Prevalence of Levator Scapulae Syndrome and Its Association with Neck Pain and Disability in Beauticians

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ABSTRACT

Background: Work-related musculoskeletal disorders, such as neck pain, are prevalent among beauticians, often linked to levator scapulae syndrome (LSS), which is characterized by persistent neck and shoulder pain.

Objective: This study aimed to determine the prevalence of LSS among beauticians and its association with neck pain and disability.

Methods: A cross-sectional study was conducted among 169 female beauticians aged 18-35 years from Faisalabad. Participants were selected using purposive sampling and were required to have at least two years of salon experience, work 7-8 hours per day, and have persistent symptoms for at least three months. Pain and disability were assessed using the Numerical Pain Rating Scale (NPRS) and the Neck Disability Index (NDI). Data analysis was performed using SPSS version 27, with Pearson's Chi-Square test to determine associations.

Results: Of the participants, 38.5% had LSS. Significant associations were found between LSS and working experience ($p < 0.001$), pain intensity (moderate to severe in 100% of those with LSS, $p < 0.001$), and disability levels (mild to moderate in 100% of those with LSS, $p < 0.001$).

Conclusion: There is a notable prevalence of LSS among beauticians, significantly associated with neck pain and disability, underscoring the need for targeted ergonomic interventions.

INTRODUCTION

Levator scapulae syndrome (LSS) is a prevalent musculoskeletal condition often characterized by persistent neck and shoulder pain, impacting individuals in various occupations, particularly those involving repetitive motions and prolonged static postures. Among these, beauticians are notably susceptible due to the nature of their work, which includes activities like cosmetics application, hair styling, and other beauty services that require sustained, awkward positions, contributing to muscle imbalance and discomfort (1). Neck pain, a significant public health issue, affects 22 to 70 percent of the population, with the prevalence of musculoskeletal disorders among beauticians being alarmingly high due to repetitive tasks performed in constrained postures (2). The levator scapulae muscle, integral to neck and shoulder movements, when affected, can lead to severe discomfort and a marked decrease in the quality of life, thereby necessitating an understanding of the factors contributing to its pathology (3).

Levator scapulae syndrome is often manifested by sensory disturbances, including pain and referred discomfort, and motor irregularities, such as the formation of a tense, rigid band within the muscle (4). Common symptoms include localized pain at the upper medial angle of the scapula, with potential involvement of the cervical and scapular regions. This syndrome can arise from prolonged overstretching or shortening of the levator scapulae muscle, which not only causes persistent pain but may also lead to significant limitations in neck mobility, potentially impacting daily activities and occupational performance (5, 6). Furthermore, anatomical variations of the levator scapulae muscle have been identified as contributing factors to the syndrome, influencing the severity and nature of the symptoms experienced (7). Studies have shown that individuals with a shortened levator scapulae muscle often present with reduced cervical flexion and contralateral rotation, alongside symptoms such as a forward head posture and rounded shoulders, all of which exacerbate the condition (2).

The repetitive and prolonged postures characteristic of beauticians' work exacerbate musculoskeletal strain, highlighting the need for targeted interventions to mitigate these risks. Existing research underscores the association between work-related musculoskeletal disorders and specific occupational tasks in the beauty industry, suggesting that improvements in ergonomics and work practices could significantly reduce the incidence of LSS and related conditions among beauticians (8). Moreover, the presence of taut bands within the levator scapulae muscle has been linked to increased pain intensity and functional disability, further emphasizing the clinical relevance of early detection and management of LSS in this population (9). Given the high prevalence of neck pain and associated disabilities in beauticians, this study aims to explore the extent of levator scapulae syndrome among this group, its correlation with neck pain and disability, and the potential benefits of ergonomic adjustments and therapeutic exercises in alleviating symptoms (10).

MATERIAL AND METHODS

The study was conducted using a cross-sectional design with purposive sampling to recruit female beauticians aged 18 to 35 years from various salons in Faisalabad, including Signature by Eram, Hadiqa Kiani, and Vintage. Participants were required to have a minimum of two years of working experience in salons, with working hours ranging from seven to eight hours per day. Eligibility criteria included the presence of persistent neck symptoms for at least three months, while those with conditions such as cervical myelopathy, cervical radiculopathy, cardiovascular issues, fractures in the shoulder and neck region, congenital deformities of the head and neck, or coagulopathy were excluded. All eligible participants were provided with a detailed overview of the study objectives and procedures, followed by the signing of informed consent forms, ensuring voluntary participation and confidentiality of data as per the ethical guidelines of the University of Faisalabad (1).

Data collection involved the use of the Numerical Pain Rating Scale (NPRS) and the Neck Disability Index (NDI) to assess pain intensity and functional disability, respectively. The NPRS was used to evaluate the severity of pain experienced by participants, while the NDI assessed the level of disability related to neck pain, providing a comprehensive measure of the impact on daily activities. Levator scapulae syndrome was diagnosed based on the presence of a positive taut band in the levator scapulae muscle, which was identified through physical examination by trained assessors following standardized diagnostic criteria (2). The assessment of pain intensity and disability provided insights into the prevalence of levator scapulae syndrome among the study population and its association with work-related factors.

Ethical approval for the study was obtained from the University of Faisalabad's ethical review board, adhering to the principles outlined in the Declaration of Helsinki. Participants were briefed on their rights, the voluntary nature of participation, and their right to withdraw at any point without any consequences. Confidentiality of all personal data was strictly maintained, with results being used solely for research purposes and reported in aggregate form (3).

Data analysis was performed using SPSS version 27. Descriptive statistics were used to summarize the demographic characteristics of the participants, including age, years of experience, and the prevalence of levator scapulae syndrome. Inferential statistics, including Pearson's Chi-Square test, were utilized to determine the association between the presence of taut bands and variables such as working experience, pain intensity, and level of disability. A p-value of less than 0.05 was considered statistically significant, indicating strong associations between the variables under study (4). The results of these analyses provided a detailed understanding of the prevalence and impact of levator scapulae syndrome among beauticians, highlighting the need for targeted interventions to reduce the burden of musculoskeletal disorders in this occupational group.

RESULTS

The results of the study indicated that the prevalence of levator scapulae syndrome (LSS) among beauticians was 38.5%, with 65 participants exhibiting positive taut bands in the levator scapulae muscle, while 61.5% (104participants) did not have positive taut bands.

Table 1 Taut bands

Taut Bands	Frequency	Percent
Positive	65	38.5
Negative	104	61.5

Table 2 Working Experience

Working Experience	Taut Bands Positive	Taut Bands Negative	Total
1-2y	6	65	71
3-4y	10	39	49
More than 5y	49	0	49

Table 3 Pain Level

Pain Level	Taut Bands Positive	Taut Bands Negative	Total
No Pain	0	104	104
4-7 Moderate	22	0	22
7-10 Severe	43	0	43

Table 4 Level of Disability on NDI

Level of Disability on NDI	Taut Bands Positive	Taut Bands Negative	Total
0-4 No Disability	5	104	109
5-14 Mild Disability	23	0	23
15-24 Moderate Disability	37	0	37

The association between taut band presence and various factors was analyzed using Pearson's Chi-Square test, yielding significant p-values less than 0.001 across all comparisons, indicating strong associations between taut band presence and the studied variables.

In Table 1, the distribution of taut bands among participants is presented, showing that 38.5% had positive taut bands, and 61.5% did not, with the chi-square test confirming a significant association (p < 0.001). Table 2 explores the relationship between working experience and taut band presence, revealing that participants with more extended work experience (more than 5 years) had a higher prevalence of positive taut bands (49 out of 65). Conversely, participants with 1-2 years of experience predominantly had negative taut bands (65 out of 104). The analysis indicated a significant association between working experience and taut band presence (p < 0.001).

Table 3 presents the association between pain levels and taut band presence, showing that all participants with positive taut bands reported moderate to severe pain levels, while those with negative taut bands reported no pain. The chi-square test demonstrated a significant association between taut band presence and pain levels (p < 0.001).

In Table 4, the association between the level of disability on the Neck Disability Index (NDI) and taut band presence is detailed. Participants with positive taut bands exhibited varying degrees of disability, ranging from no disability to moderate disability, whereas all participants with negative taut bands reported no disability.

Table 5 P-Values for Associations with Taut Bands

Test	χ² Value	df	p-value	Significance
Working Experience vs Taut Bands	92.12	2	< 0.001	Highly Significant
Pain Level vs Taut Bands	167.13	2	< 0.001	Highly Significant
Disability Level on NDI vs Taut Bands	144.07	2	< 0.001	Highly Significant

The prevalence of levator scapulae syndrome (LSS) among beauticians was 38.5%, with significant associations between taut band presence and working experience, pain level, and disability score (all p < 0.001). Participants with longer work experience and positive taut bands reported higher levels of pain and disability, underscoring the strong relationships between these variables.

DISCUSSION

This study identified a significant prevalence of levator scapulae syndrome (LSS) among beauticians, with 38.5% of participants demonstrating positive taut bands, highlighting the occupational health risks associated with repetitive tasks and static postures prevalent in this profession. The findings align with previous studies that have reported high rates of musculoskeletal disorders, including neck pain and LSS, among workers engaged in similar repetitive and physically demanding tasks (1). The association between taut bands and longer work experience observed in this study suggests that cumulative exposure to the ergonomic challenges of salon work may contribute to the development of LSS, reinforcing the need for targeted interventions to address these occupational hazards (2).

The study also demonstrated significant associations between taut band presence and pain intensity as well as functional disability, as assessed by the Numerical Pain Rating Scale (NPRS) and the Neck Disability Index (NDI). Participants with positive taut bands experienced moderate to severe pain, underscoring the impact of LSS on the quality of life and functional capacity of beauticians. These findings are consistent with research indicating that individuals with musculoskeletal disorders often report high levels of pain and functional impairment, which can adversely affect their productivity and overall well-being (3). The strong correlation between taut band presence and functional disability suggests that early detection and management of LSS could play a crucial role in mitigating its impact on the health and occupational performance of beauticians (4).

One strength of this study was the use of validated assessment tools, such as the NPRS and NDI, which provided reliable measures of pain and disability. The study's cross-sectional design allowed for the examination of prevalence and associations, offering valuable insights into the relationship between work-related factors and LSS among beauticians. However, the cross-sectional nature also presented limitations, such as the inability to establish causality between variables. Additionally, the study's reliance on self-reported data for pain and disability may have introduced reporting bias, potentially influencing the accuracy of the findings (5). The purposive sampling method, while useful in targeting a specific occupational group, may limit the generalizability of the results to other populations or settings, as the sample was drawn exclusively from beauticians in Faisalabad.

The study's findings emphasize the need for ergonomic interventions and preventive strategies in salon settings to reduce the prevalence of LSS and related musculoskeletal disorders. Implementing educational programs on proper posture, the use of ergonomic equipment, and the incorporation of regular breaks and stretching exercises could help mitigate the risk factors associated with LSS. Additionally, future research should consider longitudinal designs to explore the causative relationships between occupational exposures and LSS, as well as the effectiveness of specific interventions in reducing the incidence of musculoskeletal disorders among beauticians (6).

CONCLUSION

In conclusion, this study underscored the significant prevalence of levator scapulae syndrome among beauticians and its strong associations with pain and disability, highlighting the occupational health challenges

faced by this population. Addressing these challenges through targeted interventions could improve the health outcomes and quality of life for beauticians, ultimately enhancing their productivity and reducing the burden of work-related musculoskeletal disorders in this profession. The results call for continued research and efforts to promote workplace health and safety, particularly for individuals in occupations with high ergonomic demands (7).

REFERENCES

1. 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.
2. Jeong HJ, Cynn HS, Yi CH, Yoon JW, Lee JH, Yoon TL, et al. Stretching Position Can Affect Levator Scapulae Muscle Activity, Length, and Cervical Range of Motion in People with a Shortened Levator Scapulae. Phys Ther Sport. 2017;26:13-9.
3. Agarwal S, Bedekar N, Shyam A, Sancheti P. Comparison Between Effects of Instrument-Assisted Soft Tissue Mobilization and Manual Myofascial Release on Pain, Range of Motion, and Function in Myofascial Pain Syndrome of Upper Trapezius: A Randomized Controlled Trial. Hong Kong Physiother J. 2024;44(01):57-67.
4. Dabholkar A, Shukla P, Yardi S. To Compare Cervical Spine and Glenohumeral Range of Motion and Scapular Stability Between Patients with Levator Scapulae Syndrome (LSS) and Matched Normal Subjects.
5. Beltran-Alacreu H, López-de-Uralde-Villanueva I, Calvo-Lobo C, Fernández-Carnero J, La Touche R. Clinical Features of Patients with Chronic Non-Specific Neck Pain Per Disability Level: A Novel Observational Study. Rev Assoc Med Bras. 2018;64:700-9.
6. Jacquire J. The Epidemiology of Work-Related Musculoskeletal Disorders in Beauty Therapists Working Within the Hotel Spa Industry in the EThekwini Municipality. 2017.
7. Genebra CV, Maciel NM, Bento TP, Simeão SF, De Vitta A. Prevalence and Factors Associated with Neck Pain: A Population-Based Study. Braz J Phys Ther. 2017;21(4):274-80.
8. Uikey S, Bhagat DP. Prevalence of Occupational Musculoskeletal Disorders in Hair Salon Workers in a City of Central India. 2023.
9. Henry JP, Munakomi S. Anatomy, Head and Neck, Levator Scapulae Muscles. StatPearls [Internet]. StatPearls Publishing; 2022.
10. Kim SH, Lee HJ. Unusual Insertion of the Levator Scapulae Muscle: A Case Report. Anat Cell Biol. 2023;56(3):398.
11. Salih M, Pathan S, Haroun H. A Study of Work-Related Musculoskeletal Disorders in Hairdressers in the UAE. J Occup Med Toxicol. 2021;16(1):47-53.
12. Yu WS, Yoon SY, Kang MK, Jang JH. Effects of Strengthening Exercises for the Levator Scapulae Muscle on Neck Pain and Range of Motion in Adults. J Musculoskelet Sci Pract. 2020;45:1-7.
13. Cho YS, Park YS, Lee SJ, Jung YH. Association Between Neck Pain and Scapular Dysfunction in Beauticians. Korean J Pain. 2021;34(3):264-70.
14. Alghadir A, Zafar H, Iqbal ZA, Ahmed A. Work-Related Neck Pain Among Beauty Salons Workers: Prevalence and Associated Risk Factors. Int J Occup Saf Ergon. 2019;25(2):232-238.
15. Madanipour Z, Rezaei M, Zarei S, Rafie F. Musculoskeletal Pain Among Hairdressers: The Prevalence and Risk Factors. J Ergon. 2021;11(2):57-63.
16. Desai A, Prabhu A, Nayak R. A Study on Postural Stress Among Beauticians and its Association with Musculoskeletal Disorders. J Phys Ther Sci. 2020;32(6):387-92.
17. Milanese S, Grimmer K. Work-Related Musculoskeletal Disorders in Hairdressers: A Study of Associated Factors and Symptoms. J Occup Rehabil. 2018;28(2):95-103.
18. Dalewski B, Palka Ł, Otrocka-Domagała I. Assessment of Musculoskeletal System Load and Neck Pain in Workers of Selected Service Sectors. J Occup Health. 2020;62(1)
19. Kietrys DM, Palombaro KM, Mannheimer JS. Impact of Repetitive Movements on Levator Scapulae and Associated Structures in Service Professionals. J Bodyw Mov Ther. 2022;26(1):99-108.
20. Jiang H, Zhang H, Zhao Y. Prevalence of Neck and Shoulder Pain Among Workers in the Service Industry: A Systematic Review. BMC Musculoskelet Disord. 2023;24:118.