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Original Article

Association of Levator Scapulae Syndrome with Neck Pain, Neck Disability, and Upper Limb Dysfunction Among Culinary Professionals: A Cross-Sectional Survey

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ABSTRACT

Background: Culinary professionals are exposed to repetitive upper-limb activity, prolonged standing, sustained neck flexion, shoulder-girdle loading, and constrained work postures, which may increase their risk of work-related neck and shoulder musculoskeletal disorders. Levator scapulae syndrome is a clinically relevant but under-recognized contributor to neck pain and functional limitation in occupational groups with repetitive manual demands. Objective: To determine the prevalence of levator scapulae syndrome and examine its association with pain severity, neck disability, and upper extremity function among culinary professionals with chronic neck pain. Methods: This cross-sectional observational survey included 150 culinary professionals aged 20–40 years with at least three months of neck pain. Participants were recruited through non-probability purposive sampling and equally categorized as sous chefs, commis chefs, pastry chefs, street food cooks, and home chefs. Levator scapulae syndrome was assessed clinically, while pain severity, neck disability, and upper extremity function were measured using the Numeric Pain Rating Scale, Neck Disability Index, and Upper Extremity Functional Index. Associations were analyzed using Pearson chi-square tests in SPSS version 27. Results: Levator scapulae syndrome was present in 85 of 150 participants, giving an overall prevalence of 56.7%. Prevalence was highest among pastry chefs (63.3%), followed by commis chefs and street food cooks (60.0% each), sous chefs (56.7%), and home chefs (43.3%). LSS was significantly associated with pain severity across all chef categories. Associations with neck disability were significant among commis, pastry, and home chefs, while upper extremity functional limitation was significantly associated with LSS among sous chefs, street food cooks, and home chefs. Conclusion: Levator scapulae syndrome was common among culinary professionals with chronic neck pain and was consistently associated with greater pain severity, while disability and upper extremity functional associations varied by chef role. Occupational screening and ergonomic prevention strategies may help reduce symptom burden in this population. Keywords: Culinary Professionals; Levator Scapulae Syndrome; Neck Pain; Neck Disability; Upper Extremity Function; Work-Related Musculoskeletal Disorders

INTRODUCTION

Levator scapulae syndrome is a clinically relevant musculoskeletal condition characterized by pain, stiffness, tenderness, and myofascial trigger-point involvement around the upper cervical region and the superior or upper medial border of the scapula. The levator scapulae muscle contributes to scapular elevation, downward rotation of the scapula, and cervical extension and lateral flexion; therefore, sustained cervical flexion, repetitive upper-limb activity, and prolonged shoulder-girdle loading may increase mechanical stress on this muscle. Clinically, involvement of the levator scapulae may present with localized pain around the upper medial scapular border, neck stiffness, painful cervical movement,

shoulder-region discomfort, and functional limitation, particularly when symptoms are associated with muscle tightness and trigger points (1).

Work-related musculoskeletal disorders remain a major occupational health concern in physically demanding professions, including food-service and culinary occupations. Culinary professionals frequently perform repetitive chopping, lifting, stirring, carrying, plating, cleaning, and prolonged standing tasks under time pressure, often in constrained workspaces that promote forward head posture, sustained neck flexion, shoulder elevation, and repeated upper-limb loading. Previous occupational studies have reported a high burden of musculoskeletal symptoms among restaurant and catering workers, with neck, shoulder, upper back, elbow, wrist, and low-back complaints commonly attributed to awkward posture, repetitive work, forceful exertion, and insufficient ergonomic recovery time (2). These exposures are particularly important for chefs because routine kitchen work requires simultaneous postural endurance, precision hand activity, and repetitive shoulder-girdle control.

The levator scapulae has anatomical and biomechanical features that make it vulnerable in occupations requiring sustained cervical and scapular positioning. It originates from the posterior tubercles of the transverse processes of C1–C4 and inserts along the superior part of the medial border of the scapula, with innervation from the dorsal scapular nerve and cervical nerves. Because of this anatomical course, prolonged forward head posture, repeated cervical rotation, shoulder elevation, and scapular loading can increase muscle tension and contribute to pain-sensitive trigger points or localized tenderness (3). When symptoms persist, levator scapulae dysfunction may contribute not only to neck pain but also to neck-related disability and upper extremity functional limitation, especially in workers whose job performance depends on sustained arm use and repeated cervical positioning (4,5).

Evidence from occupational groups suggests that neck and shoulder pain are common among workers exposed to repetitive upper-limb tasks and awkward postures. Studies among restaurant cooks and food-service workers have highlighted the relationship between personal work characteristics, physical discomfort, and musculoskeletal symptoms, while research among hospital food-service workers has similarly identified musculoskeletal disorders as an important occupational health problem (6,8). In chef populations, differences in job role may also influence symptom patterns because sous chefs, commis chefs, pastry chefs, street food cooks, and home chefs may differ in workload, posture, task repetition, work pace, and exposure to prolonged static positions. For example, pastry work may involve prolonged static preparation and precision tasks, while street food cooking may involve sustained standing, heat exposure, and repetitive upper-limb activity. These role-specific exposures provide a plausible basis for examining whether levator scapulae syndrome differs across culinary subgroups.

Although musculoskeletal disorders among culinary workers have been investigated, most available studies have focused on generalized musculoskeletal pain, overall body discomfort, or broader neck and shoulder complaints rather than levator scapulae syndrome as a specific clinical entity. Similarly, many studies of neck pain emphasize general cervical dysfunction or upper trapezius-related symptoms, while comparatively less attention has been given to the levator scapulae muscle despite its anatomical relevance to neck and scapular pain. This creates a clinically important evidence gap because early recognition of levator scapulae involvement may help identify culinary workers at risk of greater pain intensity, neck-related disability, and upper extremity functional limitation.

Therefore, the present study was conducted to determine the prevalence of levator scapulae syndrome among culinary professionals with chronic neck pain and to examine its association with pain intensity, neck disability, and upper extremity function across different chef categories. The study was guided by the research question: among culinary professionals aged 20–40 years with at least three months of neck pain, is the presence of levator scapulae syndrome associated with higher pain severity, greater neck disability, and poorer upper extremity function?

MATERIALS AND METHODS

This cross-sectional observational survey was conducted to evaluate the prevalence of levator scapulae syndrome and its association with neck pain intensity, neck disability, and upper extremity functional limitation among culinary professionals. A total of 150 participants were recruited using a non-probability purposive sampling approach and were distributed equally across five occupational categories: sous chefs, commis chefs, pastry chefs, street food cooks, and home chefs, with 30 participants included in each group. Participants were recruited from multiple culinary settings in Lahore, Pakistan, including hotels, cafés, restaurants, bakeries, sweet shops, food streets, and home-based culinary work environments, allowing representation of both commercial and domestic food-preparation roles.

Eligible participants were culinary professionals aged 20–40 years who worked for approximately 6–7 hours per day, had at least two years of experience in culinary work, and reported a history of neck pain for at least three months. Participants were excluded if they had a history of non-occupational repetitive strain exposure such as weight lifting, recent surgery within the previous six months, cervical radiculopathy, diagnosed subacromial bursitis, rotator cuff tear, thoracic outlet syndrome, or current physical therapy or analgesic treatment for neck pain within the previous six months. These criteria were applied to reduce clinical overlap with non-occupational or alternative sources of neck, shoulder, and upper-limb symptoms, particularly conditions that may mimic cervical or shoulder-region pain (9,10).

Sociodemographic and occupational data were collected using a semi-structured questionnaire. The recorded variables included age, sex, height, weight, body mass index, current job title, type of culinary establishment, total years of experience in the culinary field, years in the current position, average working hours per day, and average working days per week. Body mass index was calculated from measured or recorded height and weight and was treated as a continuous variable for descriptive analysis. Chef category was treated as the main occupational grouping variable, while levator scapulae syndrome status was treated as the principal clinical exposure variable. Pain intensity, neck disability, and upper extremity function were treated as the main outcome variables.

Levator scapulae syndrome was assessed using clinical symptom and examination criteria based on pain over the upper medial border of the scapula, pain radiating toward the neck or shoulder region, tenderness or tightness near the insertion of the levator scapulae at the superior angle of the scapula, presence of trigger points along the muscle, and restriction or discomfort during cervical range-of-motion assessment. The levator scapulae length test was performed bilaterally in a seated position. Each participant was instructed to sit upright while the tested shoulder was stabilized downward; the examiner then passively flexed the neck, rotated it contralaterally, and added slight lateral flexion away from the tested side. Reproduction of stretch discomfort, tightness, tenderness, or trigger-point pain along the levator scapulae region was considered clinically suggestive of levator scapulae involvement (11,12).

Pain intensity was measured using the Numeric Pain Rating Scale, an 11-point self-reported scale ranging from 0 to 10, where 0 indicates no pain and 10 indicates the worst imaginable pain. Scores were interpreted as no pain at 0, mild pain at 1–3, moderate pain at 4–6, and severe pain at 7–10 (13). Neck-related disability was assessed using the Neck Disability Index, which contains 10 items scored from 0 to 5, producing a maximum raw score of 50, with higher scores indicating greater disability related to neck pain (14). Upper extremity function was assessed using the Upper Extremity Functional Index, a 20-item self-reported instrument scored from 0 to 4 per item, producing a total score out of 80, where lower scores indicate greater upper extremity functional limitation (15).

To improve internal consistency and reduce measurement bias, participants across all chef categories were assessed using the same questionnaire format, clinical screening procedure, and standardized outcome tools. The same eligibility criteria were applied across all groups, and clinically overlapping conditions such as cervical radiculopathy, rotator cuff tear, subacromial bursitis, and thoracic outlet

syndrome were excluded to reduce diagnostic misclassification. Equal group allocation was used to support comparison across chef categories. Potential confounding variables included age, body mass index, work duration, years of occupational experience, and chef category; these variables were collected to describe the sample and to support interpretation of group differences.

Data were entered and analyzed using IBM SPSS Statistics version 27. Continuous variables, including age, height, weight, and body mass index, were summarized as mean and standard deviation. Categorical variables, including chef category and levator scapulae syndrome status, were summarized as frequency and percentage. The prevalence of levator scapulae syndrome was calculated overall and within each chef category. Associations between levator scapulae syndrome and pain severity, neck disability, and upper extremity functional limitation were assessed using Pearson chi-square tests after categorization of outcome scores according to their respective scale interpretation criteria. Statistical significance was set at $p < 0.05$. Findings were interpreted with attention to the cross-sectional design, non-probability sampling approach, and potential confounding by occupational and demographic characteristics.

Data integrity was maintained through structured data collection, uniform coding of variables, and analysis of the final dataset using predefined variable categories. Descriptive and inferential outputs were reviewed for consistency between text and tables, with particular attention to matching denominators, percentages, and p-values across chef categories. Because the study used a cross-sectional design, the analysis was interpreted as evidence of association rather than causation.

RESULTS

A total of 150 culinary professionals were included in the analysis, with equal representation from five occupational categories: sous chefs, commis chefs, pastry chefs, street food cooks, and home chefs, with 30 participants in each group. The demographic profile of participants is presented in Table 1. The overall mean age of the sample, derived from the five group means, was 29.46 years. Sous chefs had the highest mean age at 33.00 ± 3.31 years, followed by street food cooks at 31.23 ± 5.58 years and home chefs at 29.16 ± 7.33 years, while commis chefs were the youngest group with a mean age of 25.00 ± 3.19 years. One-way comparison of the reported group summary values showed a statistically significant difference in age across chef categories, with a moderate-to-large between-group effect. Mean body weight also differed significantly across groups, with sous chefs having the highest mean weight at 77.00 ± 7.15 kg and home chefs having the lowest mean weight at 62.30 ± 11.96 kg. In contrast, BMI values were relatively comparable across groups, ranging from 22.85 ± 3.29 kg/m² among commis chefs to 24.99 ± 4.99 kg/m² among pastry chefs, and the difference in BMI across chef categories was not statistically significant.

Table 1. Demographic Characteristics of Participants by Chef Category

Variable	Sous Chef (n = 30)	Commis Chef (n = 30)	Pastry Chef (n = 30)	Street Food Cook (n = 30)	Home Chef (n = 30)	Overall Mean*	F Statistic†	p-value†	η²†
Age, years	33.00 ± 3.31	25.00 ± 3.19	28.93 ± 5.25	31.23 ± 5.58	29.16 ± 7.33	29.46	10.09	<0.001	0.218
Height, feet	5.80 ± 0.31	5.75 ± 0.20	5.52 ± 0.43	5.65 ± 0.27	5.29 ± 0.22	5.60	14.21	<0.001	0.282
Weight, kg	77.00 ± 7.15	70.30 ± 10.82	70.23 ± 12.02	73.30 ± 9.41	62.30 ± 11.96	70.63	8.09	<0.001	0.182
BMI, kg/m²	24.77 ± 3.24	22.85 ± 3.29	24.99 ± 4.99	24.82 ± 4.13	23.83 ± 4.09	24.25	1.54	0.195	0.041

†F statistic, p-value, and η² were derived from reported group means, standard deviations, and equal group sizes; these values should be verified against the original dataset before final submission.

The prevalence of levator scapulae syndrome across chef categories is presented in Table 2. Overall, levator scapulae syndrome was present in 85 of 150 participants, giving an overall prevalence of 56.7% with an approximate 95% confidence interval of 48.7% to 64.3%. Pastry chefs demonstrated the highest prevalence, with 19 of 30 participants affected, corresponding to 63.3%. Commis chefs and street food cooks each showed a prevalence of 60.0%, while sous chefs showed a prevalence of 56.7%. Home chefs had the lowest observed prevalence, with 13 of 30 participants affected, corresponding to 43.3%. Although professional chef categories generally showed higher observed prevalence than home chefs,

the difference in LSS prevalence across chef categories was not statistically significant on chi-square comparison.

Table 2. Prevalence of Levator Scapulae Syndrome by Chef Category

Chef Category	LSS Present n (%)	95% CI	LSS Absent n (%)	Total, n	Chi-square Statistic	p-value	Cramer's V
Sous Chef	17 (56.7%)	39.2%–72.6%	13 (43.3%)	30			
Commis Chef	18 (60.0%)	42.3%–75.4%	12 (40.0%)	30			
Pastry Chef	19 (63.3%)	45.5%–78.1%	11 (36.7%)	30			
Street Food Cook	18 (60.0%)	42.3%–75.4%	12 (40.0%)	30			
Home Chef	13 (43.3%)	27.4%–60.8%	17 (56.7%)	30			
Overall	85 (56.7%)	48.7%–64.3%	65 (43.3%)	150	2.99	0.560	0.141

CI = confidence interval; LSS = levator scapulae syndrome. Confidence intervals were calculated from reported frequencies. The chi-square test compared LSS prevalence across the five chef categories.

The association of levator scapulae syndrome with pain severity, neck disability, and upper extremity function is presented in Table 3. For pain intensity measured through the Numeric Pain Rating Scale, levator scapulae syndrome showed a statistically significant association across all chef categories. The strongest statistical evidence was observed among sous chefs, where the association reached $p < 0.001$, followed by pastry chefs and home chefs, both with $p = 0.001$. Significant associations were also observed among street food cooks ($p = 0.006$) and commis chefs ($p = 0.009$). These findings indicate that the presence of levator scapulae syndrome was consistently associated with greater pain severity across all culinary subgroups.

For neck disability measured through the Neck Disability Index, the association with levator scapulae syndrome varied by chef category. Statistically significant associations were observed among home chefs ($p = 0.001$), commis chefs ($p = 0.027$), and pastry chefs ($p = 0.028$), indicating that LSS was associated with greater neck-related disability in these groups. However, the association was not statistically significant among sous chefs ($p = 0.072$) or street food cooks ($p = 0.212$). This suggests that although LSS was consistently related to pain severity, its relationship with neck-related disability was more variable across occupational categories.

For upper extremity function measured through the Upper Extremity Functional Index, statistically significant associations were observed among sous chefs ($p = 0.013$), street food cooks ($p = 0.019$), and home chefs ($p = 0.043$). The association among pastry chefs was borderline at $p = 0.050$ and should be interpreted cautiously, while the association among commis chefs was not statistically significant ($p = 0.090$). These findings suggest that LSS may be linked with upper extremity functional limitation in selected culinary roles, particularly where occupational tasks involve sustained shoulder-girdle loading, repeated upper-limb activity, or prolonged static postures.

Table 3. Association of Levator Scapulae Syndrome with Pain Severity, Neck Disability, and Upper Extremity Function by Chef Category

Chef Category	NPRS p-value	NDI p-value	UEFI p-value
Sous Chef	<0.001	0.072	0.013
Commis Chef	0.009	0.027	0.090
Pastry Chef	0.001	0.028	0.050
Street Food Cook	0.006	0.212	0.019
Home Chef	0.001	0.001	0.043

NPRS = Numeric Pain Rating Scale; NDI = Neck Disability Index; UEFI = Upper Extremity Functional Index. Pearson chi-square testing was reported in the manuscript. Additional inferential statistics such as chi-square values, degrees of freedom, odds ratios, confidence intervals, and Cramer's V for NPRS, NDI, and UEFI associations could not be calculated from the available aggregate manuscript output because the underlying cross-tabulated score categories by LSS status were not provided.

Taken together, the results demonstrate that levator scapulae syndrome was common among culinary professionals with chronic neck pain, affecting more than half of the total sample. The highest observed prevalence was found among pastry chefs, followed by commis chefs and street food cooks, while home chefs had the lowest prevalence. LSS showed the most consistent association with pain severity, as all five chef categories demonstrated statistically significant NPRS associations. In contrast, associations with neck disability and upper extremity functional limitation were more occupation-specific, suggesting that the clinical impact of LSS may vary according to job role, task exposure, and functional demands. These findings support the relevance of screening for levator scapulae involvement among culinary professionals presenting with chronic neck pain, while also indicating the need for more detailed adjusted analyses using complete participant-level data.

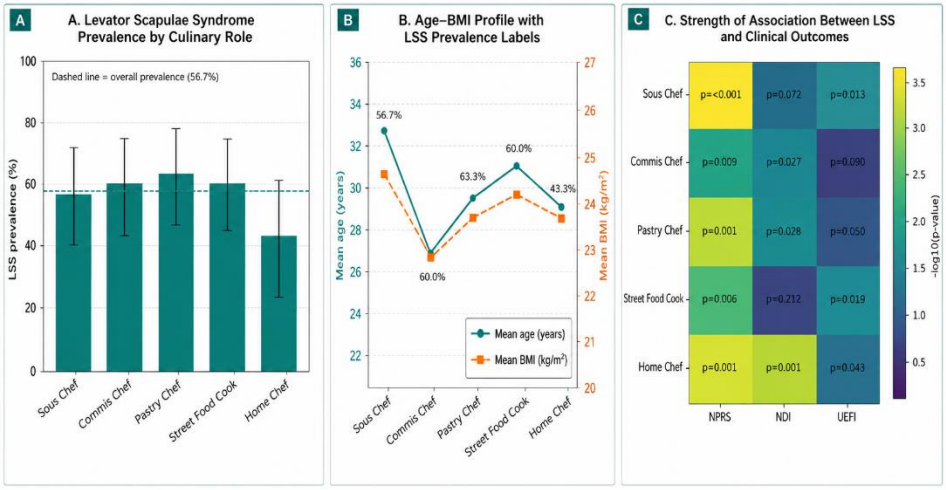

Figure 1 Clinical Burden and Association Pattern of Levator Scapulae Syndrome Among Culinary Professionals

The panelled figure demonstrates that levator scapulae syndrome affected 85 of 150 culinary professionals, giving an overall prevalence of 56.7%, with the highest burden observed among pastry chefs at 63.3%, followed by commis chefs and street food cooks at 60.0% each, sous chefs at 56.7%, and home chefs at 43.3%. The demographic gradient shows that higher LSS prevalence was not simply explained by older age or higher BMI, as pastry chefs had the highest prevalence despite a mean age of 28.93 years and BMI of 24.99 kg/m², while sous chefs had the highest mean age at 33.00 years but a lower LSS prevalence of 56.7%. Association-strength mapping further indicates that pain severity was the most consistently associated clinical outcome, with significant NPRS associations across all chef categories, whereas neck disability and upper extremity functional limitation showed more role-specific patterns, including significant NDI associations among commis, pastry, and home chefs, and significant UEFI associations among sous chefs, street food cooks, and home chefs. This pattern suggests that LSS is a clinically meaningful contributor to pain burden across culinary roles, while its functional impact may vary according to task-specific ergonomic exposure and occupational demands.

DISCUSSION

The present cross-sectional study evaluated the prevalence of levator scapulae syndrome and its association with pain severity, neck disability, and upper extremity functional limitation among culinary professionals with chronic neck pain. The overall prevalence of levator scapulae syndrome was 56.7%, indicating that more than half of the included chefs demonstrated clinical features consistent with levator scapulae involvement. The highest observed prevalence was found among pastry chefs at 63.3%, followed by commis chefs and street food cooks at 60.0% each, sous chefs at 56.7%, and home chefs at 43.3%. Although the between-category prevalence difference was not statistically significant, the observed pattern suggests that professional kitchen roles involving sustained postural loading, repetitive

upper-limb activity, and prolonged static neck or shoulder positioning may contribute to clinically relevant levator scapulae dysfunction.

The most consistent finding was the association between levator scapulae syndrome and pain severity. NPRS scores were significantly associated with LSS across all chef categories, including sous chefs, commis chefs, pastry chefs, street food cooks, and home chefs. This pattern supports the clinical relevance of the levator scapulae muscle in occupational neck pain presentations, particularly in tasks requiring repeated cervical stabilization, shoulder elevation, and upper-limb use. These findings are consistent with previous work by Liaqat et al., who reported an association between levator scapulae syndrome, neck pain, and disability in beauticians, another occupational group exposed to repetitive upper-limb activity and sustained neck postures (16). The similarity between these occupational contexts suggests that levator scapulae involvement may be an important contributor to work-related neck pain in professions characterized by repetitive manual tasks and prolonged static cervical positioning.

The association between levator scapulae syndrome and neck disability was more variable across chef categories. Significant associations were observed among commis chefs, pastry chefs, and home chefs, whereas sous chefs and street food cooks did not demonstrate statistically significant NDI associations. This difference may reflect variation in job-specific task demands, work organization, adaptive movement strategies, or symptom tolerance. Pain intensity may occur early and consistently in relation to levator scapulae involvement, while measurable disability may depend on additional factors such as workload duration, rest intervals, psychosocial stress, task autonomy, and cumulative exposure. The findings should therefore be interpreted as evidence that LSS is consistently associated with pain severity but not uniformly associated with disability across all culinary roles.

Upper extremity functional limitation also showed role-specific associations. Significant UEFI associations were observed among sous chefs, street food cooks, and home chefs, while the association among pastry chefs was borderline and the association among commis chefs was not statistically significant. This pattern suggests that functional impact may be influenced by the type of upper-limb demand rather than LSS status alone. Culinary tasks such as lifting heavy pots, repetitive cutting, sustained shoulder elevation, stirring, plating, carrying, and food preparation under time pressure may interact with cervical and scapular muscle dysfunction, producing different functional consequences across chef roles. Previous studies among chefs and food-service workers have similarly reported that work-related musculoskeletal symptoms are influenced by task repetition, posture, forceful exertion, and occupational exposure patterns (6,8,9).

The present findings also align with literature identifying the levator scapulae as a clinically important structure in neck and shoulder pain. Anatomically, the levator scapulae connects the upper cervical spine to the medial scapular border and contributes to scapular elevation and cervical movement, making it susceptible to overload during sustained forward head posture and repeated shoulder-girdle activity (3,7). Reliability and clinical assessment studies have further emphasized the relevance of levator scapulae length, stiffness, and dysfunction in individuals with mechanical or chronic neck pain (5,12). In the current study, the high prevalence of LSS among chefs with chronic neck pain supports the need to consider levator scapulae assessment as part of occupational musculoskeletal screening, rather than focusing only on generalized neck pain or upper trapezius-related symptoms.

The occupational relevance of these findings is strengthened by the physical demands of culinary work. Chefs often work in environments requiring prolonged standing, repeated upper-limb activity, forward head posture, quick transitions between tasks, and work under heat, time pressure, and limited ergonomic control. Studies among restaurant workers and chefs have reported high frequencies of musculoskeletal discomfort, particularly in the neck, shoulder, upper back, and upper limb regions, supporting the plausibility of the associations observed in this study (2,6,9,17). Pastry chefs demonstrated the highest observed LSS prevalence in the present sample, which may relate to prolonged static preparation tasks, repetitive fine motor activity, and sustained cervical flexion during baking and

decoration work. However, because exposure duration and task-specific ergonomic variables were not analyzed in adjusted models, this interpretation should be considered clinically plausible rather than confirmatory.

Several methodological limitations should be considered. First, the cross-sectional design does not allow causal inference or determination of temporality between levator scapulae syndrome and pain, disability, or upper extremity dysfunction. Second, the sample was restricted to culinary professionals aged 20–40 years with neck pain for at least three months; therefore, the reported prevalence reflects LSS among chefs with chronic neck pain rather than prevalence among all culinary professionals. Third, non-probability purposive sampling may limit generalizability beyond similar culinary settings. Fourth, potential confounders such as age, BMI, years of experience, work intensity, ergonomic exposure, physical activity, prior injuries, and non-occupational posture habits were not controlled in adjusted regression models. Fifth, the association analyses were reported using p-values without cross-tabulated outcome distributions, effect sizes, or confidence intervals, limiting interpretation of magnitude and clinical precision. Finally, multiple subgroup comparisons were performed across chef categories and outcome measures, increasing the risk of chance findings.

Despite these limitations, the study provides useful preliminary evidence that levator scapulae syndrome is common among culinary professionals with chronic neck pain and is consistently associated with pain severity. The findings also suggest that disability and upper extremity functional limitation may vary according to chef role and task-related demands. Future studies should use probability-based or multicenter sampling, include chefs with and without neck pain, apply standardized diagnostic criteria for LSS, and incorporate adjusted statistical models to account for ergonomic and demographic confounders. Longitudinal or interventional studies would be valuable to determine whether workplace ergonomic modification, stretching programs, posture education, strengthening, and early clinical screening can reduce LSS-related pain and functional limitation among culinary workers.

CONCLUSION

Levator scapulae syndrome was common among culinary professionals with chronic neck pain, affecting 56.7% of the total sample, with the highest observed prevalence among pastry chefs and the lowest among home chefs. The presence of LSS was consistently associated with greater pain severity across all chef categories, while its association with neck disability and upper extremity functional limitation varied by occupational role. These findings suggest that levator scapulae involvement is an important clinical consideration in chefs presenting with chronic neck pain, particularly in work roles involving sustained cervical posture, repetitive upper-limb activity, and shoulder-girdle loading. However, because of the cross-sectional design, non-probability sampling, and lack of adjusted analyses, the findings should be interpreted as evidence of association rather than causation. Screening for levator scapulae dysfunction, ergonomic education, early symptom recognition, and targeted preventive strategies may help reduce pain burden and functional limitations among culinary professionals.

REFERENCES

1. Gagnon P, Dunning J, Bliton P, Charlebois C, Henry N, Gorby P, et al. Dry needling in the management of chronic tension-type headache associated with levator scapulae syndrome: a case report. Clin Case Rep. 2024;12(5):e8858.

2. Tegenu H, Gebrehiwot M, Azanaw J, Akalu TY. Self-reported work-related musculoskeletal disorders and associated factors among restaurant workers in Gondar City, Northwest Ethiopia, 2020. J Environ Public Health. 2021;2021:6082506.

3. Henry JP, Munakomi S. Anatomy, head and neck, levator scapulae muscles. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2023.

4. Kini RS, Dinesh TK, Shetty A, K A. Exploring the risks faced by hotel kitchen professionals: from stovetop to safety net. Cogent Soc Sci. 2025;11(1):2460700.

5. Varol U, Valera-Calero JA, Sánchez-Jiménez E, Fernández-de-Las-Peñas C, Ortega-Santiago R, Kobylarz MD, et al. Levator scapulae stiffness measurement reliability in individuals with and without chronic neck pain by experienced and novel examiners. Sci Rep. 2024;14(1):277.

6. Abdul Aziz F, Rohizad MAA. Evaluation of the relationship between body discomfort and personal background among restaurant cooks. In: Human Factors and Ergonomics Malaysia Biennial Conference. Singapore: Springer; 2023.

7. Lee JH, Lee KW, Yi KH, Lee HJ. Anatomical analysis of the intramuscular distribution patterns of the levator scapulae and the clinical implications for pain management. Surg Radiol Anat. 2023;45(7):859-64.

8. Leong KBR, Ng QX, Gan WH, Ng WT, Lim JW. Epidemiology of work-related injuries, musculoskeletal disorders and dermatitis among hospital food service workers in a tertiary hospital in Asia. J Occup Med Toxicol. 2024;19(1):18.

9. Nazar Z, Shakeel S, Naseer A, Razzaq R. Prevalence of musculoskeletal pain among chefs working in restaurants of Sialkot. Pak J Health Sci. 2023:134-9.

10. Chiou-Tan FY. Musculoskeletal mimics of cervical radiculopathy. Muscle Nerve. 2022;66(1):6-14.

11. Moore KL, Dalley AF. Clinically oriented anatomy. Philadelphia: Wolters Kluwer; 2018.

12. Mishra A, Goyal M, Sharma S, Kumar P, Ahmed S. Establishing the inter-rater and test-retest reliability of the levator scapulae index in women with chronic mechanical neck pain: a reliability study. Int J Ther Rehabil. 2022;29(10):1-8.

13. Childs JD, Piva SR, Fritz JM. Responsiveness of the numeric pain rating scale in patients with low back pain. Spine. 2005;30(11):1331-4.

14. MacDermid JC, Walton DM, Avery S, Blanchard A, Etruw E, McAlpine C, et al. Measurement properties of the neck disability index: a systematic review. J Orthop Sports Phys Ther. 2009;39(5):400-17.

15. Paraskevopoulos E, Plakoutsis G, Papandreou M. A pilot test of the measures of the Greek version of Upper Extremity Functional Index in patients with lateral elbow tendinopathy. Med Sci. 2023;11(3):45.

16. Liaqat R, Ahmad A, Ali Z, Rehman Q, Rasool A, Zafar M. Prevalence of levator scapulae syndrome and its association with neck pain and disability in beauticians. J Health Rehabil Res. 2024;4(3):1-4.

17. Tan S, Muniandy Y, Vasanthi RK. Prevalence of musculoskeletal disorders and associated work-related risk factors among pastry chefs in Malacca, Malaysia. Int J Aging Health Mov. 2021;3(2):20-30.