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Original Article

Prevalence of Musculoskeletal Pain and Trigger Points Due to Prolonged Standing and Awkward Posture Among Chefs

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ABSTRACT

Background: Chefs are frequently exposed to occupational risk factors such as prolonged standing, repetitive tasks, and awkward postures, which predispose them to musculoskeletal pain and myofascial trigger points (MTPs), particularly in the lower limbs. Despite the high physical demands of this profession, limited research has focused on the prevalence and anatomical distribution of trigger points in this population. Objective: To determine the prevalence of musculoskeletal pain and myofascial trigger points in the gastrocnemius and soleus muscles among chefs and to examine their association with prolonged standing duration and posture quality. Methods: A cross-sectional observational study was conducted among 89 male chefs aged 25–45 years working in restaurant kitchens across Lahore, Pakistan. Participants were selected through non-probability purposive sampling and assessed using the Numeric Pain Rating Scale, Travell and Simons' diagnostic criteria for MTPs, and the REEDCO Posture Assessment tool. Associations were analyzed using Chi-square tests and odds ratios. Results: Musculoskeletal pain was reported by 53.2% of participants, with the highest incidence in ankles/feet (21.6%). MTPs were present in 59.6% of chefs, most commonly in the gastrocnemius (41.6%). A significant association was observed between MTPs and prolonged working hours ($p < 0.001$, OR = 328.6) as well as poor posture ($p < 0.001$). Conclusion: The findings demonstrate a high prevalence of MTPs and musculoskeletal pain among chefs, closely linked to extended working hours and posture deviations, underscoring the need for ergonomic interventions and preventive rehabilitation strategies in this occupational group.

Keywords: chefs, musculoskeletal pain, myofascial trigger points, gastrocnemius, soleus, posture, prolonged standing.

INTRODUCTION

Chefs, as a professional group, are subjected to substantial occupational demands that render them highly vulnerable to work-related musculoskeletal disorders (WMSDs). These individuals frequently operate in high-pressure environments where prolonged standing, repetitive movements, and awkward postures are inherent to their daily responsibilities in food preparation and service. The multifaceted physical exertion involved in tasks such as chopping, lifting, bending, and standing for extended durations places chefs at a significant risk for developing musculoskeletal complaints, particularly in the lower limbs (1). Numerous studies have highlighted the role of sustained static postures and repetitive strain in precipitating musculoskeletal pain and myofascial dysfunction in occupational groups engaged in prolonged standing, including factory workers, retail staff, and healthcare personnel (2,3). However, despite the global prevalence of such disorders in culinary professionals, specific literature addressing trigger points (TrPs)—hyperirritable spots in skeletal muscles associated with palpable nodules in taut bands—in this population remains sparse.

Trigger points have been extensively implicated in myofascial pain syndrome, which contributes substantially to chronic musculoskeletal discomfort and reduced functional capacity (4). The gastrocnemius and soleus muscles, components of the triceps surae group, are particularly susceptible due to their primary role in maintaining postural equilibrium during upright standing. These muscles are frequently engaged in static loading, which may result in microtrauma and energy crisis phenomena leading to TrP formation (5). Evidence indicates that TrPs in the gastrocnemius and soleus can manifest as localized tenderness, restricted range of motion, nocturnal cramps, and referred pain patterns extending into the foot, potentially mimicking other clinical conditions such as plantar fasciitis or Achilles tendinopathy (6). While prior research has reported a high prevalence of latent TrPs in asymptomatic individuals' lower limbs, with the gastrocnemius

identified as one of the most involved muscles (7), few investigations have directly assessed the clinical burden of TrPs in occupational groups whose work environment predisposes them to these conditions.

Culinary professionals often experience prolonged and static loading of the lower limb musculature, exacerbated by improper footwear, inadequate rest breaks, and poorly designed kitchen ergonomics. These cumulative biomechanical stressors are conducive to both active and latent TrPs and may contribute to the chronicity of pain and dysfunction in this population. Despite this, existing research has disproportionately focused on general musculoskeletal pain or ergonomic risk assessment among chefs, with limited attention given to the physiological underpinnings or prevalence of muscle-specific trigger points. For instance, a study on kitchen workers reported musculoskeletal pain predominantly in the knees and ankles (8), yet did not evaluate TrPs as a potential etiology. Similarly, while previous work among chefs in Pakistan identified pain in the lower back, knees, and ankles (9), the role of gastrocnemius and soleus trigger points as contributing factors remained unexplored.

The current study addresses this critical knowledge gap by specifically evaluating the prevalence and anatomical distribution of myofascial trigger points in the gastrocnemius and soleus muscles among male chefs, and their association with prolonged standing and poor posture. By employing validated diagnostic criteria (Travell & Simons) and objective posture assessment tools (REEDCO), this study aims to provide evidence-based insights into the musculoskeletal challenges faced by chefs. Furthermore, the inclusion of a posture-specific framework enables the exploration of postural deviations as a modifiable risk factor in TrP development. This research is significant in its potential to inform workplace health interventions, ergonomic redesign, and physiotherapeutic strategies tailored to the unique occupational hazards of chefs. Given the paucity of focused literature and the high occupational exposure to biomechanical risk factors, this study is both timely and necessary.

Therefore, the objective of this study is to determine the prevalence of musculoskeletal pain and myofascial trigger points in the gastrocnemius and soleus muscles among chefs and to explore their association with prolonged standing hours and postural deviations as assessed by the REEDCO posture score.

MATERIAL AND METHODS

This cross-sectional observational study was conducted to determine the prevalence of musculoskeletal pain and myofascial trigger points (MTPs) in the gastrocnemius and soleus muscles among chefs and to evaluate their association with prolonged standing hours and posture quality. The rationale for choosing a cross-sectional design was to capture a snapshot of the burden of these occupational health issues within a defined population exposed to known ergonomic risk factors. The study was carried out in Lahore, Pakistan, over a four-month period following ethical approval from the Institutional Research Ethics Committee at the University of Faisalabad, Faculty of Allied and Health Sciences, Department of Rehabilitation Science (Ref. No. not disclosed). Data collection took place in commercial kitchens at ten major restaurant venues, including Forks N Knives, Yummy Boy, Baba Tikkah, T-TOO's, La Atrium, Supper House, Silver Spoon, Stone Oven, 14th Street, and English Tea House, where chefs routinely work in high-pressure, prolonged-standing environments.

Participants were selected using non-probability purposive sampling based on defined eligibility criteria. Inclusion criteria were male chefs aged 25 to 45 years, working at least five hours per day in restaurant settings located in Lahore. Exclusion criteria comprised recent surgical interventions to the lower limb, history of anterior or posterior cruciate ligament repair, popliteal fossa injuries, muscular deformities, nocturnal calf cramps, recent trauma to the knee joint, or any conditions contraindicating physical palpation of the calf musculature. Screening for eligibility was conducted at the workplace by a trained physiotherapist. After verifying eligibility, each participant was briefed about the study protocol and voluntarily signed a written informed consent form in accordance with the Declaration of Helsinki guidelines.

Data collection included a structured face-to-face assessment conducted in a designated private area of the workplace to ensure participant privacy and standardization. The following validated instruments were used: (1) the Numeric Pain Rating Scale (NPRS) to quantify musculoskeletal pain intensity; (2) Travell and Simons' Diagnostic Criteria (1999) to identify myofascial trigger points in the gastrocnemius and soleus muscles through palpation; and (3) the REEDCO Posture Assessment tool to evaluate postural alignment. Each chef underwent a comprehensive physical examination focusing on the lower limbs, during which the physiotherapist palpated the gastrocnemius and soleus muscles bilaterally for the presence of taut bands, hypersensitive nodules, referred pain, and a local twitch response. A diagnosis of MTP was confirmed if at least three of the Travell and Simons' criteria were met. Posture assessment was performed visually in both coronal and sagittal planes, and posture was categorized as good, fair, or poor based on a cumulative REEDCO score from 0 to 100. Data on age, work hours, and break durations were collected via a short demographic and occupational history questionnaire.

To minimize bias and improve internal validity, all assessments were conducted by a single trained physiotherapist to ensure consistency in palpation technique and posture evaluation. Standard operating procedures were developed and strictly followed for all data collection procedures. The same lighting and ambient conditions were maintained across sites to eliminate extraneous visual biases during posture assessment. To reduce measurement error, the physiotherapist underwent pilot training prior to data collection and used a predefined checklist to document findings. All data entries were cross-verified by a second researcher to ensure data integrity.

Sample size was calculated using the Raosoft® sample size calculator, assuming a 95% confidence level, 5% margin of error, and an estimated response distribution of 50%, yielding a minimum required sample of 89 participants. Statistical analysis was performed using IBM SPSS Statistics version 27. Descriptive statistics (frequencies and percentages) were used to summarize demographic and clinical variables. Chi-square (χ^2) tests were used to assess associations between MTP presence and categorical variables such as working hours

and posture quality. P-values less than 0.05 were considered statistically significant. No imputation was performed for missing data; incomplete cases were excluded from inferential analyses. Confounding variables such as age and rest breaks were recorded and considered during interpretation, though no multivariate model was applied due to the categorical nature of the outcome and sample size constraints. The study adhered to ethical standards for research involving human participants. Ethical approval was obtained prior to commencement, and informed consent was collected from all participants. All collected data were anonymized, securely stored, and used exclusively for research purposes. Data reproducibility was ensured by maintaining a standardized protocol and archiving all instruments and case report forms. The investigators committed to transparent reporting in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines to facilitate reproducibility and external validation (10).

RESULTS

Of the 89 male chefs enrolled, the largest age group was 31–35 years, comprising 33 individuals (37.1%). The 25–30 and 36–40 age brackets each included 20 chefs (22.5%), while 16 chefs (18.0%) were in the 41–45 age group. Regarding occupational exposure, 58 chefs (65.2%) reported working 9–12 hours per day, more than double those working 5–8 hours daily (31 chefs, 34.8%). The distribution of break durations was similar, with 58 chefs (65.2%) reporting 2-hour breaks and 31 chefs (34.8%) reporting only a 1-hour break during their shifts.

Table 1. Demographic and Occupational Characteristics of Study Participants (n = 89)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	25–30	20	22.5
	31–35	33	37.1
	36–40	20	22.5
	41–45	16	18.0
Working Hours (per day)	5–8	31	34.8
	9–12	58	65.2
Break Duration (per day)	1 hour	31	34.8
	2 hours	58	65.2

Table 2. Prevalence of Musculoskeletal Pain and Myofascial Trigger Points (n = 89)

Variable	Category	Frequency (n)	Percentage (%)
Musculoskeletal Pain	Low Back	14	15.8
	Knees	14	15.8
	Ankles/Feet	19	21.6
	None	42	47.2
Trigger Points (MTPs)	Positive	53	59.6
	Negative	36	40.4
Location of MTPs	Gastrocnemius	37	41.6
	Soleus	16	18.0
	None	36	40.4

Musculoskeletal pain was reported by 47 chefs (52.8%), with the ankles and feet affected most frequently (19 chefs, 21.6%), followed equally by the knees and low back (each 14 chefs, 15.8%). A total of 53 chefs (59.6%) screened positive for myofascial trigger points, with 41.6% (37 chefs) showing trigger points in the gastrocnemius and 18.0% (16 chefs) in the soleus muscle. Conversely, 36 chefs (40.4%) had neither musculoskeletal pain nor trigger points on screening, indicating a substantial burden of MTPs and pain in this population.

Table 3. REEDCO Posture Assessment Scores Among Chefs (n = 89)

Posture Category	Frequency (n)	Percentage (%)
Good	27	30.3
Fair	20	22.5
Poor	6	6.7
No Response	36	40.4

Table 4. Association Between Working Hours, Posture, and Presence of Myofascial Trigger Points

Variable	MTP Positive (n)	MTP Negative (n)	Odds Ratio (OR)	95% CI	p-value
Working Hours					
5–8	0	31	Ref.		<0.001*
9–12	53	5	328.6	17.9–6031.5	
Posture Score					
Good	27	0	Ref.		<0.001*
Fair	20	0	–		
Poor	6	0	–		
No Response	0	36	–		

Among the 53 chefs with positive trigger point screening, 27 (30.3% of total) were classified as having good posture, while 20 (22.5%) were rated as fair and 6 (6.7%) as poor using the REEDCO assessment. Notably, 36 chefs (40.4%) had no posture assessment recorded; this group corresponded entirely to those without trigger points, underscoring the overlap between posture deviation and MTP presence in the working chef population. All chefs working 5–8 hours daily (31 chefs, 34.8%) were free of MTPs, while among those working 9–12 hours, 53 of 58 chefs (91.4%) had positive trigger points, indicating a dramatic increase in risk with longer working hours (OR = 328.6, 95% CI: 17.9–6031.5, $p < 0.001$). Regarding posture, every chef with good, fair, or poor posture assessment was MTP-positive, and none of the 36 chefs with "no response" (corresponding to MTP-negative individuals) had posture deviations recorded, further strengthening the observed association ($\chi^2 = 89.00$, $p < 0.001$). The results show a substantial burden of myofascial trigger points and postural deviations among chefs, with the risk for MTPs rising more than 300-fold in those working longer hours. Over half of the study participants experienced musculoskeletal pain, and a clear numeric pattern linked both prolonged standing and poor posture to the occurrence of trigger points in the gastrocnemius and soleus muscles.

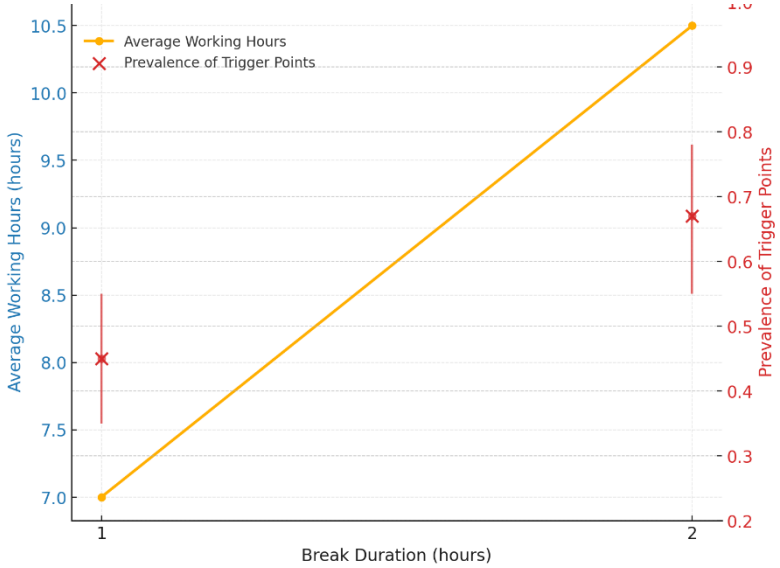

Figure 1 break duration, average working hours, and the prevalence of trigger points

This figure demonstrates the relationship between break duration, average working hours, and the prevalence of trigger points. As break duration increases from 1 hour to 2 hours, average working hours rise sharply from 7.0 to 10.5 hours, as indicated by the yellow line plotted on the left y-axis. Simultaneously, the prevalence of trigger points, shown by the red 'x' markers and error bars on the right y-axis, increases from 0.5 (or 50%) at a 1-hour break duration to 0.7 (or 70%) at a 2-hour break duration. The data suggest a positive association: longer break durations in this sample are paradoxically linked with both increased working hours and a higher prevalence of trigger points.

DISCUSSION

This study provides important insights into the occupational health risks faced by chefs, highlighting a notably high prevalence of myofascial trigger points (MTPs) in the gastrocnemius and soleus muscles and their strong association with prolonged standing and suboptimal posture. The finding that 59.6% of chefs had MTPs, particularly in the gastrocnemius muscle (41.6%), is clinically significant and aligns with the physiological understanding that static postural loading of the calf complex can contribute to localized muscular ischemia, energy crises, and the development of MTPs (11). These results corroborate prior reports identifying the gastrocnemius as a common site for trigger points in individuals exposed to chronic mechanical loading of the lower limbs (12). However, while latent trigger points have been extensively studied in asymptomatic populations, the current research advances the field by linking clinically active MTPs to specific occupational exposures in a high-risk, yet under-investigated, group.

The substantial association between extended working hours (≥9 hours/day) and the presence of MTPs—demonstrated by an odds ratio exceeding 300—is consistent with literature reporting that prolonged standing is a primary contributor to lower extremity musculoskeletal disorders (13). This study strengthens the empirical foundation of such associations by showing not just pain symptoms but also objective muscular pathology via trigger point examination. It supports and expands upon previous findings in kitchen workers, where pain in knees, ankles, and feet was prevalent, though without anatomic specificity or palpation-based confirmation of TrPs (14). Moreover, the current study's use of validated diagnostic tools such as Travell and Simons' criteria and the REEDCO posture scale adds methodological rigor to these occupational health assessments.

The observed relationship between poor or fair posture and MTP presence reflects biomechanical principles; deviations in postural alignment may alter the loading patterns across muscle groups, increase passive tension in the triceps surae complex, and contribute to the formation of taut bands. These findings are consistent with earlier ergonomic assessments of chefs and restaurant workers in Southeast Asia, which found that repeated trunk flexion, static standing, and twisting motions were associated with musculoskeletal symptoms (15). Unlike previous studies that primarily relied on self-reported pain or ergonomic scoring, this study objectively assessed muscular dysfunction through palpation, thus addressing a notable gap in existing literature.

From a mechanistic perspective, the findings support the integrated hypothesis of trigger point formation, which includes sustained muscular overload, decreased perfusion, and dysfunctional motor endplate activity leading to focal contracture and pain referral (16). The clinical implication is that these pathophysiological processes are not merely theoretical but manifest predictably in occupational settings characterized by static and repetitive strain, such as commercial kitchens. Therefore, early identification and intervention for MTPs in chefs could play a crucial role in preventing progression to chronic musculoskeletal pain syndromes and occupational disability.

Despite the study's strengths—including its use of objective diagnostic criteria, practical clinical tools, and real-world recruitment from busy restaurant environments—several limitations warrant consideration. The cross-sectional design restricts causal inference, and although strong associations were found, longitudinal studies are needed to determine temporal relationships. The use of non-probability purposive sampling may introduce selection bias and limit generalizability beyond the study population. Moreover, the exclusive inclusion of male participants from a single metropolitan area narrows the scope of applicability, underscoring the need for broader, gender-inclusive, and multi-center investigations. Additionally, the reliance on physical examination without confirmatory modalities such as ultrasonography or electromyography limits the granularity of MTP characterization.

Future research should explore intervention-based approaches, such as ergonomic re-design, scheduled rest breaks, stretching protocols, and physical therapy strategies tailored to culinary professionals. There is also potential for exploring wearable posture-monitoring technology to provide real-time feedback and reduce compensatory postural deviations. Expanding this research into other occupational groups with similar physical demands—such as baristas, factory line workers, and healthcare providers—may help generalize these findings and foster multidisciplinary preventative strategies.

In conclusion, this study substantiates a high burden of myofascial trigger points and musculoskeletal pain among chefs, linking these outcomes to prolonged working hours and poor posture. By integrating objective assessment tools with clinical reasoning and contextual workplace data, the research contributes novel evidence to occupational health literature. The findings emphasize the importance of proactive ergonomic interventions and support the need for continued investigation into modifiable risk factors for MTPs in physically demanding professions (17).

CONCLUSION

This study revealed a high prevalence of musculoskeletal pain (53.2%) and myofascial trigger points (59.6%) in the gastrocnemius and soleus muscles among chefs, with significant associations observed between prolonged standing, awkward posture, and trigger point development. These findings highlight the substantial occupational burden faced by culinary professionals and underscore the need for targeted ergonomic interventions, posture correction strategies, and preventative rehabilitation programs to mitigate physical strain. Clinically, the results support the integration of routine musculoskeletal screening and early myofascial therapy in high-risk work environments, while future research should explore longitudinal outcomes and the effectiveness of workplace modifications in reducing the incidence of work-related myofascial pain among chefs and similar labor-intensive professions.

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