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Original Research Article

Assessment of Lumbar Lordosis in Medical Students with Low Back Pain: An Observational Study

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Abstract:

Introduction: One of the main factors contributing to health issues is low back pain. Students, particularly medical students, are affected by this pain, which reduces their efficiency. Distinct and particular pathological etiology behind the back pain may be attributed to spodylolisthesis, kyphosis, scoliosis, etc. The typical human spine has a distinctive structural characteristic known as lumbar lordotic curvature (LLC). Only prospective studies that link current LLC with potential low back problems can clearly show the cause and effect relationship between LLC and LBP. The aim of the current study was to assess the lumbar lordosis in medical students who had low back discomfort**.**

Materials & Methods: Present study was conducted on 340 medical students out of which 203 were males and 137 were females in the Department of Anatomy, Rohillkhand Medical College. Bareilly. Lumbar lordosis was measured by tangent method on each subject with the help of flexicurve.

Results: According to the study, In both the sexes majority of cases belongs to the age group of 18 – 24 years. Demographic features of all the subjects were noted. Lumbar lordosis was measured and compared in different age groups of all the subjects and statistically significant result was found. Lumbar lordosis was increased with increasing age in both males and females.

Conclusion: Increased lumbar lordosis with increasing age result in bad posture and leading to low back pain symptoms at early age. Intervention methods must be taken to reduce the discomfort and increase the efficiency of youth.

Keywords: Observational Study, Lumbar Lordosis, Low Back Pain.

Introduction

About 60 to 80% of persons will experience low back pain (LBP) at some point in their life. Anderson calculated that the annual global incidence of LBP in adults is 15%, and the point prevalence is 30%. [1] According to Papageorgiou et al., at least 50% of people would have gone through an episode of LBP. [2] Several studies have shown that LBP is among the most frequent reasons for doctor visits [3] and that both men and women are equally impacted by LBP. According to research, 30 percent of teenagers worldwide had at least one episode of LBP. [4] Numerous researches shown that LBP is a very prevalent issue among teenagers, with peak prevalence in the third decade of life. [5] According to some writers, growth spurts and increased physical activity may be the cause of LBP in adolescents and

children. [6] Contrarily, Fairbank et al. found that students experiencing back discomfort were more prone than their peers who participated in sports to avoid sports. When compared to young adults who did not have LBP at age 14, those who did had a higher incidence of the condition 25 years later. [7, 8]

Over the past few decades, there has been considerable discussion and criticism around the health of medical students. Since medical school courses are frequently rigorous, students are more likely to have sedentary lifestyles and may therefore be at risk for LBP. [9, 10] Thus, preventing and avoiding LBP during the early stages of adolescence can impede LBP from progressing and thereby reduce the related morbidities. The associated variable and non-variable risk factors must be identified, in order to prevent LBP.

Lumbar Lordosis

The typical human spine has a unique structural characteristic called lumbar lordotic curvature (LLC), which is not seen in the neonatal spine but gradually becomes more noticeable as a person matures and adopts the upright postures. [11,12] According to phylogenetic analysis, LLC is the primary structural adaption to bipedalism. It raises the torso's center of mass above the hip and allows the soft tissue surrounding the spine to absorb shear pressures [13] while increasing its ability to withstand gravitational force. [14] In this way, people can hold themselves upright in daily life in a steady and energy-efficient method with little mechanical stress. [15] It is interesting how the LLC works and its interactions with affected spines are surrounded by contradicting data and viewpoints. Loss of LLC is almost always a sign of aging in the spine, and LBP is more common as people get older. [16] It seems irrational to think that reducing the LLC, a mechanism that happens naturally as we age, may be a way to relieve LBP. Furthermore, it is contradictory because LLC is both a necessary part of ergonomic bipedality and the root of LBP. It is obvious that the issue of causality in the association between LLC and LBP is poorly understood, raising severe concerns about whether the therapeutic low back exercises employed to lower LLC are in fact beneficial or injurious. Only prospective studies that correlate current LLC with potential low back problems can clearly show the cause and effect relationship between LLC and LBP. However, there is very little research on the subject. A consistent pattern in the modification of lumbar curvature in LBP patients may not be readily apparent because LBP is a very heterogeneous entity. The spino-pelvic complex's sagittal alignment is highly varied even in asymptomatic people, making it impossible to distinguish LBP patients from healthy normal controls by looking exclusively at LLC. [17] Nevertheless, as it immediately affects the establishment and implementation of corrective exercises, the ongoing advancement and improvement of our knowledge of the sagittal profile of the lumbar spine in LBP patients has enormous therapeutic value. In order to evaluate the lumbar lordotic curvature in medical college students with low back pain, the current study was conducted.

Materials and Methods:

Study Design: Descriptive observational Study

Study Setting: Department of Anatomy, Rohillkhand Medical College, Bareilly after approval from the College research committee & Institutional ethical committee (IEC no. BRU /REG/PhD/389)

Study Duration: 1 Year.

Study Population: 340 medical students of RMCH out of which 203 were males and 137 females as per inclusion & Exclusion criteria.

Inclusion Criteria:

- All the undergraduates & postgraduates medical students of RMCH aged 18-35 years.
- Subjects was considered symptomatic if they had a history of LBP for more than 6 weeks before the study or had on-and off back pain and had experienced at least 3 episodes of LBP, each lasting more than 1 week during the year before the study. [18]

Exclusion Criteria:

1. Students suffering from musculoskeletal, neurological, cardiac, metabolic or rheumatic illness.
2. Athletes, dancers, sportsperson & pregnant women

Materials:

1. Flexible curve Ruler (Least count – 1cm)
2. Stadiometer (Least count – 1cm)
3. Digital weighing machine (Least count – 10 gm)
4. Marker pen
5. Graph paper

The height & weight of each subject was measured.

BMI of each subject was calculated.

Measurement of Lumbar lordosis: The size of the lumbar lordosis was determined using the flexicurve. The flexicurve is a flexible metal ruler with a plastic covering that can be molded to a person's back to mimic the form of the spine. The validity of the flexicurve in protocols including measurement of the spinal curvature at discrete levels has been demonstrated in a number of investigations. Hart and Rose certified the flexicurve for usage in the lumbar region. Each patient stood barefoot with the back exposed while the C7, T1, T12, L5, and S1 vertebrae's spinous processes were identified and marked for the flexicurve evaluation. The individual was told to stand upright, with the feet parallel, the knees straight, and the elbow and shoulder at 90 degrees. When utilizing the flexicurve to measure spine curvature, the spinous processes (C7, T1, T12, L1, L5, and S1) were located using palpation. The C7, T1, T12, L1, L5, and S1 spinal processes were found and measured using the instrument's built-in metric scale while the flexicurve was shaped to fit the shape of the spine.(fig 1) The flexicurve was removed after shaping the spine's outline, and the internal edge—the part of the flexicurve that contacts the skin—was traced onto graph paper. The lumbar angles were then calculated using the tangent method. (fig 2)(19)

Statistical analysis:

SPSS Statistics for Windows, version 23.0 (IBM SPSS Statistics for Windows, Armonk, NY: IBM Corp.), was used to evaluate the obtained data after being entered into MS Excel. For each of the study's quantitative variables, descriptive statistics were done. Numbers, percentages (%), means, and standard deviations were used to express the data. P value 0.05 or less is regarded as statistically significant. One-way ANOVA was used to compare factors across age groups.

Results:

Table 1 shows the distribution of cases according to age group in sex. According to the study, out of 203 males 125 males (61.57 %) belong to age group of 18-24 years. 51 males (25.12%) belong to 25- 30 years and 27 (13.30%) males were in the age group of 31- 35 years. In case of female subjects out of 137 total females 97 (70.80%) was in the age group of 18 -24 years, 33 (24.08%) females belongs to 25-30 years of age group and 7 (5.10%) females were in the age group of 31- 35 years. In both the sexes majority of cases belongs to the age group of 18 – 24 years.

Table 1 depicts the measurement of different variables among all the cases. Mean age of the subjects are 23.83 with

std. deviation of 4.43. The minimum and maximum age ranges from 18 to 35. The mean ± SD of weight is 60.92 ± 7.41. The minimum and maximum value ranges from 0.20 – 88.60. The mean height of the subjects is 158.72 with standard deviation of 4.89.The minimum and maximum value ranges from 148 – 172. The mean ± SD of lumbar lordosis is 40.88 ± 6.08.

When we compared lumbar lordosis between different age groups of male subjects, statistically significant result was found (f = 48.41, p = 0.000).

When lumbar lordosis was compared between different age groups of female subjects, result was found to be statistically significant (f =26.61, p = 0.000).Though there is no gender difference in lumbar lordosis in different age groups. But according to the results lumbar lordosis increases with age in both males and females (Table 1).

Table 1: Distribution of Cases according to age groups and sex

Age group	Male (%)	Female (%)
18-24 years	125(61.57%)	97(70.80)
25-30 years	51 (25.12%)	33(24.08)
31-35 years	27(13.30%)	7(5.10%)
Total	203	137

Chi square value= 6.59, p value=0.03

Table 2: Measurement of different variables among cases

Variables	Mean	SD	Minimum	Maximum
Age	23.83	4.43	18.00	35.00
Weight	60.92	7.41	0.20	88.60
Height	158.72	4.89	148.00	172.00
Lumbar lordosis	40.88	6.08	24.40	55.20

Table 3: Measurement of lumbar lordosis among different age groups of both male and female subjects

	Lumbar lordosis		
Age groups	Male	Female	P - value
18 – 24 years	38.62 ± 6.05	38.28± 5.62	0.6688
25 – 30 years	44.56 ± 2.27	43.92± 1.46	0.1545
31 – 35 years	47.73 ± 4.31	48.04 ± 2.29	0.8565

Figure 1: Measurement of lumbar lordosis using flexicurve

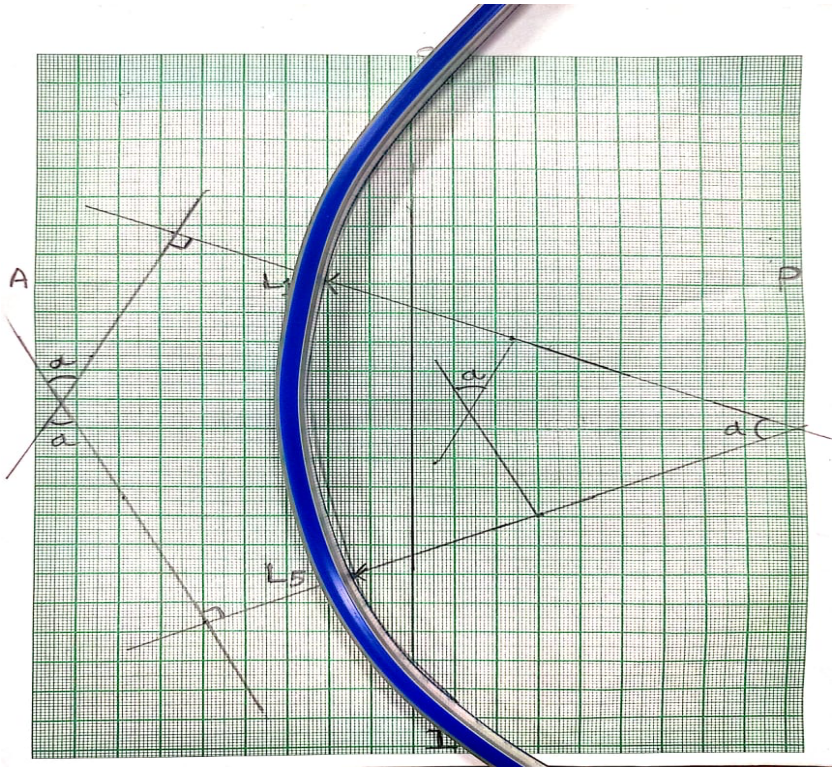

Figure 2: Measurement of lumbar angles by tangent method

Discussion

In this study, we selected low back-pain-afflicted medical students between the ages of 18 and 35. The majority of the subjects are between the ages of 18 and 24 in both genders. Age, weight, and height of the subjects were noted as demographic characteristics. In our study, the mean lumbar lordosis value ranged from 24.40 to 55.20, with a mean value of 40.88. Various study methods were employed to report a range of lumbar lordosis angles. In 2010, Shayesteh reported an average of 29.47 ±11.90 lumbar lordosis in the Iranian population using the Winter and Willtse method. (20) Using the flexible curve approach, Youdas et al. [21] and Nourbakhsh et al. [22], respectively, have already reported the range of 37.11 and 37.13 degrees for lumbar lordosis. Cobb's angle approach was employed by Damasceno et al. [23] to report a value of 62.01 degrees in females and 59.30 degrees in males. Later, Milani et al. [24] reported the value as 65.4 degrees using the same technique. According to the present study, the lumbar lordosis was not found to be sexually dimorphic in the current investigation; however the lumbar lordosis angle increases with age, irrespective of sex.

VonLackum's work demonstrated how shifting the center of gravity anteriorly and increasing shearing strain or stress in the anterior direction are proportionally related. The shearing strain at the lumbosacral junction will increase due to this mechanics. [25] This increased angle resulting in bad posture and back pain may result in decrease in the lumbar lordotic Cobb's angle. A recent study by Partogi Napitupulu et al. on participants aged 20 to 64 found a correlation between preferring to work from home and an increase in complaints of low back discomfort. The incidence of LBP was 75(63.0%) had LBP, although the mean LSA was 37.4 ±7.3o. [26]

Conclusion

According to the study's findings, medical students had a higher prevalence of low back discomfort. One of the elements influencing the progression of pain is

lumbar lordosis. In young medical students, increased lumbar angles unquestionably contribute to bad posture and back pain. Intervention techniques should be adopted to reduce this morbidity because musculoskeletal disorders of the spine, notably back pain and postural alterations that may lead to decreased functionality, are significant public health issues.

References:

1. Andersson GB. Epidemiological features of chronic low-back pain. The lancet. 1999 Aug 14; 354(9178):581-5.
2. Papageorgiou AC, Croft PR, Ferry S, Jayson MI, Silman AJ. Estimating the prevalence of low back pain in the general population: evidence from the South Manchester Back Pain Survey. Spine. 1995 Sep 1;20(17):1889-94.
3. Hart LG, Deyo RA, Cherkin DC. Physician office visits for low back pain: frequency, clinical evaluation, and treatment patterns from a US national survey. Spine. 1995 Jan 1;20(1):11-9.
4. Balague F, Nordin M, Skovron ML, Dutoit G, Yee A, Waldburger M. Non-specific low-back pain among schoolchildren: a field survey with analysis of some associated factors. Journal of spinal disorders. 1994 Oct 1; 7(5):374-9.
5. Diepenmaat AC, Van der Wal MF, De Vet HC, Hirasing RA. Neck/shoulder, low back, and arm pain in relation to computer use, physical activity, stress, and depression among Dutch adolescents. Pediatrics. 2006 Feb; 117(2):412-6.
6. Kujala UM, Taimela SI, Erkintalo MI, Salminen JJ, Kaprio JA. Low-back pain in adolescent athletes. Medicine and science in sports and exercise. 1996 Feb 1;28(2):165-70.
7. Fairbank JC, Pynsent PB, Van Poortvliet JA, Phillips HU. Influence of anthropometric factors and joint laxity in the incidence of adolescent back pain. Spine. 1984 Jul 1;9(5):461-4.
8. Harreby M, Neergaard K, Hesselsøe G, Kjer J. Are radiologic changes in the thoracic and lumbar spine of adolescent's risk factors for low back pain in adults? A 25-year prospective cohort study of 640 school children. Spine. 1995 Nov 1;20(21):2298-302.
9. Moroder P, Runer A, Resch H, Tauber M. Low back pain among medical students. Acta Orthopaedica Belgica. 2011 Feb 1;77(1):88.
10. Anand T, Tanwar S, Kumar R, Meena G, Ingle G. Knowledge, attitude, and level of physical activity among medical undergraduate students in Delhi. Indian journal of medical sciences. 2011 Apr 1; 65(4):133.
11. Mac-Thiong J-M, Berthonnaud É, Dimar JR, Betz RR, Labelle H. Sagittal alignment of the spine and pelvis during growth. Spine. 2004; 29(15):1642-7.
12. Suri P, Miyakoshi A, Hunter DJ, et al. Does lumbar spinal degeneration begin with the anterior 5 structures? A study of the observed epidemiology in a community-based population. BMC musculoskeletal 6 disorders. 2011;12.
13. Williams SA, Russo GA. Evolution of the hominoid vertebral column: The long and the short of it. Evolutionary Anthropology: Issues, News, and Reviews. 2015; 24(1):15-32.
14. Aspden R. The Spine as an Arch A New Mathematical Model. Spine. 1989; 14 (3):266-74.
15. Saha D, Gard S, Fatone S, Ondra S. The effect of trunk-flexed postures on balance and metabolic energy expenditure during standing. Spine. 2007; 32(15):1605-11.
16. Dionne CE, Dunn KM, Croft PR. Does back pain prevalence really decrease with increasing age? A systematic review. Age and ageing. 2006; 35(3):229-34.
17. Chaleat-Valayer E, Mac-Thiong JM, Paquet J, Berthonnaud E, Siani F,

Roussouly P. Sagittal spinopelvic alignment in chronic low back pain. European spine journal: official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society.
18. Reza M, Massoud A. Relationship between Mechanical Factors and Incidence of Low Back Pain J Orthop Sports Phys Ther. 2002; 9(32);447-60.
19. Oliveira TS, Candotti TA, Torre M, ToninPelinson PP, Furlanetto T S, Kutchak FM, Loss FJ. Validity and Reproducibility of the Measurements Obtained Using the Flexicurve Instrument to Evaluate the Angles of Thoracic and Lumbar Curvatures of the Spine in the Sagittal Plan (Rehabilitation Research and Practice Vol. 2012: 9.
20. Shayesteh AM, Talebpour F, Alaee A, Hadinejad A, Sajadi M, Nozari A. Association of low back pain with lumbar lordosis and lumbosacral angle. J Mazandaran Univ Med Sci. 2010; 20: 9–15.
21. Youdas JW, Garrett TR, Egan KS, Therneau TM. Lumbar lordosis and pelvic inclination in adults with chronic low back pain. Phys Ther. 2000; 80:261–275.
22. Nourbakhsh MR, Moussavi SJ, Salavati M. Effects of lifestyle and work-related physical activity on the degree of lumbar lordosis and chronic low back pain in a Middle East population. J Spinal Disord. 2001; 14:283–292.
23. Damasceno LH, Catarin SR, Campos AD, Defino HL. Lordose lombar: estudo dos valores angulares e da participacao dos corpos vertebrais e discos intervertebrais. Acta Ortop Bras. 2006; 14:193–198.
24. Milani GB, Natal Filho A, Amado Joao SM. Correlation between lumbar lordosis angle and degree of gynoid lipodystrophy (cellulite) in asymptomatic women. Clinics (Sao Paulo). 2008; 63:503–508.
25. Von Lackum HL. The lumbosacral region. Journal of the American Medical Association. 1924; 82: p. 1109.
26. Napitupulu P, Nareswari G, Rahmansyah M, Tanaji TC. Radiographic lumbosacral angle has a low yield for diagnosing low back pain in workers 20-70 years of age. Universa Medicina. 2022 Dec 20; 41(3):263-70.