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Prevalence of Upper Cross Syndrome in Multipara Women

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Abstract

Background: Upper Cross Syndrome (UCS) is now a commonly emerging syndrome in the presently existent population. In terms of clinical features, it can be defined as a postural disorder resulting from constriction of the pectoral muscles coupled with weakness of the trapezius and deep neck flexors, leading to forward-facing head stance, rounded shoulders, and kyphosis of the thoracic cavity. Comprehensive documentation of the incidence of this syndrome in multiparous communities is lacking in the literature. As a result, a study was carried out to ascertain the prevalence of UCS in multiparous women. **Objective:** To determine the prevalence of UCS in multiparous women. **Methods:** This study was approved by the Ethical Committee and the Protocol Committee (protocol no. 629/2022-2023). The subjects of the prospective cohort study were women who are multiparous and reside in Karad, Maharashtra, India. Using cluster sampling, 76 multiparous participants were included. Assessments were conducted for individuals within the age range of 23 to 58 years, evaluating them based on Craniovertebral Angle (CVA), Forward Head Posture (FHP), pectoralis minor tightness, and deep neck flexor strength. **Results:** This research looked at 76 participants involved in the study out of which 66.7% were prone to upper cross syndrome. **Conclusion:** The prevalence of UCS was notably high among multiparous women, with poor posture habits identified as a significant risk factor.

Keywords: Craniovertebral Angle, Forward Head Posture, Pectoralis Minor Tightness, Upper Cross Syndrome

1. Introduction

UCS is distinguished by the tightness of the upper trapezius and levator scapulae on the posterior side, which intersects with the tightness of the pectoralis major and minor on the anterior side. The diminished strength of the deep cervical flexors on the front side coincides with the weakness of the middle and lower trapezius on the posterior side[1]. Effects of UCS involve lordotic curvature in the cervical spine and heightened kyphotic curvature in the thoracic spine, protracted, or rounded shoulders. The patient complains of neck pain, strain in the upper back, chest pain, shoulder numbness and tingling[2]. Muscles affected by UCS exhibit deformities, exerting strain on surrounding muscles, tendons, bones, and joints, resulting in a modified biomechanical posture in the upper back[3]. The projected occurrence of neck pain, as indicated by various studies, falls within the range of 10.4% to 21.3%, with a notably elevated prevalence observed among office and computer workers[4]. Typically, this prevalence is higher among women, in high-income nations compared to low and middle-income countries, and in urban areas as compared to rural areas[4,5]. A compelling concept was introduced by Dr. Janda categorising muscles into two groups, Postural and Phasic. Posture and muscle tone play a key role in sustaining an upright posture and tend to become tight and hypertonic. On the other hand, phasic muscles, encompassing nearly all other muscle groups, have a propensity to weaken and become hypotonic[6].

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A pattern of muscle imbalance was noticed in the shoulder and head region, primarily resulting from poor posture. This condition arises from the overuse and tightness of muscles, including the Sternocleidomastoid (SCM), upper trapezius, levator scapulae, and pectoral muscles, coupled with a concurrent weakness and lack of flexibility in the lower trapezius, serratus anterior, and deep cervical flexors. Dr. Janda coined the term "Upper Cross Syndrome" to describe this phenomenon. In contemporary terms, it is sometimes colloquially referred to as "Text Neck."[6]

The Atlanto-occipital joint, C4-C5 segments, glenohumeral joint, cervicothoracic joint, and T4-T5 segments are all affected by the series of imbalances. It is common in people with FHP, desk workers, dentists, beauticians, and so on[6].

Improper postures and habits diminish flexibility and lead to tension in muscles and soft tissues. Chronic cervical pain is caused by constantly maintained muscle contraction, fatigue, and muscle weakness[6].

According to Karel Lewitt, muscle imbalance causes functional imbalance. In Janda's perspective, muscle dysfunction refers to a state in which specific muscles undergo shortening and stiffening, while others experience weakness and inhibition. According to Janda's observations regarding UCS, this particular pattern affects the neck, upper thoracic spine, and shoulder joint. He noted that repetitive movements often prioritise the postural system at the expense of the phasic system, leading to an imbalance in muscle engagement. He further noticed that imbalance begins in the extremities of the upper limb when compared to the extremities of the lower limb in adults[6].

People exhibiting UCS typically display characteristics such as FHP, thoracic spine hunching (rounded upper back), raised and protracted shoulders, winging of the scapula, and limited movement in the thoracic spine. At times, musculoskeletal disorders can be attributed to manual material handling activities. For instance, workers engaging in tasks with improper postures and repetitive movements during their workday may be prone to such disorders[7].

Hence, the strength of muscles in the cervical region plays a crucial role in stabilising and controlling the neck. In addition to impacting daily activities, neck pain can significantly affect the work lives of individuals, resulting in work-related disruptions and economic losses for the community at large[6].

The impact of poor posture and its alignment significantly influences physical activity, with its direction contributing to heightened stress on supportive structures and repetitive bending. Consequently, achieving an optimal mechanical condition of the body holds particular importance for minimising energy consumption in both daily activities and exercise[7].

2. Methods

This study was approved by the Ethical Committee and Protocol Committee (protocol no. 629/2022-2023). The subjects of a prospective cohort study were women who are multiparous and reside in Karad, Maharashtra, India. Using cluster sampling, 76 multiparous participants were included. Assessments were conducted for individuals within the age range of 23 to 58 years, evaluating them based on the CVA, FHP, pectoralis minor tightness, and deep neck flexor strength.

The ON Protractor smartphone app was employed to measure the CVA[8,9]. Participants were directed to fixate on a specific point while maintaining an upright posture, having their foot on the floor, flexing their hips and knees to 90 degrees and sitting on a stool or plinth with hands by their sides. The angle was measured by placing a marker from C7 to the tragus and extending a horizontal line from C7 to the marker.

A measuring tape was used to take the length of the Pectoralis Minor Length (PML) measurement. The instructions for the participants were to lie down on their sides, arms at their sides, and look straight ahead. The inferior aspect of the fourth rib and the medial-inferior angle of the coracoid process were the two precise landmarks on which the measuring tape was placed. The anterior inferior edge of the ribs, one finger's width lateral to the sternum, was designated as the fourth rib landmark. Next, an inch tape was used to measure the PML at rest.

For measurement of the strength of the deep neck flexors, a test for the cervical flexion movement pattern was performed. Participants in a supine position, with no pillow under the head, were asked to flex their necks. A positive result in this test is identified when the chin or jaw protrudes forward at the onset of the movement, suggesting an overactivity or dominance of the SCM and scalene muscles over the deep cervical flexors.

3. Results

For the assessment of CVA, out of 76 participants, 43 participants were positive for FHP i.e. 43 participants had CVA<48°. Of the remaining population of 76 participants, 19 participants had CVA between 48-50° and 14 participants had CVA<50°. (Table 1)

Table 1. Craniovertebral angle distribution

Craniovertebral Angle	Frequency
Less than 48°	43
48-50°	19
More than 50°	14

For the assessment of PML measurement, out of 76 participants, 55 participants were associated with tightness of the pectoral minor muscle due to less than 13 cm length. 10 participants were in groups of 13 cm and 11 participants were in groups of more than 13 cm. (Table 2)

Table 2. Pectoral minor length distribution

Pectoral Minor Length (in cm)	Frequency
Less than 13	55
13	10
More than 13	11

In the pattern test of cervical flexion movement, out of 76 participants, 51 participants were positive whereas 25 participants were negative. (Table 3)

Table 3. Cervical flexion pattern movement test

Cervical Flexion Movement Pattern	Frequency
Positive	51
Negative	25

This study comprised a total of 76 subjects, with 50 women diagnosed with UCS. By measuring the CVA, PML and pattern test of cervical flexion movement, the outcome suggested a prevalence of 66.7% UCS in multiparous women. (Table 4 and Figure 1)

Table 4. Upper cross syndrome prevalence

	Frequency	Percentage
Upper Cross Syndrome Affected	50	66.7%
Upper Cross Syndrome Non-Affected	26	33.3%

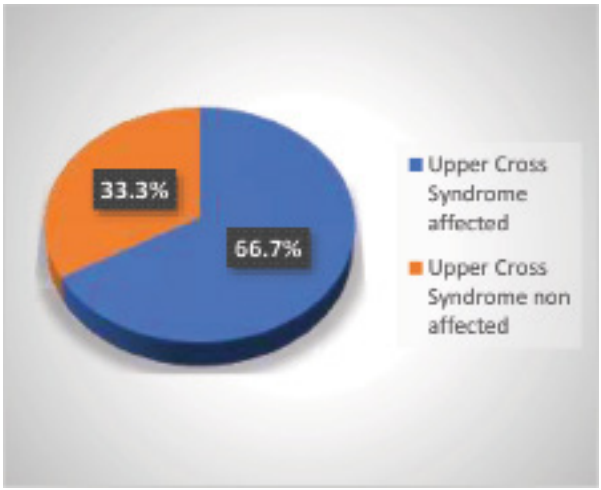

Figure 1. Upper cross syndrome prevalence.

4. Discussion

The primary objective of this study was to determine the prevalence of UCS in multiparous women. This study comprised a study population of multiparous women, with a total of 76 subjects included within the age group of 23-58 years in and around Karad. They were assessed based on the CVA, pectoralis minor tightness, and deep neck flexor strength. Among the 76 subjects, the findings revealed a prevalence of 66.7% for UCS in multiparous women.

A majority of the participants in a study by Chidiebele Petronilla Ojukwu *et al.*, breastfed more than ten times a day, with the cradle hold being the most popular breastfeeding position, with each session lasting for over 30 minutes. Prevalence of breastfed-related neck pain was observed in 51.7% of women among nursing mothers[10]. A cross-sectional study on female undergraduates was carried out by Ashiyat Kehinde Akodu in another article to look into the relationship between breast hypertrophy, FHP, and functional impairments associated with neck and shoulder pain. Among the 43 participants, he found that a forward-facing head stance was highly prevalent[11]. Twenty-eight participants had a "DD" cup size, twenty-six participants had a "DDD" cup size. Thus, a correlation between breast hypertrophy, FHP, and weight was discovered[10,11]. The current study looked at multiparous women, where 43 participants were positive for FHP.

According to a study by Akhila Krishnakumar and colleagues, when postpartum women were evaluated for scapular stability, they showed heightened pectoralis minor tightness, increased muscle strength in the bilateral

upper trapezius and decreased strength in the bilateral rhomboids and right lower trapezius[12]. This indicates that a significant number of mothers predominantly breastfed while sitting or lying down, with only a small proportion adopting an ergonomically correct posture that included back support during feeding[12]. The current study looked at the assessment of pectoral tightness, where it was found that 55 participants were associated with tightness of the pectoral minor muscle due to less than 13 cm length.

In the present study, 51 participants were positive for the pattern test of cervical flexion that suggested a decrease of strength in the flexors of the deep cervical. A report by Jyoti Kataria *et al.,* states that when the head is flexed forward while engaging in interactions with children or working on a computer, the vertebrae may not provide sufficient support for the weight of the head[13]. As a result, muscles, tendons, and ligaments exert increased effort to sustain the position and weight of the head. The extreme effort required to keep the head in a certain position is what causes the muscles and other soft tissues to tighten up over time. A shortened posture weakens the anterior neck muscles, and neuronal structures are maintained in suboptimal positions that can exacerbate anterior neck muscle weakness[13].

Chuanling Wang *et al.,* discovered that the occurrence of cervical spondylosis diminishes with age among the elderly but rises with age in the young and adult populations[14]. The primary maintenance of cervical stability relies on neck muscles, which play a crucial role in sustaining the dynamic-static balance of cervical vertebrae. However, cervical spondylosis can disrupt the normal physiological curve, thereby impacting the dynamic balance of cervical vertebrae stability[14]. Research has repeatedly shown that people who have a FHP frequently have a relatively small CVA[14]. As a result, exercise therapy has seen increased application in recent years. It has proven effective in enhancing the dynamic-static force balance of the cervical vertebrae, restoring mechanical equilibrium, and yielding positive therapeutic outcomes. This is achieved through targeted training of the neck flexors and extensor[14].

People's profiles of health and physical fitness heavily depend on their body composition. A report by Jhanvi Singh *et al.,*[15] conducted a comparative study on elderly individuals for posture and anthropometric covariates between physically active and sedentary individuals. It is a crucial component that improves maximal work capacity affecting physiological parameter[15]. It has been noted that physically inactive people often develop bad posture, such as forward-leaning shoulders and heads. In contrast, people who regularly engage in physical activity typically do not experience postural aberrations and have better anthropometric measurements[15]. Ageing-related physiological and morphological changes in the neuromuscular system result in a reduction in muscle function and performance. When coupled with a sedentary lifestyle, these changes impair older people's functional reserve capacity, resulting in diminished physical strength, slower reaction times, and poorer motor coordination in comparison to young adults[15].

5. Conclusion

In our study, 66.7% of multiparous women were found to exhibit UCS. One of the most prevalent predisposing factors for the development of UCS can be attributed to a lack of awareness and neglectful habits that contribute to poor posture. Hence, it's necessary to create postural awareness and ergonomic advice among women.

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