ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 06 | June - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A STUDY OF ASSOCIATION OF CHRONIC LOW BACK PAIN INTENSITY WITH LUMBOSACRAL SPINE MEASUREMENTS

Orthopedics

Dr. Rahul Prakash Jadhao M.S.ORTHOPEDICS, B.J. Medical College And Sasoon Hospital Pune.

Kedar Sunil Bhoi* D.ORTHO, DNB ORTHOPEDICS, Assistant Professor, B.J.MEDICAL College And Sasoon General Hospital Pune. *Corresponding Author

ABSTRACT

Objective: This study was done to find the association of chronic low back pain (CLBP) with the radiographic measurements of the sagittal lumbosacral spine.

Methods: It was a cross-sectional study conducted in the department of Orthopedics in a tertiary hospital in which standing lateral lumbar spine radiographs from 176 patients with CLBP were analyzed and radiographic measurement of lumbar lordosis, lumbosacral disc angle, and sacral inclination performed.

Results: The study showed no significant correlation of the angles with pain and age ($r \leq 0.09$, $P > .05$). Weak but statistically significant correlation was identified between all 3 measurements and sex ($r = -0.12$ to 0.21, $P < .05$). Greater pain was not noted for hypo- and hyperlordosis; regression coefficients for the linear and quadratic effects were approximately 0 ($P > .05$).

Conclusion: This study concluded that there was no correlation between lumbar lordosis and pain levels for people with CLBP

KEYWORDS

low back pain.

INTRODUCTION:

With the emergence table and desk job in the recent times, Low back pain (LBP) is becoming the single leading cause of professional and social disability worldwide. (1) At least 70% of the population experiences low back pain at least once during their lifetime. (2) Despite its socioeconomic impact and high prevalence, (3) the etiology and understanding of the disease remain relatively enigmatic. Changes in the lumbar lordosis have been debated as a correlating factor in the production of LBP, with previous studies finding varying results. (4,5,6,7)

Historically, clinicians have noted a relationship between aberrations of lumbar spine posture and the development of low back pain. (8) Abnormal posture causes straining of the highly innervated soft tissues, with tightening of the static postural muscles and weakening of dynamic musculature, thus indirectly altering the lumbar lordosis.(9).

In addition to aberrant posture, It has been proposed by previous authors that differences of the lordotic curve, as well as other sagittal lumbosacral measurements, including sacral inclination and the lumbosacral disc angle, may correlate with sex and age.(5,10,11,12) It is important to examine the effects of these particular factors as they partake in the patient-specific treatment.

The purpose of this study was to evaluate association between radiographic postural findings in the sagittal lumbosacral spine, including lumbar lordosis, lumbosacral disc angle, and sacral inclination posture and pain intensity for people with CLBP.

METHODOLOGY

The study was conducted in the department of orthopedics in a tertiary hospital from January 2015 to December 2015 and included 176 of the 200 original participants.

Inclusion Criteria:

1. above 18 years old.
2. to have a current history of at least 3 consecutive months of nonspecific CLBP of mechanical origin.
3. to have had some LBP on 30 days in the prior 6 weeks and a minimum LBP index of 25 on a 100-point scale to prevent floor effects.

Exclusion Criteria:

1. Participants were excluded if they received manual therapy within the previous 90 days, or
2. had contraindications to study interventions and complicating conditions such as active cancer, spinal pathologic conditions, inflammatory arthropathies, autoimmune disorders, anticoagulant conditions, neurodegenerative diseases, pain radiating below the knee, organic referred pain, pregnancy, and disability compensation. (13) Furthermore, survey data were unavailable for some participants and so finally 176 cases were studied.

Outcomes And Baseline Variables

A baseline questionnaire, validated by Jensen et al, (14) was completed by the participants during the study; it included age, sex, and average LBP in the last 4 weeks on a numeric pain rating scale from 0 to 10.

RESULTS:

In a sample of 176 participants with at least 3 months of CLBP, there were 83 women (47%) and 93 men (53%). Their ages ranged from 18 to 81 with a mean age of 41.2 years (Table 1). The mean LBP intensity was 4.7 out of 10 (standard deviation = 1.7).

Table 1: Values Are Mean (Standard Deviation) or Number (Percentage) of Age, Women, Average CLBP, Lumbar Lordosis Angle, Sacral Inclination Angle, and Lumbosacral Disc Angle.

Variable	Mean	Standard Deviation
Age	41.2	14.1
Women	83 (47%)	93 (53%)
Average numeric pain score (out of 10)	4.1	1.7
Lumbar lordosis angle (degrees)	43.3	11.0
Sacral inclination angle (degrees)	52.7	7.8
Lumbosacral disc angle (degrees)	14.5	5.0

The range of lordosis was between 5° and 78° with a mean of 43.3 ± 11.0° (Table 1). The lordosis correlated poorly with average CLBP (r = 0.09) and was determined to not be statistically significant (P = .175) (Table 2). The mean lumbar lordosis identified in men was 2.6° less than that of women.

Table 2: Correlation Coefficients and P Values Among Lumbar Lordosis Angle, Sacral Inclination Angle, Lumbosacral Disc Angle and Average CLBP, Age, and Sex

Angle	Average CLBP, r (P Value)	Age, r (P Value)	Sex, r (P Value)
Lumbar lordosis angle	0.09 (.175)	–0.01 (.652)	–0.12 (.026)
Sacral inclination angle	0.09 (.204)	–0.05 (.110)	–0.15 (.005)
Lumbosacral disc angle	–0.04 (.378)	0.01 (.941)	0.21 (<.001)

Sacral inclination angles had a wide range from 18.5° to 77° with an average of 52.7 ± 7.8° (Table 1). Statistical analysis with Pearson correlation coefficients identified no statistically significant

correlation between sacral inclination and average CLBP ($r = 0.09$, $P = .204$) (Table 2). Men had a mean sacral inclination 2.3° less than women did.

The measurements of lumbosacral disc angle ranged from 3° to 28° with an average of 14.5 ± 5.0° (Table 1). No statistically significant correlation was identified between lumbosacral disc angle and average CLBP ($r = –0.04$, $P = .378$) (Table 2). Men had a mean lumbosacral disc angle 2° higher than women did.

DISCUSSION:

Many studies of the past shows wide variation in their results with respect to lumbar lordosis and CLBP (4,5,6,7) in the present study, no statistically significant correlation was identified between the degree of lumbar lordosis and pain in a CLBP population. Our results agree with Hansson et al, (6) who reported no relationship between lumbar lordosis and acute or CLBP. Additionally, in a 2001 study by Nourbakhsh et al, (5) no difference was identified between normal participants and symptomatic patients in a study on CLBP. In contrast, Jackson et al (7) reported a significantly decreased lumbar lordosis in the CLBP patients. The inconsistency of the findings could be due to a multitude of factors, including variations in sample size, demographic features of the sample population (age, race, and sex), and radiographic measurement technique.

Our statistical analysis identified no significant correlation between the degree of lumbar lordosis and age, which is not consistent with prior research. With respect to increasing age, it has been accepted that a total loss of lordosis occurs. Dreischarf et al (10) reported an average 20% loss of lumbar lordosis with aging in their 2014 study on asymptomatic participants. Nourbakhsh et al (5) reported a significant loss of lordosis in the group aged 50 to 65 compared with the younger participant groups. However, they also identified no relationship between age and lumbar lordosis in the younger participant groups. Researchers who have reported loss of lordosis with age hypothesize that this is due to a variety of factors, such as osteoporosis, degenerative disc disease, weakening of the abdominal musculature, and overall increased lumbar stiffness. (10,11,15,16)The differing results between our study and prior research could be due to the fact that our participants are from a CLBP population lacking a control group, which may be obscuring the results.

The study findings agreed with prior studies that reported a statistically significant correlation between lumbar lordosis and sex. Lang-Tapia et al (17) reported, in their study on healthy participants, that the lumbar lordosis in women was 12° more than in men. Janssen et al (18) reported that the female sagittal spinopelvic alignment was greatly different from male alignment, with higher dorsally directed shear loads than in the male spine. In 2001, Nourbakhsh et al (5) reported that the degree of lumbar lordosis in women is 10° greater than that in men in an LBP study. Although the magnitude of degree difference between men and women was determined to be less in our study, we noted similar results, with women having 2.6° greater lumbar lordosis measurement.

Our results both agree and disagree with prior studies with respect to sacral inclination and lumbosacral disc angle and how they correlate with pain, age, and sex. Evcik et al (12) reported that sacral inclination angles increased in patients with CLBP.

In regard to clinical application, our results do not support the use of lumbar spine radiograph roentgenometrics for the management of pain for patients with CLBP.

CONCLUSION:

This study determined that there was no correlation between lumbar lordosis and pain levels for people with CLBP. All of the sagittal lumbosacral radiographic measurements correlated poorly with pain and age.

REFERENCES:

1. Tüzün C, Yorulmaz I, Cindas A, Vatan S. Low back pain and posture. Clin Rheumatol. 1999;18(4):308–312.
2. Deyo R, Rainville J, Kent D. What can the history and physical examination tell us about low back pain? JAMA. 1992;268(6):760–765.
3. Andersson GBJ. Epidemiological features of chronic low-back pain. Lancet. 1999;354(9178):581–585.
4. Youdas JW, Garrett TR, Egan KS, Therneau TM. Lumbar lordosis and pelvic inclination in adults with chronic low back pain. Phys Ther. 2000;80(3):261–275.
5. 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(4):283–292.
6. Hansson T, Bigos S, Beecher P, Wortley M. The lumbar lordosis in acute and chronic low-back pain. Spine. 1985;10(2):154–155.
7. Jackson RP, McManus AC. Radiographic analysis of sagittal plane alignment and balance in standing volunteers and patients with low back pain matched for age, sex, and size. A prospective controlled clinical study. Spine (Phila Pa 1976) 1994;19(14):1611–1618.
8. During J, Goudfrooij H, Keessen W, Beeker TW, Crowe A. Toward standards for posture. Postural characteristics of the lower back system in normal and pathologic conditions. Spine (Phila Pa 1976) 1985;10(1):83–87.
9. Christie HJ, Kumar S, Warren SA. Postural aberrations in low back pain. Arch Phys Med Rehabil. 1995;76(3):218–224.
10. Dreischarf M, Albiol L, Rohlmann A. Age-related loss of lumbar spinal lordosis and mobility—a study of 323 asymptomatic volunteers. PLoS ONE. 2014;9(12):e116186.
11. Tsuji T, Matsuyama Y, Sato K, Hasegawa Y, Yimin Y, Iwata H. Epidemiology of low back pain in the elderly: correlation with lumbar lordosis. J Orthop Sci. 2001;6(4):307–311.
12. Evcik D, Yücel A. Lumbar lordosis in acute and chronic low back pain patients. Rheumatol Int. 2003;23(4):163–165.
13. Haas M, Vavrek D, Peterson D, Polissar N, Neradilek MB. Dose-response and efficacy of spinal manipulation for care of chronic low back pain: a randomized controlled trial. Spine J. 2014;14(7):1106–1116.
14. Jensen MP, Karoly P, Braver S. The measurement of clinical pain intensity: a comparison of six methods. Pain. 1986;27(1):117–126.
15. Gelb DE, Lenke LG, Bridwell KH, Blanke K, McEnery KW. An analysis of sagittal spinal alignment in 100 asymptomatic middle and older aged volunteers. Spine. 1995;20(12):1351–1358.
16. Takeda N, Kobayashi T, Atsuta Y. Changes in the sagittal spinal alignment of the elderly without vertebral fractures: a minimum 10-year longitudinal study. J Orthop Sci. 2009;14(6):748–753.
17. Lang-Tapia M, Espana-Romero V, Anelo J, Castillo MJ. Differences on spinal curvature in standing position by gender, age and weight status using a noninvasive method. J Appl Biomech. 2011;27(2):143–150.
18. Janssen MMA, Drevelle X, Humbert L, Skalli W, Castelein RM. Differences in male and female spino-pelvic alignment in asymptomatic young adults: a three-dimensional analysis using upright low-dose digital biplanar X-rays. Spine (Phila Pa 1976) 2009;34(23):E826–E832.