

Prevalence of Forward Head Posture Among Middle Adolescence School-Going Students: A Cross-Sectional Study

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ABSTRACT

Background and Objectives: Forward Head Posture is a prevalent postural deviation among school children, leading to musculoskeletal disorders. This study aimed to determine the prevalence of Forward Head Posture among school-going students.

Method: A cross-sectional study conducted on 263 students (189 boys and 74 girls) aged 12-16 years from schools in Coimbatore. Forward Head Posture is assessed using the craniovertebral (CV) angle measured with MB Ruler software. A craniovertebral angle of less than 49 degrees was classified as Forward Head Posture. Data on gender, age, weight, height, and body mass index were collected.

Result: The study found a 21.28% overall prevalence of Forward Head Posture (FHP) among the students. The prevalence was higher in girls (28.38%) compared to boys (18.52%). The mean Craniovertebral angle was 46.95° for boys and 45.59° for girls.

Conclusion: The findings indicated a significant presence of Forward Head Posture among 12-16 years old school students, particularly in females. Awareness of proper posture and ergonomic practices, along with lighter backpacks, will help mitigate this issue.

KEYWORDS: Forward Head Posture, Craniovertebral angle, Posture, Body Mass Index.

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INTRODUCTION

Posture is defined as the alignment and positioning of the body's parts for various activities [1]. Forward head posture (FHP), is the forward orientation of the head with greater lower cervical and upper thoracic flexion and upper cervical extension, which a common abnormal postural condition [2]. Poor posture causes musculoskeletal disorder, which worsen with age. Children frequently develop Forward Head Posture as a result of poor study habits, inadequate classroom furniture, heavy

backpacks, and excessive screen usage [3].

Children exhibit a high prevalence of spinal postural abnormalities, such as FHP and prolonged shoulder [1]. It is connected with the shortening of muscles such as the upper trapezius and sternocleidomastoid, causing neck and shoulder pain. Deep neck flexor muscles, such as the longus capitis and longus colli, are essential for postural adjustment and neck stability [4].

High school adolescents, who are under going fast skeletal and soft tissue growth, are

especially prone to postural difficulties caused by internal and external influences [3,4]. The school environment has a substantial impact on pupils' posture, with extended bad sitting positions during classroom activities leading to physical inactivity and static spine loading [5-8]. Inadequate furnishings and the physical demands of schoolwork exacerbate these problems [9].

Many researches have looked at the relationship between Forward Head Posture and neck pain, and they have discovered that decreased muscle fiber length and the ability to generate tension in Forward Head Posture induce significant neck discomfort [10].

Aside from severe neck pain and muscular imbalance, Forward Head Posture causes fatigue, restricted range of motion, temporomandibular joint dysfunction, teeth clenching, pinched nerves, myofascial pain syndrome, numbness, tingling in arms and hands, and muscle spasms, which interfere with daily activities [11-13].

It has been linked to chronic headaches such as tension-type, cervical, and general tension headaches, as well as trigger points in the suboccipital muscles, specifically the rectus capitis posterior minor, rectus capitis posterior major, and oblique capitis superior [14].

This posture also induce respiratory difficulties, sleep disturbances, limb numbness and a variety of degenerative diseases, including temporomandibular disorders, vertebral body abnormalities and changes in soft tissue length and strength. It causes scapula and shoulder dyskinesia, which affects daily activities [15,16].

There are currently no studies on the incidence of Forward Head Posture among schoolchildren in Tamil Nadu, India. The purpose of this study is to evaluate the prevalence of FHP among school-aged adolescents in order to better understand its scope and, ultimately, to design interventions to encourage better posture habits and prevent negative musculoskeletal health implications.

Participation is entirely voluntary and both parents/guardians and the school administration must provide written authorization. All

data are kept confidential and used only for research purposes, with no identifying information provided. By participating, children, their parents/guardians, and the school contribute to research that can assist enhance understanding of postural health and influence future preventive efforts in schools.

MATERIALS AND METHODS

This cross-sectional study looked at the prevalence of forward head posture (FHP) in 263 students, both male and female, aged 12 to 16, from government high schools in Coimbatore, Tamil Nadu. Prior to the study, individuals who satisfied the inclusion criteria but did not meet the exclusion criteria were informed of the study's objectives and procedures. Exclusion criteria were postural syndrome, neck pain, cervical fracture, whiplash injury, dysfunction, functional scoliosis, thoracic kyphosis, visual impairments, and current treatment. Each student had data taken on their gender, age, weight, height and BMI.

The craniovertebral (CV) angle, as measured using MB Ruler software, was used to determine forward head posture. Markers were applied to the tragus of the ear and the C7 spinous process. A 64-megapixel mobile phone put on a tripod and adjusted to shoulder height acquired photographs of students standing laterally, with their left shoulder facing the camera, weight uniformly distributed and eyes forward. Following head flexion and extension, a picture is captured and evaluated. A craniovertebral angle of less than 49 degrees was identified as FHP [3].

RESULTS

In this study, 263 students were evaluated, consisting of 189 boys and 74 girls. Among the boys, 35 were identified as having forward head posture (FHP), resulting in a prevalence of 18.52%. Among the girls, 21 were identified with FHP, resulting in a prevalence of 28.38%. The total number of students with FHP was 56, making the overall prevalence of FHP in the student population 21.28%. The prevalence difference between boys and girls was 9.86

Table 1: DEMOGRAPHIC DATA.

Age	Total	Male	FHP	Mean Degree	Female	FHP	Mean Degree
12	136	99	14	46.28°	37	11	45.64°
13	66	52	11	46.72°	14	4	46°
14	13	6	2	46.5°	7	1	45°
15	27	17	4	48°	10	3	45.33°
16	21	15	4	47.28°	6	2	45.5°
Total	263	189	35(18.52%)	46.95°	74	21(28.38%)	45.59°

Abbreviation: FHP – Forward Head Posture.

Table 2: BMI CLASSIFIATION.

Body Mass Index Categories		Boys	Girls
<18.5	Underweight	15	12
18.5 – 24.9	Ideal	17	7
25.0 – 29.9	Pre Obese	2	1
30.0 – 34.9	Obese Class – I	1	1
35.0 – 39.9	Obese Class – II	-	-
>40	Obese Class – III	-	-

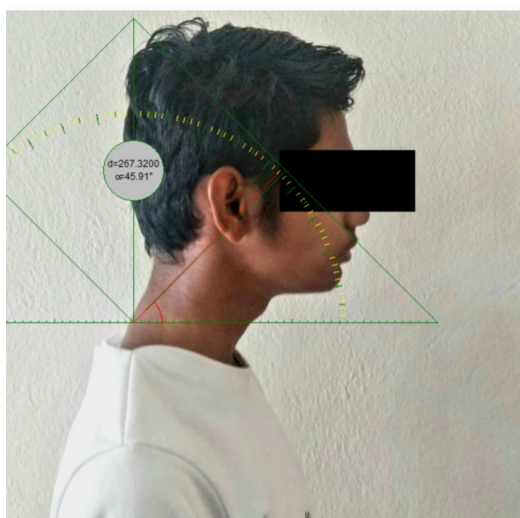


Fig. 1: Measurement of CV angle.

percentage points, indicating a higher prevalence of FHP among female students compared to male students. The mean CV angle was 46.95° for boys and 45.59° for girls.

The mean BMI for boys was 18.729, and for girls, it was 18.810. Among those with FHP, 27 were underweight, 24 had an ideal BMI, and 5 were obese.

DISCUSSION

The current study discovered that 21.28% of school children have Forward Head Posture (FHP), indicating a high prevalence of postural difficulties. Previous research supports this finding, which indicated that 66% of males and

65.7% of females ages 6 to 12 suffered musculoskeletal pain when using backpacks [17]. Similarly, this study found FHP in 56% of males and 71% of females among 300 screened students, with an average craniovertebral angle (CVA) of 42 [3]. A survey of 100 students revealed a 36% prevalence of FHP [18]. In a 2008 assessment of adolescents, forward head position is shown to be prevalent at up to 25% [19].

Adolescents are more likely to develop FHP as their use of technologies such as computers and cellphones increases [20]. This study found that cell phone addiction is frequent among young people. The study discovered that 43% had a high degree of addiction, 30% had a moderate level of addiction, and 27% had a low level of addiction [21].

Maintaining a neutral head posture during loaded isometric shoulder flexion exercises can be biomechanically beneficial, potentially lowering work-related neck and shoulder pain [22].

The primary consequence is muscle spasms and trigger points in the upper trapezius, as well as reduced neck mobility [23]. However, our study discovered a comparatively reduced prevalence of FHP, which could be attributed to various factors:

1. Growing awareness among parents and children about proper smartphone use and maintaining good posture.
2. Improved ergonomical support in classrooms, reducing neck and back strain.
3. Reduced weight of backpacks, with fewer books being carried by students.
4. Reduced workload in schools due to the introduction of smart classes. Potentially reducing the prevalence of FHP.

Limitation: In our study is that we do not focus on the contributing factors, the pain associated with forward head posture in children, or the evaluation of how FHP increases with age. This restricts our understanding of the complete scope of FHP, its development, and its impacts across different age group in children.

Recommendations: Posture education especially with gadget use. Ergonomic supports and encourage exercises that strengthen neck and back muscles. Backpack weight and usage.

CONCLUSION

This study discovered a 21.28% prevalence of Forward Head Posture (FHP) among school children, with females having a greater proportion (28.38%) than boys (18.52%). The adoption of ergonomically built furniture and lighter backpacks, as well as increased knowledge of the benefits of physical activity and screen time reduction. At this age, having FHP can lead to additional issues as an adult if not addressed. Children who do not understand the value of proper posture may have chronic discomfort, musculoskeletal ailments and other health problems later in life. Addressing FHP early is critical for preventing long-term health problems in children.

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