

Prevalence of Hamstring Tightness in Nursing Students Using 90-90 SLR Test: A Cross-Sectional Study

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ABSTRACT

Background: Flexibility is a range of movement available at a joint. Tightness of muscle is caused by a decline in the ability of muscle to disfigure. Hamstring tightness can lead to low back pain, bad posture, imbalances of muscles and knee pain. According to previously performed studies, prolonged sitting can be a factor that leads to hamstring tightness; therefore, we selected nursing students as a participant in the study who have a daily sitting time of 6-8 hours. Hence objective of the study is to find out the prevalence of hamstring tightness among nursing students.

Aim: The study's aim was to find out if Nursing Students have hamstring tightness due to Prolonged Sitting using a 90-90 SLR test.

Study design: Observational study.

Methodology: In this cross-sectional study, 145 participants were included by verifying inclusion and exclusion criteria. Consent was taken before evaluation. Hamstring tightness was measured by a 90-90 SLR test. After that, height and weight were measured, and BMI was calculated. After evaluating all participants, prevalence was calculated. Then, it was compared with BMI.

Result: 20.68 per cent of participants had hamstring tightness.

Conclusion: The result indicates that the prevalence of hamstring tightness is low in nursing students.

KEYWORDS: Hamstring tightness, Nursing students, 90-90 SLR test, Body Mass Index.

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INTRODUCTION

Flexibility is the ability to move a single joint or series of joints smoothly and easily through an unimpeded, pain-free range of motion [1,2]. Flexibility is related to the extensibility of muscle-tendon units that cross a joint based

on their ability to relax or deform and yield to stretch force [3].

Hamstrings are a muscle group consisting of three muscles: semitendinosus, semimembranosus, and biceps femoris. The muscle group crosses the two joints, hip and knee, originates

from ischial tuberosity, and inserts into the back of the knee. Hamstrings work as knee flexors and hip extensors [4,5].

Hamstring tightness can cause lower back pain, bad posture, imbalances of muscles and knee pain, which causes decreased movement at the lumbar spine, pelvis and lower limb. Severe tightness in the hamstring can lead to a crouch gait pattern [6]. Tightness of the hamstring muscle leads to tilting of the pelvis posteriorly, resulting in a decrease in lumbar lordosis. Q angle, the angle formed between quadriceps muscles and the patella tendon is significantly higher in subjects with hamstring tightness than in the normal population. In a sitting position, the hamstring is shortened due to the knee in semi-flexed and pelvic in posterior rotation. so, it develops trigger points and causes tightness of muscle. Prolonged sitting increases pressure on the lumbar intervertebral disc. Therefore, it increases stress on the lumbar spine [7].

Hamstring tightness is assessed by 90-90 SLR test. From birth to 2 years of age popliteal angle (the angle between one line along the shaft of femur and other along tibia) is 180°, which decreases to 155° by 6 years of age and remains almost constant after that. If the angle is less than 125° the hamstring is considered tight [8,9,10].

Nursing students attend nearly 8 hours of college daily, during which time they sit for 6 hours. Some recent studies have found that the prevalence of hamstring tightness in college students is very high due to sitting in faulty posture for a prolonged period of time. Hence, the aim of the study is to find out the prevalence of hamstring tightness in nursing students.

METHODOLOGY

Observational study was conducted on Nursing students from 2-4 year at STA's college of Nursing, Aurangabad.

A convenient sampling strategy was used to enroll sampling. 145 subjects aged between 19-23 years participated in the study. Students sitting for more than 6 hours in a college daily were included into the study. Whereas students with a history of lower limb fractures,

students with inflammatory conditions of lower limb and post-surgical conditions were excluded from the study.

After receiving ethical clearance from the Institutional Ethical Committee, participants who met the inclusion criteria were enrolled in this study. Written consent was obtained from all the participants in the regional language. Demographic data, such as name, age, gender, studying year, and BMI, were noted. Popliteal angle was measured with the help of a universal goniometer, and it is noted on the data collection sheet.

90-90 SLR test was used to measure Hamstring tightness among participants. It measures the popliteal angle of a subject. The popliteal angle should be more than 125 degrees, if popliteal angle is less than 125 degrees hamstring is considered as tight. A standardized method was implemented for data collection; a universal goniometer was used to measure the popliteal angle where participants were held in a supine line position, where the hip and knee were at 90 degrees to evaluate hamstring tightness.

RESULTS

As mentioned, we studied hamstring tightness in nursing students using a 90-90 SLR test. The mean age of participants was 20±1.11, whereas the male: female ratio among participants was 18:127. There were 145 participants involved in this study, out of which 90 students were from the second year, 44 were from the third year, and 11 were from the fourth year. All the above-mentioned data can be seen in Table no.1.

Table 1: Demographic characteristics of the subjects.

| | | | |
|--|-------------|------------|-------------|
| Age (in years) | 20±1.11 | | |
| Gender ratio | 0.838194444 | | |
| (male: female) | | | |
| No. of participants in each of the academic year | Second year | Third year | Fourth-year |
| | 90 | 44 | 11 |

We found that 30 out of 145 participants had hamstring tightness, which is 20.68 per cent of the total participants. The mean popliteal angle of the left and right sides was 144.162° and 142.09°, respectively. Out of the 30 participants with hamstring tightness, 4 were

Table 2: Prevalence of hamstring tightness in Nursing Students.

| | | | |
|---|--------------------|-------------------|--------------------|
| Total number of participants | 145 | | |
| Participants with Hamstring tightness | 30 | | |
| Participants without Hamstring tightness | 115 | | |
| Mean of Popliteal angle | Left | Right | |
| | 144.162° | 142.09° | |
| No. of participants with Hamstring tightness with respect to side (Male) | Right | Left | Bilateral |
| | 1 | 0 | 3 |
| No. of participants with Hamstring tightness with respect to side (Female) | Right | Left | Bilateral |
| | 2 | 0 | 24 |
| No. of participants with Hamstring tightness with respect to age | Age | | |
| | 19-20 years | | 21-23 years |
| | 21 | | 9 |
| No. of participants with respect to BMI | Low BMI | Normal BMI | High BMI |
| | 13 | 14 | 3 |

males, and 26 were females, whereas right-sided hamstring tightness was greater than left-sided. All the above-mentioned data can be seen in Table no.2.

DISCUSSION

The aim of the study was to find out the prevalence of hamstring tightness among nursing students using the 90-90 SLR test. The lack of literature on the consequences of prolonged sitting, especially in young college-going students, made us think about it.

A dormant lifestyle is one of the contributing factors leading towards postural abnormalities, causing depletion in the usual range of motion of a joint due to a reduction in the ability of muscles to disfigure [11]. Most jobs demand prolonged sitting, including scholastic institutes, which leads to the submaximal firing patterns of postural muscles, resulting in a change in the role of the hamstring as a

stabiliser instead of their foremost function of prime movers[11,12].

Nevertheless, a prolonged sitting position, which is required in numerous jobs, can lead to hamstring muscle tightness along with low back pain, knee pain, and plantar fasciitis; hence flexibility is an indispensable component of fitness, and it determines the performance of a person and the quality of life of an individual[12].

Reetika Yadav et al. studied the effect of prolonged sitting on collegiate students' hamstring muscle flexibility and lumbar lordosis. 80 participants were included in this study from Galgotias University, Greater Noida. Hamstring tightness was measured by the AKE test, and the angle of SLR was measured with a goniometer. Lumbar lordosis was measured by flexicurve. It was concluded that increased hours of prolonged sitting may cause hamstring tightness. Long sitting hours change

the curvature of the lumbar spine leads to a decrease in lumbar lordosis angle[13].

Participants included in our study used to sit for a prolonged time, and 30 out of 145 students had hamstring tightness, which may be caused by prolonged sitting.

Bhagyashree K Koli, Deepak B Anap et al. (2018) studied the prevalence and severity of hamstring tightness among college students: a cross-sectional study. In this cross-sectional study, 50 participants with hamstring tightness were included using purposive sampling. Tightness was measured by the AKE test. Three measurements were taken, and an average of their reading was noted. The study concluded that the prevalence of hamstring tightness is very high in college-going students of age 18-25 years [14]. After evaluating 145 participants for hamstring tightness, we found that hamstring tightness was low in nursing students, as only 30 participants had tight hamstrings.

Dipesh Thakur, Sumi Rose et al. (2016) did a study to find out the correlation between the right and left hamstring length in both genders to determine the prevalence of hamstring tightness among college students. 100 subjects were recruited and screened based on inclusion and exclusion criteria. 80 healthy college students were recruited between the age group of 18-25 years; sit and reach test was done among the students. The study concluded that there is a significant correlation between right and left hamstring length in both groups, but there is no correlation between hamstring length when compared with right hamstring length between groups and left hamstring length between groups[7]. When we compared hamstring tightness according to side, the result concluded that right-sided hamstring tightness was more common than left, whereas most of the participants had bilateral hamstring tightness with the mean popliteal angles of the left and right side being 144.162° and 142.09° respectively.

Sushmita T. studied the prevalence of hamstring tightness among adolescent boys and its associated factors. 30 male participants between the ages of 18 and 25 years were

included in this cross-sectional study. The sit and reach test was used to evaluate hamstring tightness. All demographic data was calculated along with BMI. The prevalence of hamstring tightness in adolescent boys was 43.70 per cent, and a weak correlation exists between BMI and tightness. This study concluded that prolonged sitting could contribute to hamstring tightness[15].

As our study aimed to find out hamstring tightness in nursing students, which may be caused by prolonged sitting, we found that 20.68 per cent of students had hamstring tightness and 22.22 per cent prevalence in males.

In our study chief component was prolonged sitting position, and nursing students are more prone to hamstring tightness because of their extended sitting position during their daily routine, and once the hamstring gets tightened, execution of muscle function declines due to associated pain. Our study will lend a hand in ameliorating sitting arrangements for students in scholastic institutes and promoting physical activities to improve flexibility among them.

CONCLUSION

Hamstring tightness is mildly prevalent in nursing students, but if ignored, it can lead to various consequences, such as a decrease in lumbar lordosis and anterior pelvic tilt. To prevent all these consequences, it is necessary to maintain good posture during prolonged sitting and standing. Stretching exercises are often important to loosen hamstring muscles. Recent advances show that MET is effective in releasing hamstring tightness.

Conflicts of interest: None

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