Prevalence and Severity of Hamstring Tightness Inphysically Active and Inactive Surgeons

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ABSTRACT

BACKGROUND
The prolong standing during the surgical procedure may have cause musculoskeletal disorders in surgeons. Hamstring is a group of muscles that form an important part of the leg muscles & their tightness may reduce lumbar lordosis there by affecting posture, range of motion of lower limb and developing low back pain. This study was planned to test hamstring tightness in group of surgeons which are physically active & inactive as they are prone to develop it.

METHOD
In this non-experimental cross-sectional study 75 participants were included. The study was performed on normal healthy surgeons. The height and weight of the subjects were noted down. Knee extension angle were measured by active knee extension test. The angle less than 20 is considered normal. The angle between the 21-30 is considered to be mild in tightness. The angle between the 31-45 is considered moderate in tightness and the angle greater than 45 is considered severe tightness.

RESULT
This study concludes that there is an equal prevalence of developing hamstring tightness in both young male and female surgeons. The result shows 13% with grade 1 obesity and 60% with overweight and 13% with normal BMI.

CONCLUSION
The prevalence and severity of hamstring tightness in physically active and inactive surgeons very high between the angle 45º-60º.

KEYWORDS
Prolong standing, Active knee extension test, Hamstring tightness, Flexibility, Musculoskeletal disorders

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INTRODUCTION

The hamstring muscle is known as a potential factor that accounts for the co-ordination of the lumbar spine with the pelvis & lower extremities. The hamstring muscle consists of three long muscles from medial to lateral that move together move the hip joint & knee joint that is semimembranosus, semitendinosus, and biceps femoris. The hamstring muscle is a multiple-joint muscle frequently damaged due to tightness.[1] Flexibility has been known as the ability of a muscle to lengthen and allow one joint to move through the range of motion. The decrease in flexibility causes damage to the musculoskeletal system due to overuse. The decrease in the flexibility has been causing the neuromusculoskeletal symptoms that has been to decrease in strength, stability, endurance, and much more. The muscle tightness is caused by decreased ability of the muscle to deform and results in a decreased range of motion at the joint on which it acts.[2]

The decrease in hamstring flexibility is a risk factor for the development of patella tendinopathy and patellofemoral pain, hamstring injury, and symptom of muscle damage following eccentric exercises.[3] The hamstring tightness is associated with the posterior rotation of the pelvis in the standing position due to the attachment of the hamstring muscle on the ischial tuberosity. The tightness in the hamstring muscle causes the posterior pelvic tilt which leads to a decrease in the lumbar lordosis resulting in the low back pain. It is found to be that the prevalence of hamstring tightness is highly common among college going students. The muscle length, hamstring strength, strength ratio, demographic characteristics, history of previous injury, lack of flexibility, muscular control, & inadequate warm-up are some of the common causes of hamstring strain.[4]

The surgeons main posture while doing the surgery is head & neck bent forward with the prolong standing posture. This static posture maintained are described as the physical exertion where this physical posture is maintained throughout the exertion. This static work posture such prolong standing & neck & trunk flexion have been identified as task at high risk of causing acute & chronic musculoskeletal disorder.[5] The surgeons must maintain the sterile field & change in position could result in the contamination of the field so it is quite difficult for them to change the position or shift in weight. The commonest symptoms of the prolong standing in the surgeons is the discomfort & fatigue in leg & feet that is in the shins, calves, knees & thighs. This pain & discomfort can also be felt in the hips, neck & lower back.[6]

In prolonged standing, a constantly shortened position develops hamstring trigger points and causes muscle tightness. The lack of physical activity in surgeons can cause the tightness in the hamstring muscle. The surgeons which are physically active in daily life with sports, swimming, gym, etc.[7]

Hamstring tightness may be measured using the active unilateral SLR test, the passive unilateral SLR test, the sit and reach test, and the Active Knee Extension Test (AKET). Hamstring muscle tightness is defined as Knee Extension Angle (KEA) greater than 20 degrees where KEA is the degree of knee flexion from terminal knee extension.[8]

The study aimed to find the difference between hamstring tightness in physically active and inactive surgeons. This study was conducted due to the lack of literature on the difference between hamstring tightness in physically active and inactive surgeons.[9]

MATERIALS AND METHODS

Study design: The observational study is a non-experimental & descriptive study.

Ethics approval: This study was approved by the IEC of our institute & written informed consent was taken from all the subjects. The procedures were explained to the participants that were involved in it.[10]

Subjects: The study included 100 healthy male & female volunteers within the age group of 18-25 years.

Inclusion criteria: The subject includes physically active & inactive people. The subject also includes athletes.[11]

Exclusion criteria: Subjects with any past hamstring injury within the last 2 years, low back pain since past 2 months & lower limb neurological compromise were excluded.[12]

Methodology: Active Knee Extension test (AKE) is used to check the hamstring flexibility in both lower limbs. The participants were accessed on the bed in the supine position with both extremities extended. The participants lay supine on the plinth with the right lower extremities knee & hip flexed at 90º.[13] The participants were instructed to extend the right leg as much as possible, keeping their foot relaxed, and hold the position for 5 seconds and the extension was measured. The universal goniometer was placed over the joint axis and the goniometer arms were aligned along the femur and fibula. The AKE measurement was describing as the degree of knee flexion from the terminal knee extension. This test was same performed on the left lower limb.[14]

RESULTS

In this study there were total 75 participants, whose anthropometric data was collected in Table 1.

Anthropometric data	Age (Years)	BMI (kg/cm^2)
Male	27.4 ± 1.4	26.6 ± 4.4
Female	28.7 ± 1.3	23.3 ± 3.9

Table 1. Anthropometric Data.

Using height & weight, BMI was calculated. It was found to be that 13% participants have Grade 1 obesity BMI & 60 % participants were overweight BMI and 27 % participants had BMI under normal range. The data is presented in the Figure 1.

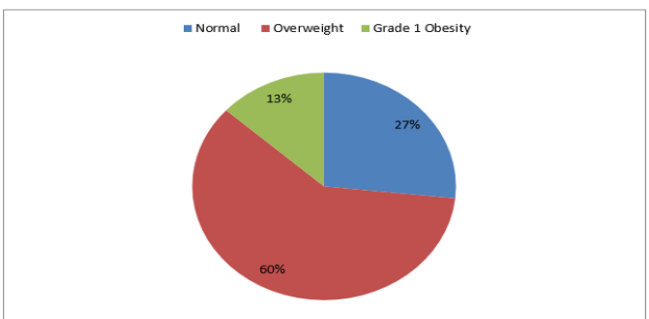

Figure 1. BMI Distribution.

In this study there were total 75 participants from that 40 participants were male & 35 participants were female. The physically active & inactive, participants were calculated in the Table 2. Graphical representation can be seen in Figure 2.

Gender	Physical active	Physical inactive
Male	10	30
Female	8	27

Table 2. Gender Distribution of Physically Active & Inactive.

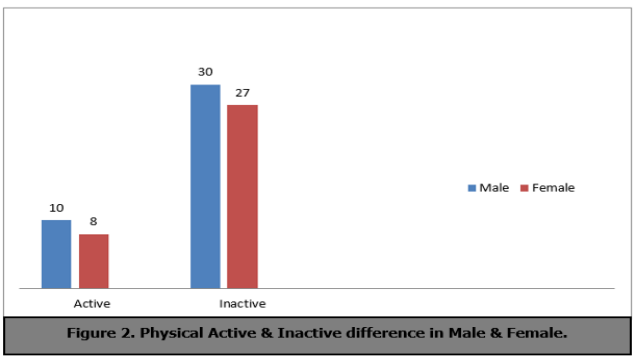

Figure 2. Physical Active & Inactive difference in Male & Female.

Severity of hamstring tightness was found higher in angle between 45º-60º of the graph. Graphical representation in Figure 3.

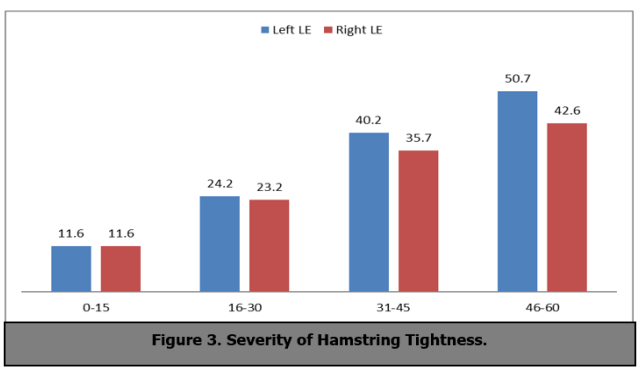

Figure 3. Severity of Hamstring Tightness.

DISCUSSION

The lack of study on hamstring tightness in the Indian population has made us to think about this research. This study was done to compare the physically active & inactive college going students hamstring tightness. The study was conducted among the students of the age group of 18-25 years of age.

The increase in sedentary lifestyle has resulted in the development of tightness of the muscle in the adults. This tightness of the muscle has increased the risk of injury & limited flexibility of the muscle. The prolonged standing posture has affected the flexibility of soft tissue especially hamstring muscle.

In the previous study the prevalence & severity of hamstring tightness among college going students. The limitation of the study was participants were not equally distributed according to gender. The result of the study was hamstring tightness among college going students.

This research was undertaken with the aim to study the prevalence of hamstring tightness in physically active & inactive surgeons. They were selected according to the inclusion & exclusion criteria & were grouped according by the convenient random sampling method. The participants were excluded according with any past hamstring injury within the last 2 years, low back pain since past 2 months & lower limb neurological compromise were excluded.

The participant's proper demographic information was taken which include name, age, height, weight, etc. Participants were asked if they were physically active or inactive in daily life. If they were physically active, then what kind of daily workout they included & for how much duration. Active Knee Extension test (AKE) is used to check the hamstring flexibility in both lower limbs. The participants were accessed on the bed in the supine position with both extremities extended. The participants lay supine on the plinth with the right lower extremities knee & hip flexed at 90º. The participants were instructed to extend the right leg as much as possible, keeping their foot relaxed, and hold the position for 5 seconds and the extension was measured. The universal goniometer was placed over the joint axis and the goniometer arms were aligned along the femur and fibula. The AKE measurement was describing as the degree of knee flexion from the terminal knee extension. This test was same performed on the left lower limb.

In this study using height & weight, BMI was calculated. It was found to be that 13 % participants have grade 1 obesity BMI & 60 % participants were overweight BMI and 27 % participants had BMI under normal range. Then the participants were divided into two groups that is with physically active & inactive surgeons. The result if this shows with more number of physically inactive college going surgeons. The severity of hamstring tightness was shown among the participants which was found higher in angle between 45°-60°. Hence the majority of the participants were affected with severe tightness in the hamstring among surgeons which are physically active & inactive.

The limitation of the study was unequal distributed participants according to gender. Hence we recommend that further study can be done with the inclusion of an equal number of males and females in consideration of level of activity.

CONCLUSION

The study concludes that the hamstring tightness is very high among surgeons which are physically active & inactive. Hence the awareness of physical activity is advised to the surgeons to prevent any further musculoskeletal disorders in the body.

CONFLICT OF INTEREST

Nil.

SOURCE OF FUNDING

Self.

ETHICAL CLEARANCE

Study approved by Institutional Ethics Committee of Krishna Institute of Medical Sciences, Karad.

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