Prevalence of Knee pain due to Prolonged Cross-leg Sitting among University Students

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Abstract- Knee joint pain is one of the most leading causes of pain in young adults. In this era most of the adults have sedentary lifestyle and spent most of their time in static sitting position. Cross legged sitting is one of the most adapted positions while sitting and along with sedentary lifestyle it can cause knee pain.

Objective: To determine the prevalence of knee pain due to cross legged sitting among university students in Lahore.

Methods: This was a cross-sectional study. 377 students were taken from different universities of Lahore between the age 18 to 29 year and who had sitting duration of at least a 3 -4 hours a day were included in the study using convenience sampling method. Knee pain was assessed through kujala anterior knee pain questionnaire for all the participants. The data was analyzed using SPSS software version 23.

Results: Results are based on the score calculated by the AKPS of every participant. Average score of participants indicates that prevalence of knee pain due to cross legged sitting is high among university students.

Conclusion: Knee pain has high prevalence as average score of all participants included in study was 73 that indicates it is fair according to the outcome scale of the questionnaire. It is concluding that prolonged cross-legged sitting cause knee pain.

Index Terms- Cross legged sitting, Knee pain, AKPS, convenience sampling, University students

I. INTRODUCTION

Knee pain is very common in adults in this era, due to sedentary lifestyle adaptations either work-related or normal daily living activities. It approximately affects 25% young population and the percentage has increased by 65% in the past 20 years(1). There are different conditions causing the pain but two common factors that contribute to knee pain are intrinsic factors and extrinsic factors(2, 3).

The knee joint is one of the most important parts of the human body because it provides weight-bearing ability and stabilization in human body and help carry out crucial tasks by maintaining normal body alignments in multiple posture and in producing normal gait(6).

The type of knee joint is a hinge type of joint that allows moving the knee in and out which is flexion and extension which are the main movements of the knee joint that help in sitting, standing, and moving, some other associated movements include kicking, stepping, and climbing(7, 8).

The term posture is described in which you maintain the body alignment in an anatomical position while sitting standing, lying, or performing other daily routine tasks. there are two types of posture dynamic posture and static posture(18).

Cross-leg sitting (CLS) posture is sitting while one leg crosses over the other leg. The crossing leg foot can be hanging over the other leg or may be crossed again around the underlying leg in a

crisscross manner. This posture can induce physiological effects on the brain taking it as a comfortable resting position while working, it has several benefits causing muscle relaxation and a sensation of comfort if adapted for a short period of time but in case of prolonged sitting it can be inappropriate for the body kinematics(22).

Many studies show that after a certain period of time, this cross-legged sitting can damage the physiological structures of the various parts of the body like trunk, spine, and hip joints causing pelvic tilts(25). The latest research tells us about the side effects of prolonged cross-leg sitting on the body that are calculated by using different devices, manual testing, questionnaires, and various scales. Prolonged cross-leg sitting also affects lumber proprioception.(31)

The current study was focused on the cross-legged sitting posture adapted for a longer period of time as this condition is encountered in our daily lives. It has pointed towards the need to improve the ergonomics, and functional capacity of the individual in daily life.

In 2023 Muhammad Tahir et al. conducted a cross-sectional study on association of knee pain on long standing and sitting among university teachers. The participants in this study all were suffering from knee pain. The sample was held from the colleges and universities teachers. The sample of 185 participants including both genders between the ages of 27 to 60 years. The conclusion was a negative correlation between knee pain and sitting hours and weak positive correlation between knee pain and standing hours and it was statistically significant. (32)

In 2021 RN.Karkosha and AR. Mohammad conducted an observational cross-sectional study on the cross-leg sitting effect on lumber proprioception in young adults at Cairo University from December 2020 to November 2021. This study evaluates the effect of Cross-leg sitting results in unbalanced faulty posture while sitting. They take thirty-six participants for both genders between the ages of 18 to 25 with BMI less than 25kg/m2. This study provides data on decreased lumbar proprioception in individuals who sit cross leg 3 hours a day daily and it should be considered avoiding sitting cross leg to prevention and intervention program of lumber proprioception impairment.(33)

In 2020 Kyoung-sim Jung et al. aimed to determine the prevalence of the effect of cross-leg sitting on the trunk and pelvic angles and the pressure in people with and without low back pain. This study was approved by the Institutional Review Board (IRB) at Gachon University. For the measurement of the intensity of pain, the Numeric pain rating scale (NPRS w) was used. The independent t-test continuous variables were weight height and age. The study was conducted among thirty participants (22 males and 8 females) with LBP and control (20 males and 10 females the trunk flexion angle and pelvic obliquity were measured by a three-dimensional motion capture system. A force plate is used to analyze gluteal pressure.(35)

In 2018 Forouzan F. et al. carried out research to explains the significance of incorporating isolated core postural control training to improve knee pain and function in women with patellofemoral pain syndrome (PFPS). Thirty-three women with PFPS were randomly assigned to a control group (n=16) or experimental group (n=17). Both groups underwent similar exercises over four weeks (12 sessions, three days per week). The experimental group received isolated core training using an unstable seat. Pain, function, and cop trajectories were measured before and after four weeks. In Summary, adding isolated core postural control training to physiotherapy exercises can benefit the rehabilitation of patients with PFPS by improving pain and function. (37)

The previous literature tells us about the different physiological and anatomical changes that occur due to prolonged cross-leg standing and its prevalence around people of different age groups from various populations. Of the many researches, limited researches are conducted on knee pain caused by adopting a long-term cross-legged sitting posture in daily life.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

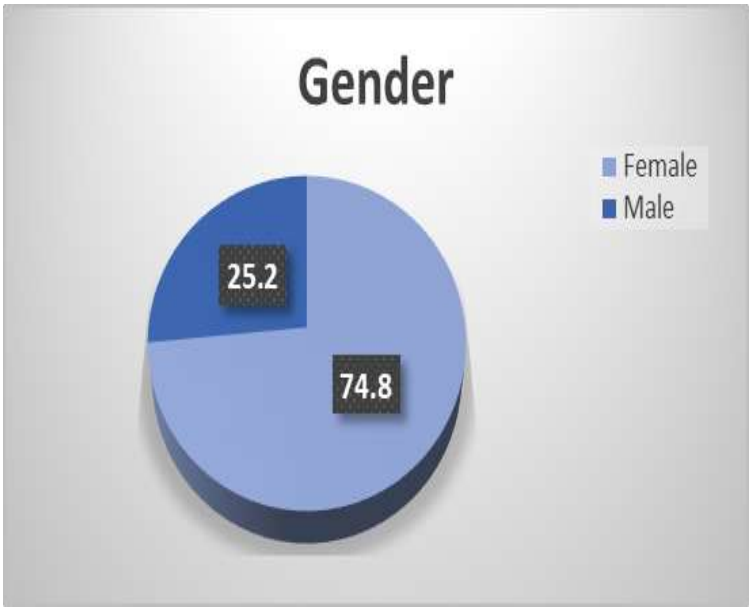
This is a Cross-Sectional study to check out the prevalence of knee pain due to prolonged crossed legs sitting among university students. Non probability Convenient sampling technique was used to select sample size. This study is carried out at 3-4 different universities of Lahore. It includes UET, Hajvery University, UOL etc. The sample size was 377 by using Rao Software with 95 % confidence interval and 5 % error margins(39). Basic demographics includes age, gender(31) and Kujala anterior knee pain questionnaire is used to assess knee pain. The AKPS is used to evaluate knee pain in PFPS patients and can also be used to assess the pain in adults due to different reasons. It consists of 13 questions that specified severity, pain and other clinical symptoms. It contains 100-point scores. The result was analyzed using software SPSS version 23. It used to draw graphs and Charts.

RESULTS

A cross-sectional was conducted to determine the prevalence of the knee pain due to prolonged cross-legged sitting among university students between the age group of 18 to 29 years. Both genders were included in the sample size of 377 while their mean age was 22 years old with standard deviation of 1.72 years. The gender distribution showed that 25.2% were males and 74.8% were females.

Table 1: Based on gender distribution

	Frequency	Percent	Valid percent	Cumulative Percent
Female	282	74.5%	74.8	74.8
Male	95	25.2%	25.2	25.2
Total	377	100.0%	100.0	100.0



This table show that there were **74.8%** (n=282) female and **25.2%** (n= 95) male participants in this study.

Fig 1: Pie chart for gender distribution

This pie graph is showing the percentage of female which is **74.8%** and male which is **25.2%** those participants in the research. To collect the data all of them was provided by online data collection questionnaire. According to the scores, of kujala knee pain questionnaire, the results are discussed of each category. About 103 participants have no knee pain, while 95 participants have mild pain which indicates good knee health. 121 participants have moderate pain which fairly effects their integrity, 58 participants have severe pain which indicates poor knee health. In average about 72% participants experience knee pain.

Data calculated by the knee AKP questionnaire indicated that there is high prevalence of knee pain due to prolonged cross-legged sitting among university students. Gender based result was calculated to precisely indicate the prevalence of knee pain among the students. It integrates population according to score.

Table 2: AKPS questionnaire

Outcome scoring measures	Total population	Male	Female
95-100 (Excellent)	103	40	63
80-94 (Good)	95	22	73
60-79 (Fair)	121	27	94
0-60 (Poor)	58	06	52
	377	95	282

Following table constitutes data score of each participant calculated by the scoring calculator of the AKPS questionnaire and then average score is also calculated which is 73 that falls under category of Fair.

Figure 2: Bar chart representing side of knee involved

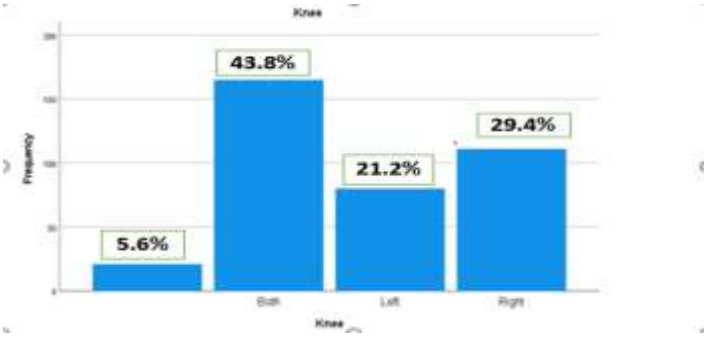


Figure is representing that **165** have symptoms on **both knee**, **80** have only **left** side involed and **111** have **right** knee symptoms while 22 didn't select any option.

DISCUSSION

This is a cross-sectional study conducted on 377 students of various universities. Among which there were 95 male participants and 282 female participants. Participants self-reported the degree of their symptoms according the AKPS there points are recorded on the bases of the marked option to conclude an individual score out of 100. On that basis there, final score indicates the general pain or health condition of knee.

Most scores indicated that many of the participants have some extent of knee pain or the have experienced symptoms for some time period. As many students spends their time sitting while attending lecture, studying or screen time, so this kind of sedentary lifestyle make them more prone toward physical deterioration(40).By sitting cross legged and putting most of the stress on knee, results in knee pain.

Many researches have been conducted on the posture while sitting and their effects on weight bearing joints. In 2020 junk K et al. studied effects of cross-legged sitting in trunk and pelvic angles but sitting cross legged for prolonged period of time can also affects the general physiology of knee joint which is not discussed by previous researchers.(25) This study shows a significantly lower trunk flexion angle and greater pelvic angle obliquity and patient with LBP with cross-legged sitting had lower trunk flexion angle and greater gluteal pressure asymmetry and trunk become more slouched. This study directly discusses the prevalence of knee pain due to prolonged cross-legged sitting which is usually most adapted posture while sitting on chair for the university students.

In 2020 Waongenngarm, P., et al conducted research on perceived damages to discomfort and postural shifts due to 4h prolonged sitting in the office workers, which conclude that prolonged sitting leads to increases musculoskeletal discomfort

over time and number of postural shift at both magnitude increases in the first 2h of sitting and in second 2-h of sitting only the number of larger postural shift increases but as we see many other individuals also adapt sitting and mostly cross-legged sitting is adapted so this research helped, to know major causes of knee pain can also be due to this sitting posture. This finding extends our understanding of sitting behaviors. (34)Basic limitation during study was cooperation of participants for recording values. Study was only conducted on university students of Lahore. No musculoskeletal problem was assessed. Study only focused on cross-legged sitting posture on chair. Recommendation for further researcher Different scales e.g. visual analog scale (VAS), numeric pain rating scale (NPRS) or KOOS, can be used to assess knee pain. Test as Lachman or McMurrays test can be used to assess muscular problem due to cross leg sitting. This research provide basis to many researchers for future research. Further study can be conducted with large data size for more generalized results. Study can be conducted among athletes for example footballer, runner etc.

III. CONCLUSION

Our research concludes that the prevalence of knee pain is high in young university students due to the prolonged cross-legged sitting. Time period of cross-legged sitting and poor posture in sitting is associated with knee pain. Knee pain is found in students who sits nearly 3-4 hours continuously indicating the risk of knee problems is increased in university students.

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