PREVALENCE OF POOR POSTURE AND ITS ASSOCIATED MUSCULOSKELETAL COMPLAINTS AMONG SCHOOL GOING ADOLESCENCE IN HIJA VILLAGE.

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ABSTRACT

Background: Poor posture among school-going adolescents has become an increasing health concern due to prolonged sitting, improper study habits, excessive use of electronic devices, heavy school bags, and reduced physical activity. Poor posture can lead to neck pain, shoulder pain, back pain, and other musculoskeletal problems that may affect daily activities, academic performance, and quality of life.

Aim: The study aims to determine the prevalence of poor posture and its associated musculoskeletal complaints among school-going adolescence of Hija village. Objective: To assess poor posture among school-going adolescence in Hija village, to determine the prevalence of musculoskeletal complaints and to assess musculoskeletal complaints among school going adolescence due to poor posture in Hija village.

Methods: A descriptive cross-sectional correlational study was conducted among school-going adolescents from grade 6th to 12th with age of 10 to 19 years in Hija village. Participants were selected using proportionate stratified random sampling from two schools. Posture assessment was performed using the Modified New York Posture Rating Scale, and musculoskeletal complaints were assessed using standardized Nordic musculoskeletal questionnaire. Data was analysed using descriptive and inferential statistics to determine the prevalence of poor posture and its association with musculoskeletal complaints.

Results: A total of 129 school-going adolescents participated in the study, with the majority aged 10–13 years (55.04%) and males comprising 55.81% of the sample. Musculoskeletal complaints were reported by 63.57% of participants. Posture assessment using the Modified New York Posture Rating Scale showed that 35.66% had poor posture, 33.33% had fair posture, 29.46% had good posture, and 1.55% had severe postural deviation. A statistically significant association was found between poor posture and musculoskeletal complaints ($\chi^2 = 16.89$, $p < 0.001$). Participants with poor posture had 6.51 times higher odds of reporting musculoskeletal complaints compared to those without poor posture.

Keywords: Poor postures, Musculoskeletal complaints, School-going adolescence, Hija Village

Introduction:

The human body undergoes constant changes throughout life, but the most significant challenges arise during the periods of dynamic growth due to rapid and progressive development, early adolescence is a time of chaotic physical development that is marked by poor posture, wherein the muscular system's difficulty to keep a usual link between certain body segments results in an imbalance in the musculoskeletal system among adolescents.[1] Posture refers to the body's position with support during muscular activity or during a coordinated motion of a set of muscles working together to maintain stability. Proper posture balances the body alignment and reduces stress on anatomical elements while poor posture leads to poor body alignment and results in increased strain in various body segments. A postural deviation refers to any variation from the ideal posture. Poor posture has an impact on various aspects of life and is getting increasingly widespread, according to studies. Continuous stress causes anatomical changes over time, even with mild levels of improper posture have an impact on the ability to do functional task of daily activity without any pain. Growing adolescence frequently suffers postural abnormalities as a result of bad postural habits that have evolved over time.[2]

Musculoskeletal problems are considered common in workplaces globally. Adolescents who complain of musculoskeletal discomfort are more likely to acquire chronic musculoskeletal pain as adults. MSDs are mostly caused by negative ergonomic factors, including awkward postures, long hours of work without rest, and bad working environment. School adolescents are more likely to have musculoskeletal pain as they grow and develop. MSDs in school students range in intensity from mild, temporary to severe disorders that limit physical activity, damage health, and affect daily living. [2] Students spend at least 5 hours per day in typical classrooms. Prolonged sitting can negatively impact children health, leading to musculoskeletal issues, discomfort at school, and exhaustion throughout the day. Continuous and excessive exertion of force may reduce tolerance to repeating the same effort. Excessive task requirements can raise the risk of MSDs if exceed the students' abilities.[3]

School bags are a popular way for students to carry books and supplies, among other manual load carriage methods. Ergonomic studies have identified schoolchildren's relative load (reported as a percentage of body weight) as a key factor for contributing to developing musculoskeletal problems among this age group. Carrying more than 10% of one's bodyweight of school bags causes higher energy consumption, forward lean in the neck and trunk, decreased lung volume, and increased cardio-respiratory parameters. It also impacts spinal posture, foot shape, and gait.[4]

Podrekar Loredan et al. (2024) found that musculoskeletal pain can start in primary school and is linked to extended sitting and poor posture in classroom. Neck pain, lower back pain, and shoulder pain are among the most frequently reported complaints when classroom furniture does not fit students' body dimensions. Factors which may contribute to abnormality of posture in adolescents are difference in height of desk, seat and depth resulting in unsupported feet, elevated shoulders and forward trunk lean (Castellucci, Arezes, & Viviani, 2016). Seat-desk height mismatches have been connected to higher spinal and muscular stress during prolonged classroom sitting (Loredan et al., 2024).[5]

Non-ergonomic postures, such as sitting with a slouched back or severe neck flexion when watching a screen, can result in muscle strain. Other elements that influence learning posture include lighting and digital device usage behaviors. Attending online classes, completing homework on a computer, or utilizing gadgets for studying all raise the risk of sedentary lifestyle. The World Health Organization (2020) asserted that a sedentary lifestyle and inadequate physical exercise significantly contribute to the 3 increasing prevalence of musculoskeletal complaints in adolescents. According to the World Health Organization (2020), prolonged sitting is a type of sedentary behaviour that increases the risk of musculoskeletal illnesses, obesity, and metabolic problems.[6]

A state of well-being also influences posture through a sense of energy and equilibrium. Stress can cause unconscious changes in posture. Individuals under stress generally have a lot of muscle tension and shallow, clavicular breathing. An individual's mood influences muscular tone, energy levels, and an overall sense of well-being. The most recognizable postures reflect emotions like rage, sadness, and disgust. As a result, a person's current mental state might be revealed by their body position. Adolescence is a stage of life that requires distinct health and developmental demands. This is the time to expand one's knowledge and talents, learn how to manage own emotions and relationships, and acquire new traits and abilities. It is the moment when not only self-image and self-esteem are built, but also the physiological body posture is strongly formed. Adolescents experience considerable changes in physical growth, mental health, and hormone secretion, which may explain the increase in improper posture rates with age. [7]

According to studies undertaken by the European Agency for Safety and Health at Work (EU-OSHA), MSD prevalence is particularly high among schoolchildren and young people (aged 7 to 26.5 years), with an average prevalence rate of 30%. The long-term risk of low back pain and other musculoskeletal difficulties is thought to grow with the usage of large school backpacks, leading to poor posture, changes in trunk position, and 4 eventually lower back discomfort and decreased balance. In India, research found that 53.9% of youngsters had experienced back pain over the prior month of 2024.[8]

Recent epidemiological studies indicate a significant increase in prevalence and incidence among teenagers globally, including in Portugal. This trend may lead to chronic conditions that persist in adulthood. Multiple studies suggest that MSDs can be caused by social, psychological, environmental, and behavioral variables, in addition to physical ones. Researching the prevalence of childhood and adolescent disorders, identifying contributing factors, and evaluating the impact of quality-of-life measures are major challenges for both health professionals and the general population. These problems have a deleterious influence on both adolescents and adults, making it a significant public health issue.[9]

According to many studies these disorders affect approximately 50% of healthy adolescents. Scoliosis is one of the illnesses that might be detected during school screenings. Idiopathic scoliosis is the most prevalent kind in adolescents, accounting for 80-90% of all instances. Kyphosis is the second most prevalent spinal condition, affecting 1-8% of individuals across various communities. Early identification and treatment can effectively eliminate and modify this disorder.[10]

Aim: To determine the prevalence of poor posture and its associated musculoskeletal complaints among school-going adolescence of Hija village.

Objectives:

1. To assess poor posture among school-going adolescence in Hija village.
2. To determine the prevalence of musculoskeletal complaints among school going adolescence in Hija village.
3. To analyse the association between poor posture and musculoskeletal complaints.

Research Question:

1. What is the prevalence of poor posture among school-going adolescence in Hija village.
2. What is the prevalence of musculoskeletal complaints among school-going adolescence in Hija village.
3. Is there any association between poor posture and musculoskeletal complaints among school-going adolescence.

Methodology:

1. Study Designed: Descriptive cross-sectional study.
2. Study setting: Government Higher Secondary School, Hija. Bumer Memorial School, Keilya, Hija-I.
3. Study Duration: 1 year
4. Sampling population: 194 students
5. Sample size: 129
6. Sampling Technique: Stratified proportionate simple random sampling.
7. Method of Data collection: offline form questionnaire.
8. Target population: Class/Grade 6 – 12th
9. Selection criteria:

A. Inclusion criteria:

a. Age: 10-19 years.[25]
b. Gender: Both Male & Female.
c. Students present on that day.

B. Exclusion criteria:

a. Students with congenital musculoskeletal deformities (scoliosis, kyphosis etc.) Barbers with known neurological or systemic disorders (e.g., rheumatoid arthritis, stroke).
b. History of trauma or surgery to the spine or limbs.
c. Neurological disorders (CP, Muscular dystrophy)
d. Students unwilling to participate.
e. Students who were absent.

10. Materials used:

1. Printed based questionnaires
2. Pen
3. Paper
4. Pencil

Measuring Tool:

1. Standardized Nordic Musculoskeletal Questionnaire.[22]
2. Modified New York Posture Rating Scale using Plumb Line method.[23,24]

STATISTICAL TOOLS:

1. Data analysis has been done using Microsoft excel, 2016.
2. Chi-square test was used to determine the association between poor posture and musculoskeletal complaints among school-going children.

Data collection procedure

Prior to data collection, ethical approval was obtained from the Institutional. Participants were approached during the least busy hours to minimize any disturbances with their duties. Each participant received an information sheet about the study's objectives, risk and benefits of participation, right to withdraw at any time, confidentiality assurance. The written informed consent was obtained from every participant before data collection started. Data was primarily collected through face-to-face interviews and filling up the questionnaire form for clarity and completeness. Completed forms were securely collected immediately after completion. The data were presented as measures of frequency and percentage of the variables with graphs. The results were analyzed using Microsoft Office Excel.

Result

In this study, out of 129 participants, the majority belonged to the age group of 10–13 years, accounting for 55.04% (n=71), followed by 14–16 years with 27.91% (n=36), while the least number of participants belonged to the age group of 17–19 years with 16.28% (n=21) (table 1)

Table 1. Age Distribution

Age Range (Years)	Frequency (n=129)	Percentage (%)
10-13	71	55.04
14-16	36	27.91
17-19	21	16.28

Among the total participants, 55.81% (n=72) were males and 44.19% (n=57) were females. This indicates that male participants were slightly higher in number compared to female participants. (Table 2)

Table 2. Gender Distribution

Gender	Frequency (n=129)	Percentage (%)

Male	72	55.81
Female	57	44.19

The highest proportion of participants belonged to Class 8, comprising 26.36% (n=34), followed by Class 10 with 17.83% (n=23) and Class 9 with 17.05% (n=22). The least number of participants belongs to Class 11 with 3.88% (n=5). The mean class/grade of the participants was 8.96 ± 1.76. (Table 3)

Table. 3. Class/Grade Distribution

Class	Frequency (n=129)	Percentage (%)
6	9	6.98
7	17	13.18
8	34	26.36
9	22	17.05
10	23	17.83
11	5	3.88
12	19	14.73
Mean = 8.96 ±1,76		

Among the participants, 60.47% (n=78) were from Bummer Memorial School, whereas 39.53% (n=51) were from Higher Secondary School Hija. This indicates that the majority of the participants were from Bummer Memorial School. (Table 4)

Table 4. School Distribution

School	Frequency (n=129)	Percentage (%)
Higher Secondary School Hija	51	39.53
Bummer Memorial School	78	60.47

Out of 129 participants, 63.57% (n=82) reported the presence of musculoskeletal complaints, while 36.43% (n=47) reported no complaints. The findings indicate that musculoskeletal complaints were prevalent among the majority of the participants. (Table 5)

Table 5. Distribution of presence of musculoskeletal complaints among school-going adolescence.

NMQ	Frequency (n=129)	Percentage (%)
Yes	82	63.57
No	47	36.43

Among the participants, 35.66% (n=46) had poor posture, 33.33% (n=43) had fair posture, and 29.46% (n=38) had good posture, while only 1.55% (n=2) had severe posture abnormality. The results indicate that poor posture was common among the participants. (Table 6)

Table 6. Distribution of posture rating among school-going adolescence using NYPR

NYPR	Frequency (n=130)	Percentage (%)
Severe	2	1.55
Poor	46	35.66
Fair	43	33.33
Good	38	29.46

The proportion of participants reporting musculoskeletal complaints was substantially higher among those with poor posture (87.0%, *n* = 40) compared to those without poor posture (56.6%, *n* = 42). Conversely, the absence of musculoskeletal complaints was more common in the not poor posture group (49.4%) than in the poor posture group (13.0%). These findings suggest that poor posture is significantly associated with the presence of musculoskeletal complaints. (Table 7)

Table 7. Association between poor posture and musculoskeletal complaints among school-going adolescence

Posture Status	MSK Complaints Present	MSK Complaints Absent	Total
Poor Posture	40 (87.0%)	6 (13.0%)	46 (100%)
Not Poor Posture	42 (50.6%)	41 (49.4%)	83 (100%)
Total	82 (63.6%	47 (36.4%)	129 (100%)

Discussion

The present study was conducted to assess the prevalence of poor posture and its associated musculoskeletal complaints among school-going adolescents in Hija village. A total of 129 adolescents participated in the study. The findings of the present study showed that poor posture and musculoskeletal complaints were common among adolescents, and a significant association was observed between poor posture and musculoskeletal complaints.

In the present study, the majority of participants belonged to the age group of 10–13 years (55.04%). This indicates that early adolescents formed the major proportion of the study population. Adolescence is an important stage of physical growth and development during which improper postural habits may easily develop due to prolonged sitting, school-related activities, increased academic workload, and excessive use of electronic devices. During this period, adolescents may spend long hours in sitting positions during classroom learning, studying, or mobile phone usage, which may negatively influence posture and musculoskeletal health.

The present study included both male and female participants, with males constituting 55.81% and females 44.19%. The inclusion of both genders provided a broader understanding of posture and musculoskeletal complaints among school-going adolescents.

The findings of the present study revealed that 63.57% of participants reported musculoskeletal complaints. This finding indicates that musculoskeletal complaints were highly prevalent among school-going adolescents. The high prevalence observed in the present study may be due to prolonged sitting posture during classroom activities, poor ergonomics, carrying heavy school bags, lack of physical activity, and increased screen time among adolescents. Similar findings were reported in a study conducted in Turkey by Serpil, Ozdemir et al. 2020 where a high prevalence of musculoskeletal pain was observed among adolescents, and poor sitting posture and school bag carriage were identified as important contributing factors.

The recent study also assessed posture using the New York Posture Rating Scale and found that 35.66% of participants had poor posture, while 33.33% had fair posture. Only 29.46% demonstrated good posture. These findings suggest that postural deviations are common among school-going adolescents. Poor posture during adolescence may gradually result in muscle imbalance, spinal stress, fatigue, and musculoskeletal discomfort if not corrected early. A study published in BMC Musculoskeletal Disorders by Brink Y, Louw Q, Grimmer K et al. 2014. also reported that prolonged poor sitting posture among adolescents may contribute to musculoskeletal symptoms and spinal stress.

Another important finding of this study was the significant association between poor posture and musculoskeletal complaints. Among participants with poor posture, 87.0% reported musculoskeletal complaints, whereas complaints were less common among participants without poor posture. Statistical analysis revealed a significant association between poor posture and musculoskeletal complaints ($\chi^2 = 16.89$, $p < 0.001$). These findings indicate that 31 adolescents with poor posture were more likely to experience musculoskeletal complaints compared to those without poor posture.

The odds ratio of 6.51 further suggests that adolescents with poor posture were more than six times more likely to develop musculoskeletal complaints compared to adolescents without poor posture. The phi coefficient ($\Phi = 0.36$) indicated a moderate to strong relationship between posture and musculoskeletal complaints. Similar findings were reported by Serpil, Ozdemir et al. 2020 which found that poor posture, prolonged sitting, and improper ergonomic habits were significantly associated with neck pain, back pain, and other musculoskeletal complaints among adolescents.

The findings of the present study may also be explained by modern lifestyle habits among adolescents. Increased use of smartphones, computers, and prolonged screen exposure often encourage forward head posture, slouched sitting, and reduced physical activity. These factors may place continuous strain on muscles and joints, contributing to musculoskeletal discomfort and postural abnormalities. Studies have shown that prolonged poor posture and sedentary habits can negatively affect spinal alignment and musculoskeletal health among school-going children. Li C, Zhao Y, Yu Z, et al 2023.

The present study highlights the importance of early screening and identification of posture related problems among adolescents. School authorities, teachers, parents, and healthcare professionals should encourage correct sitting posture, proper ergonomic practices, regular physical exercise, stretching activities, and awareness regarding posture correction. Early preventive interventions may help reduce musculoskeletal complaints and improve the physical health and quality of life of adolescents. Yengkhom S et al. 2025.

Overall, the findings of the present study conclude that poor posture and musculoskeletal complaints are highly prevalent among school-going adolescents, and poor posture is significantly associated with musculoskeletal complaints. Therefore, appropriate preventive and corrective measures should be implemented to promote healthy posture and reduce musculoskeletal problems among adolescents.

Conclusion:

The present study was conducted to assess the prevalence of poor posture and its associated musculoskeletal complaints among school-going adolescents in Hija. The findings of the study revealed that musculoskeletal complaints were highly prevalent among adolescents, with more than half of the participants reporting musculoskeletal discomfort. The study also found that a considerable proportion of adolescents demonstrated poor posture. Furthermore, a statistically significant association was observed between poor posture and musculoskeletal complaints. Adolescents with bad posture were shown to have a higher risk of developing musculoskeletal symptoms than those without poor posture. These findings imply that poor posture may have a significant influence in the development of musculoskeletal issues among school-aged adolescents. The study highlights the importance of early identification and correction of postural abnormalities during adolescence. Adolescents should be encouraged to practice proper posture, ergonomic awareness, regular physical exercise, and preventative treatments to lower the possibility of musculoskeletal problems and promote improved musculoskeletal health. Overall, the present study concludes that poor posture and musculoskeletal complaints are common among school-going adolescents, and poor posture is significantly associated with musculoskeletal complaints. Therefore, appropriate preventive and corrective strategies should be implemented in schools and communities to improve posture and reduce musculoskeletal problems among adolescents.

Limitation:

The present study had certain limitations that should be considered while interpreting the findings.

1. The study was conducted only among school-going adolescents from two schools in Hija; therefore, the findings may not be generalizable to all adolescents in other regions or populations.
2. The sample size was relatively small, which may limit the wider applicability of the study findings.
3. Musculoskeletal complaints were assessed based on self-reported responses from participants, which may have introduced recall bias or reporting bias.
4. Certain factors such as duration of mobile phone usage, physical activity level, ergonomic practices, body mass index, and school bag weight were not assessed in the present study, although they may influence posture and musculoskeletal complaints.
5. The posture assessment was conducted using the New York Posture Rating Scale, which mainly depends on observational assessment and may involve subjective interpretation.
6. The study focused only on the presence of musculoskeletal complaints and did not assess the severity, duration, or specific impact on daily activities and quality of life. Despite these limitations, the study provides valuable information regarding the prevalence of poor posture and its association with musculoskeletal complaints among school-going adolescents.

Future Recommendation:

Based on the findings of the present study on the prevalence of poor posture and associated musculoskeletal complaints among school-going adolescents in Hija village, several recommendations can be suggested. Health education programs should be conducted in schools to increase awareness among students regarding correct posture during sitting, standing, studying, and the use of electronic devices. Schools should encourage regular physical activity, stretching exercises, and participation in sports activities to improve postural alignment and reduce musculoskeletal discomfort. Teachers and parents should closely monitor students' posture habits, duration of screen time, and daily activities to prevent the development of poor postural patterns. Proper ergonomic arrangements, including suitable classroom furniture, appropriate desk and chair height, and maintenance of recommended school bag weight, should be ensured in schools. Students should also be advised to avoid prolonged use of mobile phones, computers, and other electronic gadgets without taking adequate rest breaks. Regular postural assessment and musculoskeletal screening programs should be implemented for early identification and management of postural deviations and related complaints. Physiotherapy awareness camps and posture correction programs may be organized periodically in schools to educate students regarding preventive measures and healthy posture practices. Parents should also be educated regarding the importance of maintaining a healthy lifestyle, proper study environment, and balanced physical activity among adolescents. Furthermore, future studies with larger sample sizes and inclusion of different geographical areas are recommended to obtain more generalized findings. Further research may also focus on intervention programs aimed at improving posture and reducing musculoskeletal complaints among school-going adolescents.

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