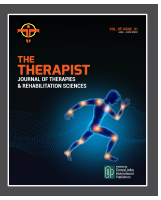
DOI: https://doi.org/10.54393/tt.v6i1.257

THE THERAPIST
JOURNAL OF THERAPIES & REHABILITATION SCIENCES
https://thetherapist.com.pk/index.php/tt
ISSN (P): 2790-7406, (E): 2790-7414
Volume 6, Issue 1 (Jan-Mar 2025)



Original Article

Prevalence of Scapulocostal Syndrome in Healthcare Professionals

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ARTICLE INFO

Keywords:
Scapulocostal Syndrome, Healthcare Professionals, Musculoskeletal Disorders, Scapular Pain and Posture-Related Pain

How to Cite:
Fatima, N., Saeed, R., Toqueer, S., Sukhera, S., Ahmed, T., & Zaidi, S. T. (2025). Prevalence of Scapulocostal Syndrome in Healthcare Professionals: Scapulocostal Syndrome in Healthcare Professionals. THE THERAPIST (Journal of Therapies &Amp; Rehabilitation Sciences), 6(1), 13–16. https://doi.org/10.54393/tt.v6i1.257

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Received Date: 23rd January, 2025
Revised Date: 15th March, 2025
Acceptance Date: 19th March, 2025
Published Date: 31st March, 2025

ABSTRACT

Scapulocostal syndrome is a musculoskeletal condition characterized by pain and dysfunction between the scapula and rib cage. It is particularly prevalent among healthcare professionals due to repetitive movements, poor posture, and prolonged static positions during patient care. **Objective:** To determine the prevalence of scapulocostal syndrome in healthcare professionals. **Methods:** It was a cross-sectional study design. A sample size of 286 was selected. The Numerical Pain Rating Scale (NPRS) and Pressure Pain Threshold (PPT) are used to assess pain. SPSS version 26.0 was used for data analysis. Functional disability was checked by using the DASH scale. PPT and trigger point palpation were used exclusively for diagnostic confirmation of SCS (per Simons' criteria) and participant eligibility. **Results:** The study involved 286 participants aged 25 to 45 years, with a majority being female (55.9%). The mean height was 1.69 ± 0.09 m, and the mean weight was 71.27 ± 14.29 kg, with 60.8% classified as overweight. Among affected muscles in scapulocostal syndrome, the rhomboid (22.0%) and serratus posterior superior (21.3%) were most common. 52.1% exhibited forward head posture (ranging from slight to severe), and 51.0% showed scapular position abnormalities. The average cervicovertebral angle was 49.75° ± 5.73°. Participants reported moderate pain levels (4.98 ± 3.24 NPRS) and moderate functional disability, with a mean DASH total score of 52.19 ± 6.70. **Conclusions:** Scapulocostal syndrome primarily affects the rhomboid and serratus posterior superior muscles. Most participants showed forward head posture, which is linked to pain and reduced function. Moderate pain and disability levels highlight the condition's impact on physical abilities.

INTRODUCTION

Scapulocostal syndrome (SCS) is a chronic myofascial pain condition that primarily affects the thoracic and scapular regions of the body [1, 2]. The pain associated with SCS is typically persistent and lasts for more than three months, qualifying it as a chronic condition. The prevalence of thoracic spine pain in the general population varies significantly, ranging from 3.0% to 55.0% annually, with a lifetime prevalence of upper back pain reaching 59.5%. SCS is particularly common among middle-aged individuals, especially those between the ages of 18 and 60 years, and is more prevalent in female than in male [3, 4]. The syndrome is notably prominent in the adult working population, which suggests that occupational factors may contribute significantly to its onset. Poor sitting posture, especially while working or using digital media, is considered a key risk factor for the development of SCS. This is largely due to the repetitive and improper use of the muscles around the scapulae, resulting in overuse disorders [5, 6]. The affected muscles involved in SCS are located around the scapulae, including the levator scapulae, upper trapezius, rhomboid major and minor, teres major and minor, infraspinatus, serratus anterior, and serratus posterior superior muscles [7]. These muscles, which are commonly involved in myofascial trigger points (MTrPs), contribute to the dysfunctional biomechanics of the scapulae and can impact the shoulder and upper back movement [8]. Furthermore, several of the muscles involved in SCS are directly attached to the rib cage, which can lead to

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alterations in chest expansion during respiration [9]. The scapular muscles, a subset of the postural muscles, play a critical role in controlling posture and facilitating efficient respiration [10]. Postural muscles serve two primary functions: maintaining posture and supporting respiratory function. The interaction between the scapular muscles and the diaphragm, a major muscle of respiration, is crucial for optimal chest expansion and diaphragmatic mobility [11]. Therefore, dysfunction in these muscles can not only impair postural control but also affect respiratory mechanics, leading to reduced functional capacity during activities that involve both posture and respiration [12]. The core muscles of the body, which stabilize the spine and pelvis, also play a significant role in supporting upper and lower limb movements [13-15].

This study aims to determine the prevalence of scapulocostal syndrome in healthcare professionals.

METHODS

This cross-sectional observational study was conducted at the Outpatient Musculoskeletal Clinic between January 2023 and June 2023, designed to evaluate the point prevalence of Scapulocostal Syndrome (SCS) and its associated factors. The sample size was calculated using Cochran's formula for prevalence studies ($n = Z^2 * P(1-P) / e^2$, where Z = 1.96, p=0.50, and e=0.05), initially targeting 437 participants. However, due to time constraints and strict inclusion criteria requiring participants aged 18–65 years with scapular pain intensity ≥5 on the Numeric Pain Rating Scale (NPRS) and at least one active myofascial trigger point (MTrP) in scapular muscles (levator scapulae, trapezius, rhomboids, etc.) per Simons' criteria only 286 participants were enrolled. Exclusion criteria included recent upper extremity trauma (<6 months), prior shoulder surgery, and systemic inflammatory conditions. A post-hoc power analysis (G*Power 3.1) confirmed sufficient statistical power (82% for NPRS pain scores, 79% for PPT-DASH correlations). Data were collected via non-probability convenience sampling and analyzed using SPSS version 28.0, with prevalence reported as proportions (95% CIs) and associations tested via specific tests (a=0.05). Participants underwent comprehensive evaluation using validated tools: NPRS (ICC=0.95; validity r=0.89 vs. VAS) for pain (score ≥5 indicating significance); Pressure Pain Threshold (PPT) via digital algometer (ICC=0.88–0.92), measured three times per site; the DASH questionnaire (α=0.96; ICC=0.96) for disability assessment (0–100 scale); and the craniovertebral angle (CV-angle) for postural analysis. SCS diagnosis required referred pain and MTrPs identified through palpation of taut bands and pain referral patterns. Scapular asymmetry was assessed via the scapular position test (≥1.5 cm difference indicating dyskinesis). These standardized protocols ensured systematic identification of SCS and its functional impacts. Participants' responses were collected. The data were analyzed using SPSS version 26.0 and interpreted to derive further results. Descriptive statistics of categorical data, such as frequency, percentage, cross-tabulation, bar charts, and pie charts, were used to represent variables. For non-categorical (continuous) data, (mean, median), dispersion (standard deviation, range), and histograms were used to summarize and interpret the data.

RESULTS

The study represents the descriptive statistics of age among the participants (n=286). The data indicates that the highest proportion of respondents (27.6%) were in the 25–30 years' age group, followed by 25.9% in the 36–40 years' age group. Participants aged 31–35 years accounted for 24.1% of the total sample, while those in the 41–45 years' group made up 22.4%. The study also represents the gender distribution of the participants (n = 286). The majority of respondents were female, comprising 55.9% of the total sample, while males accounted for 44.1%. This indicates a higher representation of female physical therapists in the study population (Table 1).

Table 1: Descriptive Statistics of Age and Gender (n=286)

Variables	Frequency (%)
Age (Years)	
25-30 Years	79 (27.6%)
31-35 Years	69 (24.1%)
36-40 Years	74 (25.9%)
41-45 Years	64 (22.4%)
Gender	
Male	126 (44.1%)
Female	160 (55.9%)

The results present the descriptive statistics for the DASH (Disabilities of the Arm, Shoulder, and Hand) scores. The mean total DASH score was 52.19 ± 6.70, with individual domain scores as follows: Physical Domain (3.01 ± 0.30), Symptoms Domain (2.97 ± 0.78), and Social/Work Domain (2.96 ± 0.63). These values suggest a moderate level of disability and symptom burden among the participants (Table 2).

Table 2: Graphical Representation of DASH (n=286)

Variables	DASH Physical	DASH Symptoms	DASH Social Work	DASH Total
Mean ± SD	3.0102 ± 0.29961	2.9708 ± 0.77545	2.9687 ± 0.62676	52.1938 ± 6.70574
Minimum	2.19	1.00	1.50	32.76
Maximum	4.05	5.00	4.33	69.83

DISCUSSION

The current study primarily investigated muscle involvement, pain levels, forward head posture (FHP), and functional disability using DAHS among individuals. It found

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that the rhomboid and serratus posterior superior muscles were most commonly affected, and a majority of participants presented with FHP, contributing to pain and disability. Similarly, Karaagaç *et al.* found that among participants with SCS, 74.67% were also diagnosed with MMP, suggesting a strong comorbidity. Positive correlations were identified between pain intensity and pressure pain threshold (PPT) in both SCS and MMP, as well as between scapular muscle sensitivity (PPT). Compared to the current study, which focused on the prevalence of muscle involvement, posture, and functional disability in SCS, this research expands the clinical understanding by linking SCS with orofacial dysfunction [16].In the current study, there were some participants whose scapula position was not normal; it could be due to the tightness of muscles around scapula, mostly the serratus anterior and rhamnoid muscles. Srijessadarak *et al.* and Narulkar et al. called Scapulocostal Syndrome (SCS), referred to as "snapping scapula," emphasizing its mechanical and anatomical origins. Unlike the current study, which focuses on the prevalence of muscle involvement, postural alterations, and functional limitations associated with SCS, Weksler's account explores less common structural causes, such as post-traumatic bony changes.The highlighted case involving a rib fracture that led to a bony callous and snapping scapula illustrates the importance of considering anatomical abnormalities in SCS diagnosis, particularly in post-trauma scenarios.While both studies recognize the role of physical therapy in management, both draw attention to surgical options when conservative treatment fails due to structural defects.Together, these findings suggest that although SCS often presents as a muscular and postural condition, as shown in the current research, clinicians must remain vigilant for underlying anatomical contributors that may warrant surgical evaluation [17, 18]. Liaqat *et al.* examined the prevalence of Levator Scapulae Syndrome (LSS) among beauticians, linking it to prolonged static postures and repetitive tasks. Similar to the current study, which also identified postural abnormalities, particularly forward head posture, as contributing factors.Both studies emphasize the role of poor ergonomics and posture in musculoskeletal syndromes affecting the scapular region [19].Mishra *et al.* discussed SCS (also referred to as levator scapulae syndrome) as a condition with symptoms often confused with cervical or visceral issues.It highlights the levator scapulae as a central pain source and notes common risk factors like poor posture, clerical work, and heavy lifting. The current study aligns with these findings by identifying scapular muscle involvement (particularly the levator scapulae and rhomboid) and poor posture in most participants, reinforcing the importance of postural correction and muscle assessment in diagnosis [20].

CONCLUSIONS

It was concluded that scapulocostal syndrome primarily affects the rhomboid and serratus posterior superior muscles. Most participants showed forward head posture, which is linked to pain and reduced function. Moderate pain and disability levels highlight the condition's impact on physical abilities.

Authors Contribution

Conceptualization: NF
Methodology: RS
Formal analysis: NF
Writing review and editing: ST, SS, TA, STZ

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

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

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