



Prevalence of hamstring muscle tightness among hospital based individuals: An observational study

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Abstract

Background: Inability to extend the knee completely when the hip is flexed accompanied by discomfort or pain along the posterior thigh and/or knee is usually attributed to hamstring muscle tightness. Hamstring tightness occurs in early childhood and it tends to increase with age. The progressive decline in flexibility with age has been attributed to change in elasticity and decreased level of physical activities.

Aim: To find out prevalence of hamstring tightness among hospital based individuals.
Method: In this study 65 hospital based individuals according to inclusive and exclusive criteria were recruited from Dr Ulhas Patil Hospital, Jalgoan. Their ages range from 20-40 yrs. The data was collected by using Active Knee Extension Test (AKE test).

Result: The study showed 152° average tightness according to active knee extension test.

Conclusion: The study concluded that the prevalence of hamstring tightness was significantly high in hospital based individuals.

Keywords: Hospital based individuals, hamstring tightness, active knee extension test, flexibility

Introduction

Flexibility is a key component for injury prevention and rehabilitation. Stretching is important for reducing injury ^[1]. The hamstrings comprise three large muscles, namely semi-tendinous, semi-membranous and biceps-femoris which originate from the infero-medial impression on the upper part of the Ischial-tuberosity and get's inserted on the upper parts of posterior surface of tibia. They are located in the posterior compartment of the thigh and acts on the hip and knee joint. Hence, they are extensors of the hip and flexors of the knee. Muscle tightness is caused by decrease in the ability of the muscle to deform, resulting in a decrease in the range of motion at the joint on which it acts ^[2].

"Inability to extend the knee completely when the hip is flexed accompanied by discomfort or pain along the posterior thigh and/or knee is usually attributed to hamstring muscle tightness". Clinically, hamstring muscle length is not measured directly but instead, it is represented indirectly by angular measurements of unilateral hip flexion with the knee extended ^[3].

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. Methods to assess hamstring flexibility include the Straight-Leg-Raising (SLR) test, Sit and Reach (SR) test and Active Knee Extension (AKE) test ^[2].

The Active knee extension test is the best method to rule out the extensibility range of the hamstring muscle with the hip stabilized at 90 degrees and with accurate instrument placement. This method gives reliable measurements about hamstring extensibility and length with a 90/90 position in supine. The amount of extension was measured using both an electro-goniometer and a standard goniometer ^[3].

Further, cinematographic study showed that pelvic rotation may influence the validity of SLR angle measurements. Even though hamstring flexibility assessment is easy using the Sit and Reach (SR) test, the validity of this test is considered poor ^[5].

Among them KEA with plantar flexion is the gold standard measure for hamstring muscle length with the Intra-Tester reliability 0.99 [6].

Hamstring tightness occurs in early childhood and it tends to increase with age. The progressive decline in flexibility with age has been attributed to change in elasticity and decreased level of physical activities [7]. Hamstring extensibility is a physical fitness component widely recognized as an important marker of health and quality of life [8]. Female tends to be more flexible than male of same age throughout the life, this is because of anatomical variation in joint structure and also performance of more rigorous physical work by men, resulting in greater micro trauma [5].

The tight hamstring can cause a posterior tilt of the pelvis which causes back pain. Low back pain and gait abnormality are commonly linked with movement dysfunction at the lumbar spine, pelvis, and lower limbs. If hamstrings are tight, then blood supply will be squeezed out of them. Therefore, muscle is working with less capacity to do work, which in turn causes low back pain [4].

Methodology

▪ **Material**

1. Wooden frame
2. Pen
3. Paper
4. Resting table
5. Goniometer

▪ **Methodology**

1. Study design-An Observational study.
2. Sampling method-Convenient sampling method.
3. Sample Size: 30 subjects.

(Using the Formula: $N = \frac{(1.96)^2 (\delta)^2}{(\pm 1)^2}$ - Sample size)

D = ±1 = Absolute precision

Z1 = 1.96 at α = 57% of level of significance

4. Study Setting-DUPMC
5. Duration-6 months
6. Target Population-20-40 yrs of age
7. Outcome Measures-Active knee extension test.

Selection Criteria

Inclusion

- Hospital based individuals.
- Age group from 20-40 years
- Both male and female
- Hospital based individuals working for than 6-7 hours a day for 6 days/week

Exclusion

- Hospital based individuals below or above 20-40 years.
- Individual consuming pain killers or Muscle relaxant.
- Injured or recent accident related to knee.
- Any neurological disorder.

- Not willing to participate.

Method

Participants

Approval taken from institutional ethical committee and informed Consent were taken before commencement of study and detailed procedure explained to the participants. Participants were selected after meeting inclusion criteria. There were 65 hospital based individual both male and female and data was collected using active knee extension test (AKE). Participants who are working in hospital for an average of 6-7 hours per day for 5 days a week who been working since 1 year. The participants sign an inform consent form and the study procedure were approved by Dr. Ulhas Patil College of Physiotherapy, Jalgoan.

Outcome Measures

In this study, the data were collected with active knee extension test (AKE). In order to determine the prevalence of hamstring tightness in hospital based individuals, active knee extension test was used.

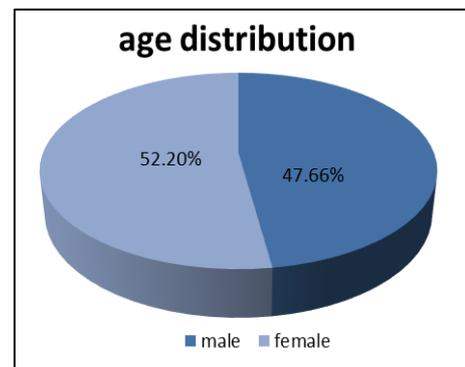
Data Analysis

Statistical Method Use

The entire data of the study was entered in MS Excel before it was statistically analyzed in Graph Pad InStat. All the results are shown in graphical format to visualize the statistical significant difference more clearly. The descriptive statistic was done for gender and age groups.

Table 1: Gender Distribution

Male	Female
(31) 47.69%	(35) 52.30%

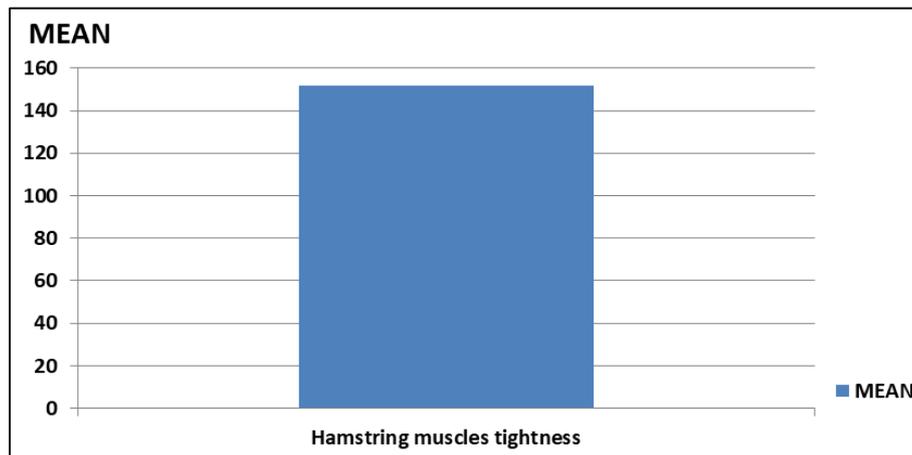


Graph 1: Gender distribution of subjects

In this the table no 1 and graph no 1 shows gender wise distribution. In that total no of male participants are 84(56.74%) and female are 64(43.24%).

Table 2: Prevalence of hamstring tightness according to active knee extension test

Hamstring Tight	AKE
Mean± SD	152±4.4



Graph 3: Hamstring tightness mean score

Result

- A total of 65 hospital based individuals participated in the study.
- The mean age of the participants was between 18-40 years.
- For the prevalence of hamstring tightness, active knee extension test was used which showed 152 average.

Discussion

- Hamstring muscle group crosses two important joints between its origin and insertion point, which are knee and hip. Any change in these joints and surrounding tissues that may cause postural changes
- Some possible causes of hamstring tightness are prolonged sitting, insufficient stretching before physical activity. Prolong sitting (6-8 hours) and awkward posture also decreases the hamstring flexibility
- The criterion for subject inclusion was tight hamstring as defined by a knee extension range of motion less than 160°. Active knee extension was measure using a Goniometer in 65 young adults.
- The present study was carried out to see the prevalence of hamstring tightness using active knee extension test. Initially 65 subjects met the inclusion criteria were recruited into the study. Outcome measures used was AKE.
- The age ranges in the study group was 18-40 years. In this study subjects were 31 (47.69%) males and 34(52.30%) subjects were females (Table1). Chief objective was to see the prevalence of hamstring tightness using active knee extension test.

The outcome measure in the study group shows following results

Variable 1-Hamstring tightness

Prevalence of hamstring tightness among hospital based individuals

Using active knee extension test on data (n=65) to measure the hamstring tightness shows the average score (mean±SD) of hamstring tightness experienced by the participants was 152±4.4 given in table and graph no 2.

The mean tightness was significantly less. The tightness was not severe enough to require any form of medical or surgical treatment. As the hospital based individuals are exposed to more sitting posture they are susceptible to tightness.

Conclusion

Based on the result of this study, our study shows prevalence of hamstring tightness among hospital based individuals.

Limitation

- Only below 18-40 years old population were evaluated.
- The study was restricted to only Dr. Ulhas Patil hospital Jalgoan District.

Future Scope

- Further studies can be conducted related to other muscle or condition.
- Future research can be done by recording response in the hospital based individual after the treatment protocol for tightness.

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