ORIGINAL ARTICLE

Contribution of Bad Posture towards Development of 'Adolescent Scoliosis' among University Students

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ABSTRACT
Background: Scoliosis, defined as an abnormal lateral curvature of spine, can affect any part of the spine. The most common regions are the chest area known as thoracic scoliosis and the lower section of the back (lumbar scoliosis). Sitting and standing with faulty posture, putting irregular exertional force on back, taking consecutive lectures for long hours are important risk factors leading to development of scoliosis.
Objectives: The objective of this study was to investigate the prevalence of adolescent scoliosis due to bad posture among university students.
Subjects and Methods: It was a cross sectional study conducted at University of Lahore with sample size of 329 students. Both male and female students were included.
Results: The prevalence of scoliosis among university students was 23.40%. Sixty percent students agreed that their backache aggravated after over activity and 41% strongly agreed that due to their bad posture they may be at increased risk of developing future scoliosis.
Conclusion: This study showed that there is a strong correlation between the bad posture and risk of developing scoliosis. Factors which leads to progression of scoliosis can be helped by early institution of physical therapy, and counselling about appropriate postural adjustments and balance improvement.

Keywords: scoliosis, spine, prevalence, posture, deformity.

INTRODUCTION
The prevalence of scoliosis in general population ranges between 0.3% to 15.3%.[1-4] Idiopathic scoliosis has an incidence of 15%. Prevalence of scoliosis is higher between the ages of 10 to 18 years. Females are more affected than males; ratio of 4:1.[4-5] In Europe, almost 1 to 14% of children are highly affected at the ages of 6 to 16 years but majority cases of scoliosis are not diagnosed due to inappropriate assessment. Only 30% of cases are identified properly, so for the proper identification effective screening tests are necessary.[5] The purpose of this study is to co-relate the bad posture and risk of developing scoliosis among university students and to assess the prevalence of scoliosis of among them.

SUBJECTS AND METHODS
It was a cross-sectional survey study carried over 3 months period using convenient sampling technique from June till August 2017 by the Department of Physiotherapy, University of Lahore (UOL). Data was collected from five universities; University of Lahore, COMSATS, University of Central Punjab, Superior University and University of the Punjab. Students were surveyed using a purpose-built proforma inquiring about any recent abnormality noted in the posture. Any reported postural abnormality related to backbone was labelled as 'adolescent scoliosis' for the purpose of this study. Though no objective assessment was carried out to confirm the developing deformity or its severity, the identified students were counselled to consult for specialist advice and were offered physical therapy for their complaints. Inclusion criteria used were university students of both genders with age ranging from 17 to 30 years. Students who had worked on laptop for longer hours and those who were taking lectures for consecutive hours were included. The exclusion criteria included students of degenerative disorder, neuromuscular problem, congenital deformity, syndromic disorder, school students and workers or professionals. In data collection procedure Likert scale questionnaire was used to collect the data and observe the prevalence of scoliosis. Data

analysis was done by SPSS 22. Qualitative variables were displayed through, bar charts, tables and mean ± standard deviation (Mean ± SD) used for Quantitative variable.

RESULTS

This study was conducted on 329 students. The students were interviewed by the researcher himself to assess the detailed different parameters and responses were noted on study questionnaire. Data was analyzed using SPPS version 22. The results of this study regarding prevalence and intensity of reported pain are depicted in Figures 1 and 2.

Table 1 clearly depicts that 40.12% students agreed, 41.34% students strongly agreed, 12.77% students disagreed, and 4.56% students strongly disagreed of thinking that their bad posture increases the risk of developing scoliosis.

Table 1: Frequency distribution of students thinking that their bad posture increases the risk of developing scoliosis

Response	Frequency	Percentage
Strongly agree	136	41.34
Agree	132	40.12
Disagree	42	12.77
Strongly disagree	15	4.56

Table 2: Frequency distribution of pain aggravation after over activity

Response	Frequency	Percentage (%)
Agree	200	60.79
Strongly agree	27	8.21
Disagree	84	25.53
Strongly disagree	18	5.47

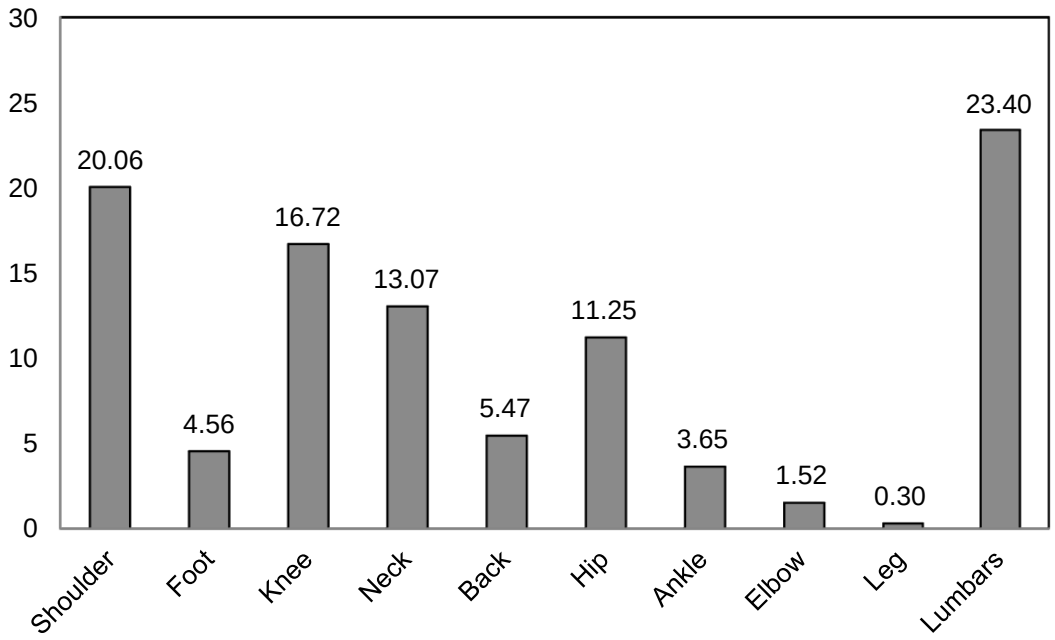

Figure 1: Prevalence of the Pain

Table 2 shows that 60.79% Students agreed, 8.21%students strongly agreed,25.53% students disagreed, and 5.47%students strongly disagreed that their pain had aggravated after activity/over activity.

Tables 3 reflects that 16.72% students agreed, 5.78% students strongly agreed, 46.81% students disagreed, and 30.70% students strongly disagreed to feel that their one shoulder was higher than other shoulder.

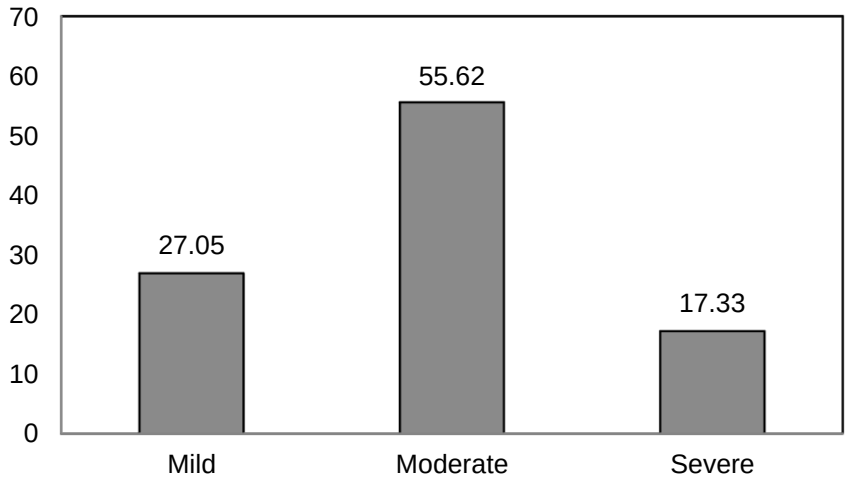

Figure 2: Descriptive statistics of intensity of pain among the students

Table 3: Frequency Distribution of students feeling that their one shoulder was higher than other shoulder

Response	Frequency	Percentage (%)
Strongly agree	19	5.78
Agree	55	16.72
Disagree	154	46.81
Strongly disagree	101	30.70

Table 4 verifies that 42.25% students agreed, 7.60% students strongly agreed, 38.30% students disagreed, and 11.85% students strongly disagreed to think that pain had limited their daily living activities.

Table 4: Frequency distribution of students thinking that pain had limited their daily living activities

Response	Frequency	Percentage (%)
Agree	139	42.25
Strongly agree	25	7.60
Disagree	126	38.30
Strongly disagree	39	11.85

DISCUSSION

According to a cohort study conducted for 12 years in Kuala Terengganu in 2004, the prevalence of scoliosis in both males and females was 2.68% that was confirmed by Cobb angle of 0.53%.[6] In China Investigations stated that in school going age, the prevalence of scoliosis due to abnormal posture was reported as 36 percent shoulder falling and 25 percent of head up.[3] Some factors that are responsible for scoliosis are inherited conditions, bone growth abnormalities, faulty body alignment, reduced bone thickness and insufficiency of neuromuscular system. Hormonal imbalance, metabolic disorders and sedentary life style is also responsible for the disorder. Some abnormal features are also seen with scoliosis as chest wall malformation, hump on the back due to which ribs can be seen in an upward direction, unequal shoulder height and waist line due to which one hip gets elevated than the other and the person may complain of back pain. Sometimes there is complaint of constant pain when greater exertion is applied on the back i.e. standing with faulty posture, sitting in a stooped manner or taking lectures of three or more consecutive hours increases the intensity of pain.[7] Physical therapy plays an important role in posture adjustments, better alignment of body and balance improvement.[3] Early management is essential to avoid the deformity and surgical intervention. For proper treatment there should be a thorough assessment of the patient which could only be done by taking detailed and appropriate history of the patient.[8] Physical activities simply reduce the progression of scoliosis. Strengthening of weak muscles, stretching of stiff muscles and motor control training exercises are helpful in improving the life standard of the diseased person.[2] Patients

are assessed every 4-6 months to see the curve progression. The follow-up of the patients depends upon the patient's age, degree of spinal curvature and maturity of skeleton. Bracing is affected for the treatment of scoliosis, but it has a slow progress of recovery. Surgery is also recommended for scoliosis. The basic aim of surgery is to achieve a solid fusion, correction of deformity and improvement of cosmetic appearance. Surgery has the fewer rates of complications like non-fusion and other skeletal deformities.[4]

This study is conducted to investigate the prevalence of scoliosis in a population of university students. A higher prevalence of 23.40% of scoliosis is found among study participants. Several factors like bad posture, abnormal sitting and standing position, abnormal force exerted on spine by lifting heavy objects, taking consecutive lectures of 3 or more hours and working on laptop for longer time were responsible for the development of scoliosis. Due to these problems most of the time the back of the student is under strain and the body mechanics was disturbed. In addition of this, the students were not aware of their faulty posture because they had no knowledge about the body mechanics and correct body posture. Walaa and colleagues conducted a study to investigate the prevalence of scoliosis among physical therapy students.[9] In their study convenient sample of students were taken from one university and a sample of 152 students was used. Their study showed the higher prevalence of scoliosis among female students. In present study, a sample of 329 students was employed and study participants were selected by random selection and overall prevalence of scoliosis was calculated irrespective of gender of participants. Another report for early detection of spinal abnormality among 2129 children (age 6 to 11 years) found a correlation between postural defects and abnormal curves of spine.[10] In this study adolescent population was selected as targeted population (age 17 to 30 years) for detecting the prevalence of scoliosis among study participants. Cho studied the prevalence of bad posture and its co-relationship with musculo-skeletal disorders and psychological stress.[11] He observed the divergence of spine and its drastic effects on body posture performing manual muscle test to observe the spinal deformities. Present study did not used any test to access the spinal deformity. In Cho study, 36% shoulder asymmetry and 25% forward head posture. In this study we found the prevalence of 23.40% of scoliosis due to bad posture in adolescent university students. Zakeri and friends worked on the prevalence of musculo-skeletal disorders among school going children.[12] In another study, Zakeri and coworkers reported that by lifting heavy weights like (school bag) on back increased the risk of postural disorders like scoliosis, kyphosis and lordosis.[13] The purpose of their study was only to observe the prevalence of scoliosis and its effect on posture. In this study it was observed that if exertional forces are acted on spine that would increase the risk of postural defects and abnormal curvature of spine. Mehrdad and Sohrab worked to evaluate the presence of scoliosis only on 300 male students and their age ranges between 18-22 years but in this study a sample of 329 students and their age ranges between 17-30 years.[14]

CONCLUSION

Results of this study found faulty posture in standing and sitting position as important factors contributing towards development of adolescent scoliosis, putting overloads on spine due to which unequal exertional forces acted on spine that would leads to backache. The major cause of this development could be that university students are taking consecutive lectures of three or more hours, studied for long hours and also sitting with constant forward head posture while doing work on laptop.

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