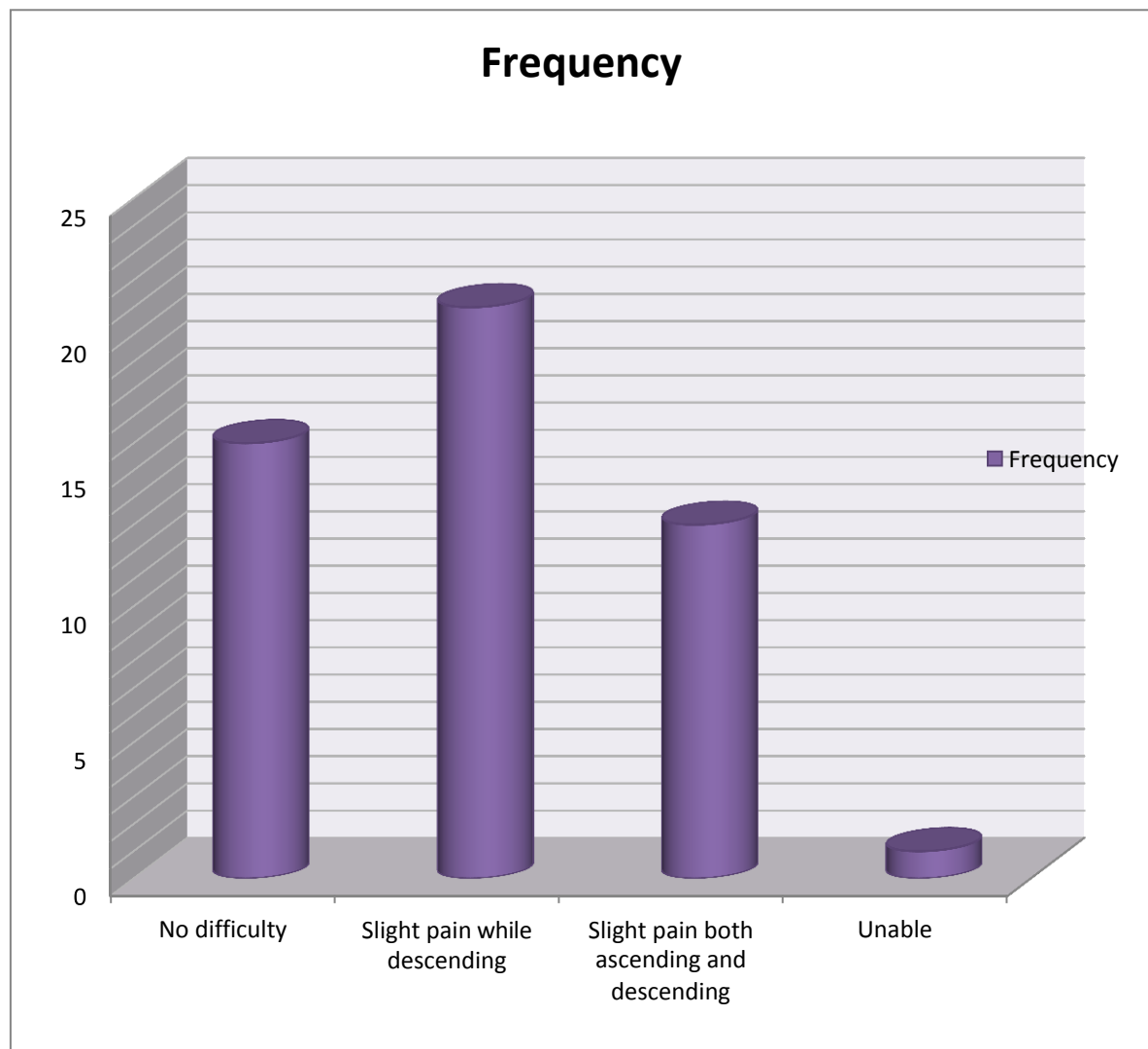
Figure 4



Stair climbing

Figure 5 shows that among 51, 16 (31.4%) patients have no difficulty in climbing stairs, 21 (41.2%) patients have slight difficulty and pain while going downstairs, 13 (25.5%) patients experience pain in both descending and ascending stairs and only 1 (2%) patient is completely unable to climb the stairs.

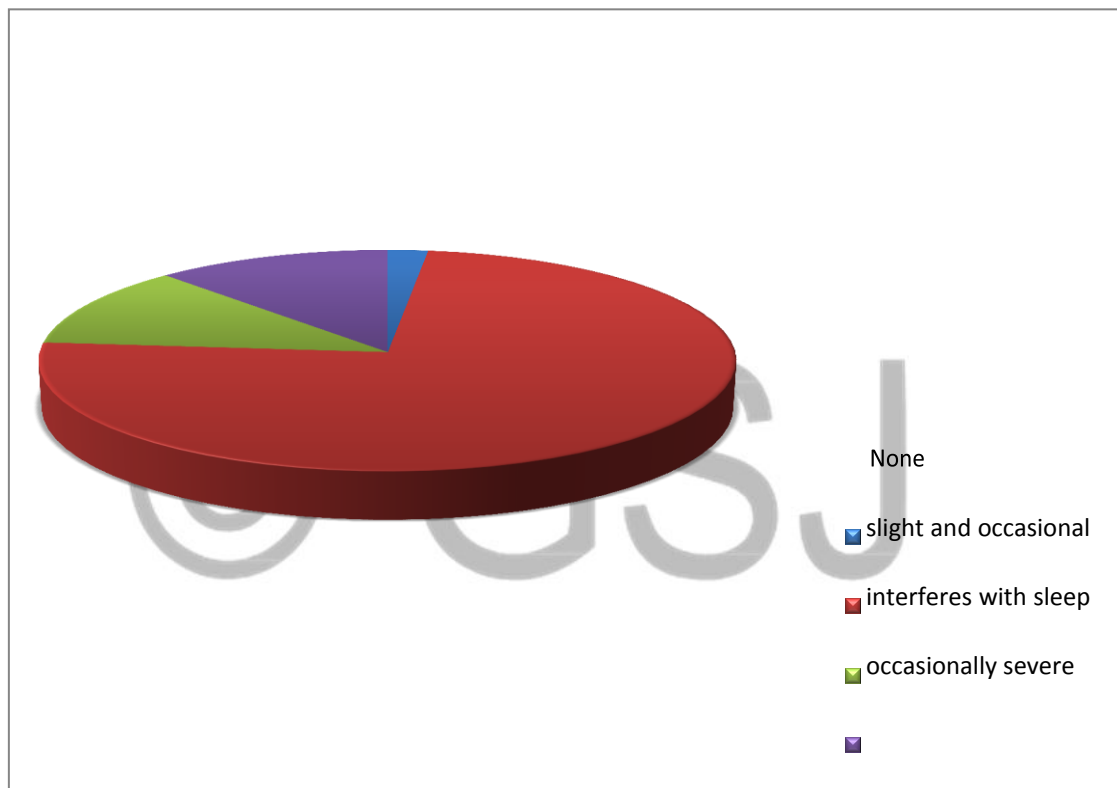
Figure 5



Assessment of Pain

Figure 6 shows that only 1 (2%) patient had no pain, 38 (74.5%) patients had mild and occasional pain, 6 (11.8%) patients had pain that disturbs their sleep and 6 (11.8%) patients had occasionally severe pain.

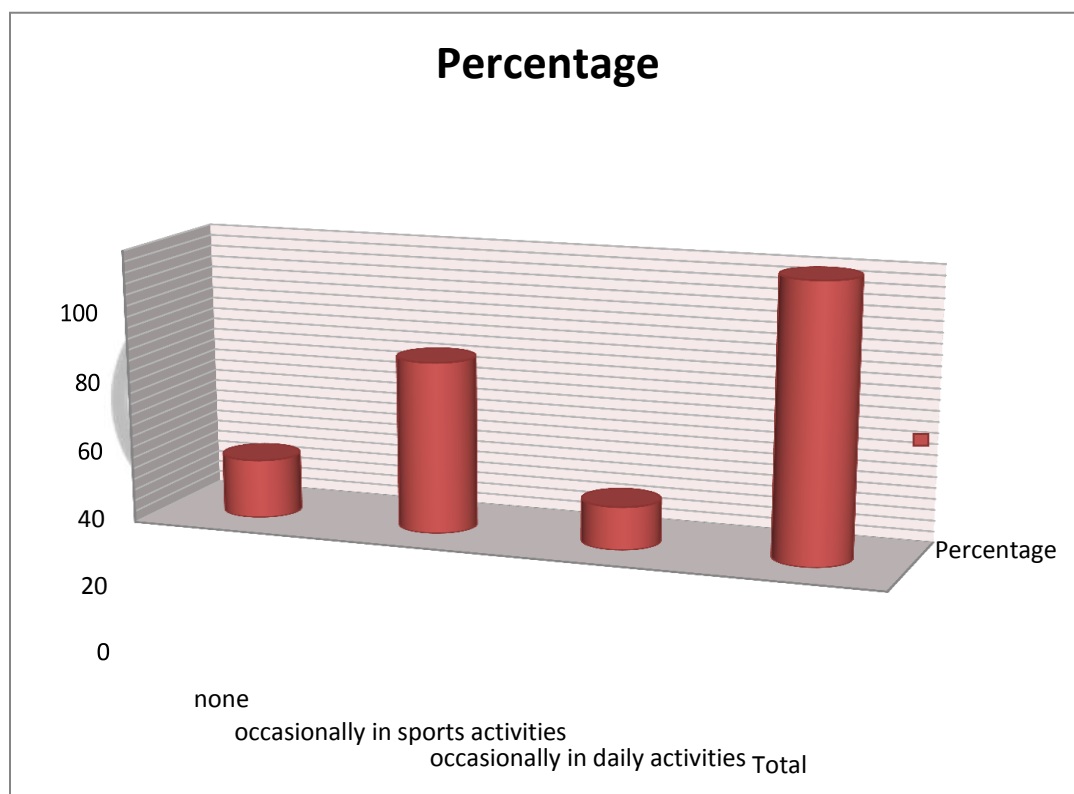
Figure 6



Abnormal knee-cap movements

Figure 7 shows that 11 (21.6%) patients felt no abnormal patellar movements, 32 (62.7%) patients had abnormal patellar movements sometimes during sports activities, 8 (15.7%) experienced abnormal knee-cap movements in doing daily activities.

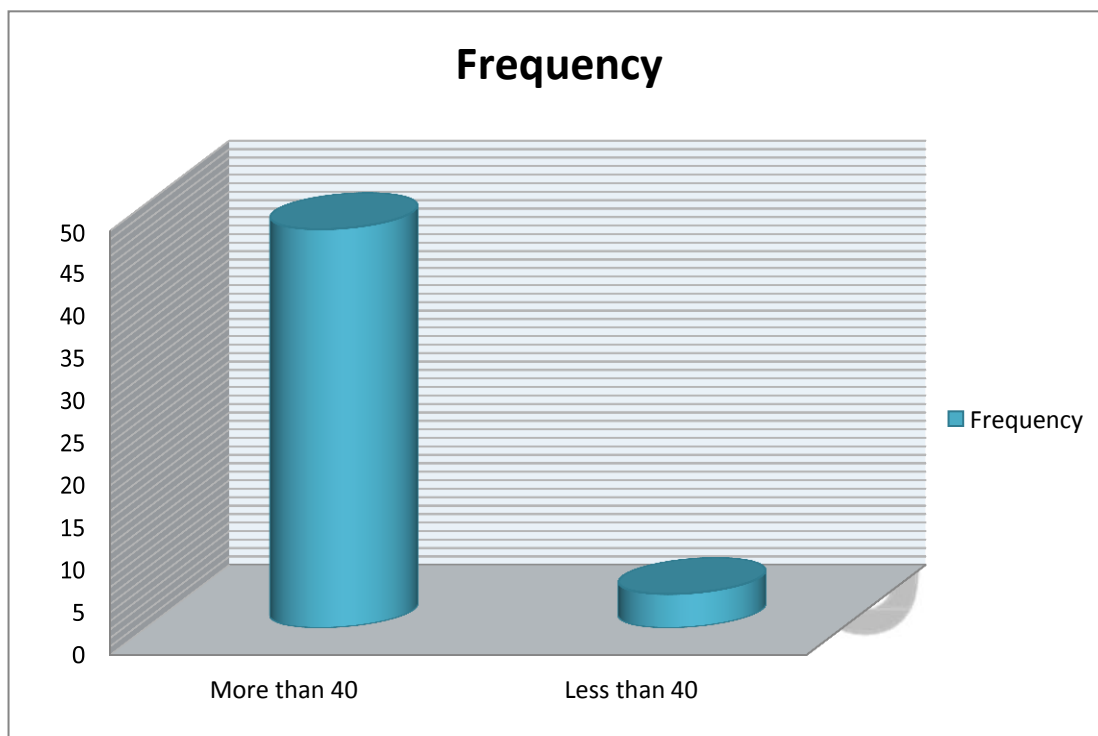
Figure 7



Determination of Kujala score

Figure 8 shows that among 51, 47 (92.2%) patients had no retropatellar pain according to anterior knee pain questionnaire and 4 (7.8%) patients were experiencing retropatellar pain.

Figure 8



Descriptive statistics

Table 1

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Anterior knee pain score	51	27.00	92.00	72.9412	16.87651

Squatting

Table 2 shows that 2 (3.9%) patients had no difficulty in squatting, 35 (68.6%) patients experienced pain while rehearsing squats, 8 (15.7%) patients felt pain each time they squat, 5 (9.8%) patients were able to perform squats with partial weight bearing and only 1 (2%) patient among 51 was unable to perform squatting.

Table 2

Squatting

	Frequency	Percent
No difficulty	2	3.9
Repeated squatting painful	35	68.6
Painful each time	8	15.7
Possible with partial weight bearing	5	9.8
Unable	1	2.0
Total	51	100.0

Assessment of Symptoms and activities

Table 3

Category	Percentages	
Can you run?	Pain after more than 2 km	58.8%
	Slight pain from start	29.4%
	Severe pain	7.8%
	Unable	3.9%
Can you jump?	No difficulty	3.9%
	Slight difficulty	64.7%
	Constant pain	15.7%
	Unable	15.7%
Can you sit for prolonged time with knees flexed?	No difficulty	3.9%
	Pain after exercise	74.5%
	Constant pain	7.8%
	Pain forces to extend knee temporarily	13.7%
Do you ever feel swelling around your knee?	None	43.1%
	After severe exertion	45.1%
	After daily activities	11.8%
Do you find atrophy of thigh on operated side?	None	58.8%
	Slight	37.3%
	Severe	3.9%
Do you feel any deficiency in range of knee flexion?	None	62.7%
	Slight	29.4%
	Severe	7.8%

DISCUSSION/FINDINGS

In this study, I evaluated the patients for the presence of retropatellar pain through previously defined diagnostic criteria and used Kujala score or Anterior knee pain questionnaire which was already used in previous studies (Metsna et al., 2014).

There was no difference found in the occurrence of retropatellar pain with respect to male and female gender as previously described in literature (Metsna et al., 2014).

Frequency of retropatellar pain assessed in this study was 7.8% and was in accordance with the previous study that gave 5-10% prevalence rate respectively (Breugem, 2014). Frequency of retropatellar pain after TKA assessed in this study is also supported by Lorenzo Sensi who also reported 8% prevalence rate of retropatellar pain after TKA (Sensi et al., 2011).

All the patients who were diagnosed to have retropatellar pain had severe limitation in stair climbing activity both in descending and ascending stairs and was also assessed in existing literature (Metsna et al., 2014).

Almost 2/3 patients included in this study experienced some pain that was originating from different sources among which one of them was retropatellar pain and was evaluated by anterior knee pain questionnaire. Previous studies also identified factors and sources that cause pain other than retropatellar pain (Metsna et al., 2014).

There was significant atrophy of the thigh observed in the patients with retropatellar pain in this study and quadriceps weakness and muscle atrophy were explained as one of the factor that could cause retropatellar pain after TKA (Breugem and Haverkamp, 2014).

Beidert explained in his study that patients who experienced retropatellar pain have severe limitation of running and jumping activities. Most of the patients in this study who underwent TKA reported some difficulty in jumping and running activities and all the patients who were diagnosed with retropatellar pain described severe difficulty in running and inability to perform jumping at all (Biedert and Sanchis-Alfonso, 2002).

Most of the patients included in this study had severe osteoarthritis of knee before surgery. Although retropatellar pain can occur in any patient after TKA but it was proposed in previous literature that most commonly it occurs in patients having grade III and IV osteoarthritis pre-operatively (Metsna et al., 2014).

Author tried her best to prevent any bias but still this study has some gaps. Sample size was too small. Sample was selected from a single hospital setting Ghurki trust and teaching hospital Lahore due to shortage of time. It is recommended that the study can improve by collecting data from more than one hospital setting and by increasing the sample size to provide readers with more generalized information about the topic.

CONCLUSION

This study concluded that occurrence of retropatellar pain has compromised the results of TKA. According to the results, frequency of retropatellar pain after TKA assessed was 7.8%. No significant gender difference was observed. Patellar resurfacing has been recommended in many studies but is still not a definitive way to exclude the risk of retropatellar pain because it is considered to be multifactorial in origin and its etiology is still unknown.

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