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EXPLORING CALF AND HAMSTRING TIGHTNESS AMONG CHEFS (CULINARY PROFESSIONALS)

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Abstract

Background: *In recent years, musculoskeletal issues have become a significant concern affecting numerous individuals worldwide. Particularly, chefs working in hotel or restaurant settings are highly vulnerable to physical strain, increasing their susceptibility to various musculoskeletal discomforts and ailments. Reduced muscle flexibility can lead to restricted joint movement, resulting in muscular tightness. Among chefs, hamstring injuries are particularly common, often arising from overstrained hamstring muscles.*

Objective: *This study aimed to assess the occurrence of calf and hamstring tightness among chefs in Gujranwala.*

Methodology: *A cross-sectional observational study was conducted; involving a sample of 297 male participants aged between 25 and 40 years who consented to participate and met the specified inclusion criteria. The study was conducted within hotel and restaurant environments. Upon obtaining consent, participants underwent examination using specialized tests. Data entry and analysis were performed using Version 24 of the Statistical Package for Social Sciences (SPSS) software.*

Results: *Analysis revealed that among the 300 participants, calf tightness was detected in 139 individuals (46.3%), while hamstring tightness was observed in 250 participants (83.3%).*

Conclusion(s): *The prevalence of calf and hamstring tightness among chefs is notably high, with hamstring tightness being more prevalent than calf tightness.*

Keywords: *Chefs, Calf tightness, Hamstring tightness, Musculoskeletal problems, Prevalence*

INTRODUCTION

Prolonged standing comes with a number of dangers. The latter will be the subject of this body of study. They have previously been listed as chronic venous insufficiency and musculoskeletal problems of the lower back, legs, and feet (1). Plantar fasciitis was 8.7 times more common in people with tight hamstrings than those without tightness. Calf muscle tightness is quite common in those with tight hamstrings (gastrocnemius and soleus). Hamstring tightness could cause knee flexion to increase, which would lead to prolonged forefoot loading (2).

Musculoskeletal disorders (MSDs) are injuries that occur in the body's soft tissue structures, including the muscles, tendons, joints, and nerves, as a result of frequent or protracted occupational exposures. The most frequent occupational injuries, or MSDs, can result in lower productivity and job-related disability (3).

When the ROM of the joints that the muscles act upon is decreased, the muscles' capacity to deform results in tightness. Hamstrings serve as hip extensors and knee flexors. As a result, it helps to keep the human body flexible(4)Musculoskeletal problems have impacted millions of people globally in recent years. A high risk of physical stress puts chefs and other catering industry professionals at risk for developing a variety of musculoskeletal problems and illnesses. (5)

Hamstring tightness is a major cause of back injury and dysfunction. The length of the hamstring particularly affects forward bending action, and tight hamstrings increase the risk of spinal damage from mechanical stress. According to earlier research, keeping the hamstrings at the right length avoids the low

back from flexing too much when bending forward, which lowers the chance of injury by minimizing the spine's anterior shearing stresses (6).

One of the most prevalent health issues among chefs worldwide is MSD. .Pain, discomfort, numbness, weakness, stiffness, and swelling are possible symptoms. The majority of MSDs are cumulative disorders brought on by prolonged static loading, rapid movements, anatomically incorrect posture, externally imposed compressive pressures, and vibration (7).

The conditions of employment, the number of hours worked, and the nature of the job demand all contribute significantly to making progress of musculoskeletal conditions connected to work (WMSDs). Due to the workstation or the working conditions, the problem could get worse or last longer (8).Muscle tension is one of the most common factors of the motor system affecting balance. Tight calf and hamstrings can affect static and dynamic balance about the body and mobility. Weak hamstring flexibility appears to be one of the accepted causes of hamstring strain injuries, musculoskeletal disorders and decline in physical activity (9).

Particularly in the hamstring and calf, which are made up of muscles that travel through more than two joints, muscle stiffness in the legs is usually noted. As a result, it has an adverse effect on gait and balance and is accompanied by proprioceptive sensory issues. During walking, jumping, or ascending stairs, calf stiffness can make it difficult for the heel to push the ground appropriately. Reduced ROM of ankle for dorsiflexion due to calf tightness leads to difficulties in maintaining the center of mass in the weight-bearing posture (10).

Chefs are the head cooks in charge of the kitchen among those employed in the catering sector. Researches from different nations (India, Hong Kong, and Taiwan) revealed that restaurant chefs, particularly Chinese restaurant chefs, have a high frequency of WMSD (9). In previous studies other musculoskeletal issues were assessed in chefs like upper limb pains, or spine conditions but hamstring and calf tightness were almost not considered. Due to long standing, there are number of reported cases of hamstring and calf tightness, so our aim is to check the prevalence of hamstring and calf tightness in chefs.

MATERIALS AND METHODS

The current cross-sectional study involved a sample size of 300 determined using the proportion formula for sample size calculation, coupled with specialized tests. The research was conducted between April and August, employing a non-probability convenient sampling technique to select male chefs from Gujranwala, Punjab, aged between 25 and 40 years, with a work experience exceeding 4 years, and a daily standing duration exceeding 4 hours. Exclusion criteria encompassed males with a history of lower limb surgery (Fracture, Orthoplasty), spine surgery, diagnosed Rheumatoid, Osteo-arthritis of the hip, knee, and foot, , neuropathies (Peripheral Neuropathy, Diabetic Neuropathy) or orthopedic (ACL injury, Ligamentous injury, Arthritis). Participants who agree to take part in this study after filling consent forms were then examined by Special tests that were 90 90 SLR (Straight leg raise) Test and Silfverskiold Tests. For 90 90 SLR **Test** Participant was in supine position with the hips and knees flexed to 90° and the lumbar spine in neutral position. The participant was then asked to stabilize this position by grabbing on to the back of the thighs than the participant actively extended the knee on the side to be tested, while his lumbar spine remains in neutral position. The Silfverskiöld test was used to measure ankle dorsiflexion with the extended knee and subsequently flexed to distinguish between tight gastrocnemius muscles and an achilles tendon contracture. It gauges the foot's dorsiflexion at the ankle joint with knee extension & flexion to 90 degrees. The test was considered positive when dorsiflexion at the ankle joint was greater with knee flexed than extended.

STATISTICAL ANALYSIS

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 24, released in 2016 by IBM Corp. Descriptive analysis employed frequency and percentages for qualitative variables, and mean and standard deviation for quantitative data. Pie charts were utilized to represent qualitative data. The chi-square test was utilized to ascertain relationships between variables. All results were calculated at a 95% confidence interval, and a P-value of 0.05 was considered statistically significant.

RESULTS

Among 300 participants the demographic characteristics of the chefs, revealing a mean age of 32.29 years (± 4.49), mean weight of 79.81 kg (± 5.29), mean height of 2.35 meters (± 9.94), mean Body Mass Index (BMI) of 25.43 (± 1.56) (Table I).

Table I. Demographic characteristics of the chefs

Variables	Mean	Std. Deviation
Age of participants	32.2867	4.48533
Weight of participants	79.8067	5.29238
Height in meters	2.345	9.94367
BMI of participants	25.4313	1.56484

According to Table I the distribution of work experience was, 17.70% (n=53) having less than 5 years of experience, 67.70% (n=203) having 5-8 years of experience, and 14.70% (n=44) having 8-12 years of experience. The distribution of daily working hours among male chefs, revealing that 9.70% (n=29) worked for less than 5 hours per day, 79.30% (n=238) worked for 5-7 hours per day, 10.30% (n=31) worked for 8 hours per day, and 0.70% (n=2) worked for more than 8 hours per day. Overall, the results indicate that 83.30% (n=250) of chefs exhibited a range of motion of 60-<90 degrees (Table II), while 16.70% (n=50) demonstrated a range of motion of 90 degrees during the 90-90 SLR Test (Table III). Figure 2 shows that in silfverskiold, test out of 300 Chefs 139 (46.3 %) were positive while 161 (53.67 %) were negative.

Table II. Work experience, working hours, standing duration

		N	%
Work experience in years	Less than 5 years	53	17.70%
	5-8 years	203	67.70%
	8-12 years	44	14.70%
	Total	300	100.00%
Working hours	Less than 5 hours/day	29	9.70%
	5-7 hours/day	238	79.30%
	8 hours/day	31	10.30%
	more than 8 hours/day	2	0.70%
	Total	300	100.00%
Standing duration/day	Less than 5 hours/day	29	9.70%
	5-7 hours/day	240	80.00%
	8 hours/day	30	10.00%
	more than 8 hours/day	1	0.30%
	Total	300	100.00%

Table III. Straight leg raise (SLR)

		N	%
SLR	60-<90 degree	250	83.30%
	90 DEGREE	50	16.70%
	Total	300	100.00%

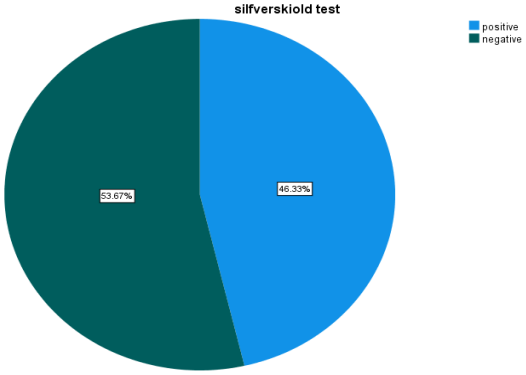

Fig 2. Silfverskiold Test

DISCUSSION

The aim of this study was to assess the frequency of calf and hamstring stiffness among male chefs aged between 24 to 40 years in Gujranwala, Punjab, Pakistan. Our findings revealed that out of 300 chefs included in the study, 139 (46.3%) tested positive for calf tightness in the Silfverskiold Test, while 161 (53.67%) tested negative. These results indicate a significant prevalence of calf stiffness among chefs in the region. Muscular stiffness and tightness, particularly in the calf and hamstring muscles, are common health concerns in the catering industry, often attributed to prolonged periods of standing and repetitive movements involved in culinary tasks.

Our study findings align with previous research conducted in Pakistan and India, which also reported high prevalence rates of hamstring tightness among various populations. A study conducted among university students in Lahore, Pakistan, found that 40% of participants experienced pain in their hamstrings, with 23.33% exhibiting hamstring tightness (11). Similarly, research from India demonstrated a high prevalence of hamstring tightness (30.83%) among individuals aged 24-35 years. These findings underscore the widespread nature of hamstring tightness across different demographics and geographic regions (12).

In one of the previous study, 150 subjects were enrolled in this study. Among the entire 150 participants , 95.3% participants had tight hamstrings in their right leg, while 94% of them had tight hamstrings in their left leg (13). This study relates to our study as it shows prevalence of hamstring tightness is very high.

As results of our research shows that long term standing also cause hamstring g tightness whose prevalence was 90.30%.Similarly, In previous study total 200 individuals were studied and amongst them 164 subjects were known as having tightness in hamstring muscle tightness according to SLR test., the frequency of hamstring muscle tightness 82%..(14)

Moreover, our study corroborates the association between prolonged standing and increased risk of calf and hamstring tightness. We found that 90.30% of chefs who reported calf and hamstring tightness worked for 5-7 hours per day, indicating a potential occupational risk factor. This observation is consistent with a study conducted in 2020, which found a 47% prevalence of iliotibial band tightness among individuals working for more than 7 hours per day (15). These findings highlight the importance of ergonomic considerations and workplace interventions to mitigate the adverse effects of prolonged standing on musculoskeletal health in chefs and other professions requiring extended periods of standing.

Furthermore, our study identified a higher prevalence of calf tightness among chefs with 5-8 years of work experience, with 91 chefs exhibiting calf tightness out of the total sample size. This finding suggests a possible cumulative effect of occupational strain on calf muscles over time. Similarly, a previous study focusing on chefs with 5 years of work experience reported calf tightness in 75 out of 126 participants, indicating a comparable prevalence rate. These findings emphasize the need for targeted interventions and ergonomic modifications to address musculoskeletal issues among chefs and promote their overall well-being.

The findings from our study also highlight the potential role of footwear in contributing to muscle tightness among chefs. In our sample, a significant number of participants with calf and hamstring tightness reported wearing non-supportive footwear for extended periods. This aligns with previous research that suggests footwear lacking proper arch support and cushioning can exacerbate muscle fatigue and tightness due to inadequate shock absorption and improper alignment of the lower extremities. Given the demanding nature of culinary professions, ensuring that chefs have access to appropriate footwear could serve as a preventive measure against muscle stiffness.

Additionally, the variability in prevalence rates of muscle tightness among chefs with different work schedules emphasizes the importance of breaks and rest periods in mitigating occupational strain. Chefs who incorporated short, regular breaks into their work routine exhibited a lower frequency of muscle tightness compared to those who did not. This observation supports existing literature on the benefits of periodic rest in reducing muscular fatigue and promoting overall musculoskeletal health. As such,

implementing structured break schedules within the culinary industry could be a valuable strategy to improve worker health and productivity.

CONCLUSION

The findings of this study reveal a notable prevalence of calf and hamstring tightness among chefs, with hamstring tightness being more prevalent than calf tightness. This suggests that culinary professionals may be particularly susceptible to musculoskeletal issues, emphasizing the importance of implementing preventive measures and targeted interventions to address these specific areas of tightness. Such interventions could include regular stretching routines, ergonomic adjustments in the kitchen workspace, and tailored exercise programs aimed at improving flexibility and reducing the risk of injury. By addressing these concerns proactively, chefs can potentially mitigate the impact of tight calf and hamstring muscles on their overall musculoskeletal health and well-being.

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Conflict of Interest:

Authors have no conflict of interest.

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