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Original Article

Prevalence of Hamstring Tightness Among Healthcare Workers

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ABSTRACT

Hamstring tightness is the incapability of the muscle to move more than 160 degrees of extension of the knee while 90 degrees is flexion of the hip is called tightness of the hamstring. Mostly seen that the higher ratio of hamstring tightness occurs in the right lower limb.

Objective: To determine the prevalence of hamstring tightness among healthcare workers.

Methods: It was a cross-sectional study conducted on hamstring tightness among healthcare workers in Karachi from July 2023 to Jan 2024. The sample size of the study was 643 healthcare workers. The convenient sampling techniques was used. For the evaluation: SLR (Straight leg raise) and AKE (Active knee extension) were used. The data were analyzed through the SPSS version 23.0. **Results:** A total number of 643 healthcare professionals of both genders were recruited from hospitals in Karachi. There were 197 (30.63%) physical therapists who were found to be the tightness of the hamstring muscle. The ranges of body mass index among healthcare workers are higher in the underweight BMI category. The severity of hamstring muscle tightness in males was observed higher between 31 to 45 degrees in the right lower limb as compared to the left. The severity of hamstring muscle tightness in females was observed higher between 31 to 45 degrees in the right lower limb as compared to the left. **Conclusions:** The prevalence of hamstring was found in all healthcare workers of research but the highest percentage was found in physical therapists as compared to other professions.

INTRODUCTION

The inability of an individual muscle or group of muscles to perform the task in the full range of motion of the specific joint that is involved in the activity is known as muscle tightness. It can cause pain in the muscles and also decrease the flexibility of the muscles [1]. The hamstring muscle is considered a large group of muscles because it covers the posterior side of the thigh and consists of three muscles which are semitendinosus, semimembranosus, and biceps femoris [2]. These muscles cross the 2 joints,

the knee and gluteus region as they arise from the tuberosity of the ischial and ends in the posterior region of the knee. The major role of the hamstring muscle is to maintain the flexibility of the body and work as a flexor of the knee and extensors of the hip joint [3]. Hamstring tightness is the incapability of the muscle to move more than 160 degrees of extension of the knee while 90 degrees is flexion of the hip is called tightness of the hamstring [4]. The main causes of tightness include sitting for a

prolonged period, standing in a constant position, lack of stretching before doing any physical activity, strain of the muscle, and hamstring shortness [5]. It shows the many musculoskeletal disorders like lower back aches, pain in the patellofemoral region, injury of the muscle, and inflammation of the plantar fascia. However, the pain ratio increases time by time increasing the tightness of the hamstring muscle [6]. People working in those departments who are working constantly in a sitting position for about 6 to 8 hours are more prone to the tightness of the hamstring which decreases flexibility and the prevalence of loss of flexibility of hamstring muscle in office workers was 85.7%, due to the loss of flexibility of the muscle causes the injuries of the hamstring muscle. Mostly seen that the higher ratio of hamstring tightness occurs in the right lower limb [7]. There are some special tests used to measure the flexibility and range of the hamstring muscle which include the active knee extension test and passively performed straight leg raise test. In young people, the movement of the hamstring muscle is poor it can cause lower back pain issues [8]. When a person sits in a constant position for a longer period it can cause trigger points in the hamstring muscle which causes tightness of muscle, exerts a high pressure on the lower lumbar spine, and also exerts mechanical stress on the spine [9]. While a person maintains a kyphotic posture for a longer time it exerts more pressure on the spine and causes muscle tightness. Many factors can affect the elasticity of hamstring muscle like age of the person, gender basis, activity of their routine, and it's body mass index. The group of hamstring muscles can linked with dysfunction of movement at the spine, pelvis, and lower extremities because it causes lower back ache and gait pattern disturbances [10]. Healthcare workers can treat individuals as consultants, nurses, physical therapists, staff, technicians, and medical waste handlers. Many musculoskeletal problems occur while they are serving human beings and do not take care of their health. Mostly upper extremities, lower back aches, pain in knees, and lower extremities are affected the most [11]. There are many different symptoms related to the musculoskeletal systems faced by healthcare professionals such as muscle stiffness and reduced muscle strength, flexibility, stability, and many more. Symptoms mainly affect more than seven times in the healthcare workers because they can perform duties to grasp the patient, bad posture, patient positioning, feeding the patient, and transferring the patient to bed, and chairs for their specific reasons [12]. Strains and tightness of muscles can be treated conservatively through rest, cryotherapy at least 3 to 4 times a day, gentle exercises, properly stretching techniques, and then back to normal life again if it is not

treated on time it can cause a major injury of the muscle, tendon, ligaments of the joint [13]. Flexibility is the major component of fitness.

The aim of our study was to evaluate the muscle tightness of the hamstring which can affect the performance of a person and enable him/her unable to function properly. The study aims to evaluate the prevalence of hamstring muscle tightness among healthcare professionals in Karachi.

METHODS

It was a cross-sectional study conducted on hamstring tightness among healthcare workers in Karachi from July 2023 to January 2024. The sample size of the study was 643 according to the healthcare workers. The sampling techniques used in this study were convenient. The inclusion criteria of the study included both genders, healthcare workers like consultants, physical therapists, pharmacists, nurses, dieticians, technicians, and other staff members who are currently working in hospital setups of Karachi, and ages between 20 to more than 59 years. Those participants were excluded in our study who were not willing to participate in the study, and who suffered from any injury or deformity of the spine and the lower limb. In this study, we used two special tests named Straight leg raise and Active knee extension which were used to identify the hamstring muscle tightness and flexibility of the hamstring muscles in male and female healthcare workers of the study. Active knee extension is measured by the performance of knee flexion from the knee in an extended position during this test every knee of the limb was measured thrice. To perform the active knee extension test, participants were required to supine lying on the couch with an extension of both lower limbs. By the use of a vertical bar apparatus, the alignment of the anterior superior iliac spine of both limbs was done. During the measurement the limb which was not measured stabilized on the couch by the thigh area. The therapist told the research participant to flexion of the hip joint towards the horizontal bar to maintain the thigh and horizontal bar contact. Now the subjects were advised to relax their feet extend the legs maximally and foot hold the position for five seconds. For checking the flexion and extension range of motion of the knee joint, the standard instrument was used named as Goniometer, which was placed around the femur and fibula bone of the lower limb. The data were analyzed through the SPSS version 23.0 software in which we calculated the frequencies and percentages.

RESULTS

A total number of 643 healthcare professionals were recruited from different hospitals in Karachi from which 98 (15.24%) were general physicians, 197 (30.63%) were physical therapists, 160 (24.88%) were nurses, 67 (10.41%) were pharmacists, 43 (6.68%) nutritionists, 37 (5.75%) was

technicians and 41 (6.37%) was staff. The ranges of body mass index among healthcare workers were higher in the underweight BMI category at 289 (44.94%) whereas lower in the obese BMI category at 48 (7.46%) and other demographics as shown in table 1.

Table 1: Demographics of Research Participants

Factors	n (%)
Healthcare Professionals	
General Physicians	98 (15.24%)
Physical Therapists	197 (30.63%)
Nurses	160 (24.88%)
Pharmacists	67 (10.41%)
Nutritionists	43 (6.68%)
Technicians	37 (5.75%)
Staff	41 (6.37%)
Age	
20-29	236 (36.70%)
30-39	147 (22.86%)
40-49	97 (15.08%)
50-59	89 (13.84%)
>59	74 (11.50%)
Gender	
Male	327 (50.85%)
Female	316 (49.14%)
Body Mass Index (BMI)	
Underweight (<18.5)	289 (44.94%)
Normal (18.5-24.9)	217 (33.74%)
Overweight (25.0-29.9)	89 (13.84%)
Obese (≥30)	48 (7.46%)

The prevalence of hamstring tightness was found in 382 (59.40%) and absent in 261 (40.59%) among healthcare workers in Karachi as shown in figure 1.

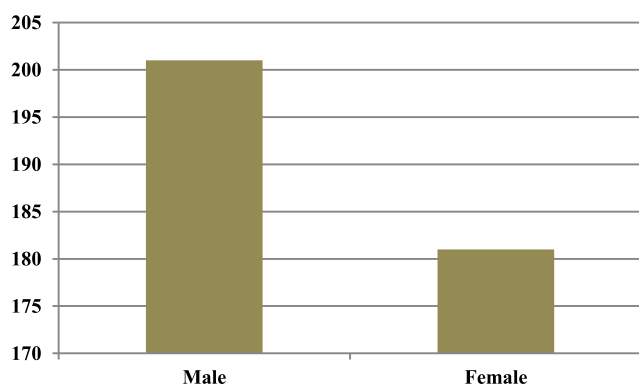


Figure 1: Prevalence of Hamstring Tightness Among Healthcare Professionals

The prevalence of hamstring tightness was found 201 (52.61%) in males healthcare professionals while 181 (47.38%) in females as shown in figure 2.

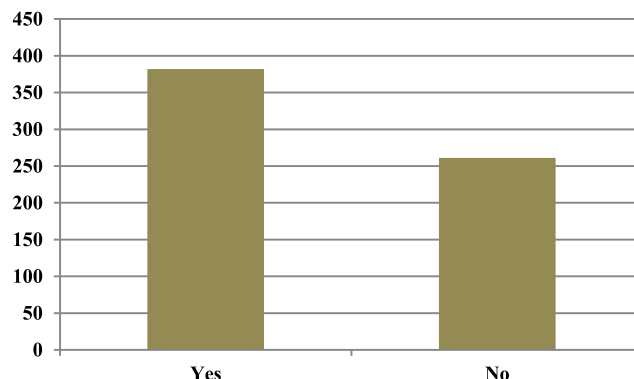


Figure 2: Prevalence of Hamstring Tightness in Both Genders

Tightness of hamstring muscle severity among males was found more in the right lower limb 172 as compared to the left lower limb 134 between 31 to 45 degrees. In the right lower limb 98 (48.75%) of the research participants had hamstring tightness in 172 males while in the left lower limb, hamstring tightness was found in 134 males from which 72 (53.73%) of participants had higher tightness in between 31 to 45 degrees. Furthermore, tightness of hamstring muscle severity among females was found more in the right lower limb 159 as compared to the left lower limb 97 between 31 to 45 degrees. In the right lower limb 67 (42.13%) of the research participants had hamstring tightness in 159 females while in the left lower limb hamstring tightness was found in 36 (37.11%) of participants out of 67 females have higher tightness between 31 to 45 degrees as shown in figure 3.

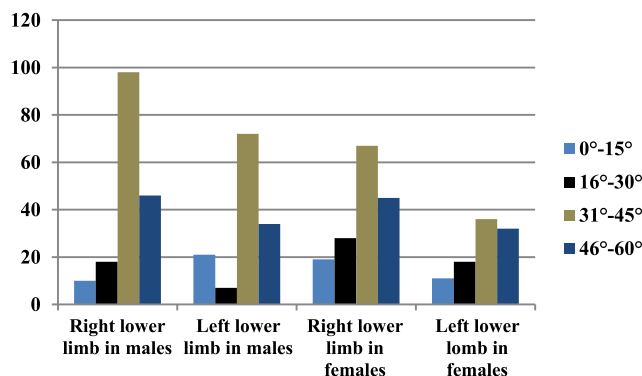


Figure 3: Severity of Hamstring Tightness in Both Limbs

DISCUSSION

The hamstring muscle group is prone to develop tightness around the the region of backside of the thigh may be due to trauma, prolonged sitting, and biomechanically imbalanced posture [14]. People of every occupation have different levels of work due to their job description but

commonly healthcare professionals have the same type of posture issues related to their specific profession which makes them prone to developing musculoskeletal injuries [15]. The objective of our study is to find out the frequency of hamstring muscle tightness among all healthcare professionals. In our study, we add multiple healthcare professionals from different departments to compare their rates of prevalence of hamstring muscle tightness. The results of our study showed a higher prevalence of hamstring muscle tightness was found in physical therapists i.e., 30.63% while in technicians the least prevalence is found i.e: 5.75% the difference in the results shows their job description variation which causes the injury. In comparison to this, a study reported that the prevalence of hamstring muscle tightness is found more in athlete males who are engaged in contact sports activities as compared to other sports and they also reported that there was no association of hamstring tightness with the height of body as well as the resting time between the sports, therefore, the athletes who engaged in contact sports should take preventive measures to avoid the hamstring muscle tightness [16]. A study conducted in Nigeria reported that the average age of hamstring tightness was between 29 to 45 years [17]. Another cross-sectional study whose authors used the active knee extension test revealed the prevalence rate of hamstring tightness was higher in between the age group of 18 to 25 years and they also reported the research participants of younger age was 82% and more common in females as compared to males [18], while in our study the commonest age of the research participants who had hamstring tightness is found in between 20 to 29 years among 36.70% of research participants. Concerning the gender a comparative study about the correlation of prevalence of hamstring tightness between the length of right and left hamstring muscle in both genders was conducted on college students and they concluded hamstring tightness was found in all research participants and there was a significant correlation between the hamstring muscle of right and left lower limbs of both genders: the male participants had more tightness in left limb while in females right limb was affected in higher amount additionally nonsignificant results were found when they compared the length of hamstring muscles in both right and left sides [19]. Furthermore, in our study, the majority of healthcare professionals fall in the underweight category of BMI while the lowest number of research participants was found in the obese category of BMI as compared to A study done in Malaysia, which concluded that the BMI of the obese category was found more in nurses as compared to the doctors [20]. The study revealed that the severity of hamstring muscle tightness

was found to be higher in 68% of subjects during the movement between the angle of 30° to 45° and reading reported after the implementation of the active knee extension test [14]. however in our study, tightness of hamstring muscle severity in males was observed higher between 31 to 45 degrees in the right lower limb as compared to left lower limb while in females the tightness of hamstring muscle severity was observed higher between 31 to 45 degrees in the right lower limb as compared to the left lower limb. Our study showed, that almost all research participants with different occupations had tightness of the hamstring muscle with slight changes in the degrees and other factors.

CONCLUSIONS

The prevalence of hamstring was found in all healthcare workers of research but the highest percentage was found in physical therapists as compared to other professions. The younger age healthcare workers from 20 to 29 years are more affected. There was a significant relation between hamstring tightness the BMI level and our study observed a higher rate of males being affected as compared to females. Therefore, awareness of stretching exercises should be increased among healthcare workers to prevent hamstring tightness and physical therapists should do some stretching exercises themselves to prevent musculoskeletal issues and future injuries.

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Authors Contribution

Conceptualization: KJ

Methodology: SH, KZ

Formal analysis: OA

Writing-review and editing: KJ, SR, SRR, SH, FZ, SA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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