



## A Study on Lumbar Degenerative Disorders and its Correlation with Various Comorbid Factors

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### ABSTRACT

**Introduction:** Disc degenerative disorders are the leading cause for the Lower Back Pain (LBP) throughout the globe. The data on LBP is limited. A study was conducted to find the correlation between age, socio-demographic and occupational factors with. **Methods:** It was a prospective research conducted in the department of Anatomy, GSL Medical College, and Rajahmundry. Study was conducted between December 2021 to January 2023. Individuals >18 years, both gender with LBP attended on outpatient basis were included. The socio-demographic data of the participants was recorded as per the Modified Kuppaswamy scale, Body Mass Index (BMI) was also estimated by entering height and weight in the National Institute of Health. Type of work, way of sitting posture, duration of continuous sitting, job related stress, requirement of outdoor activity for the job, junk food eating habits, frequency were also be recorded. Data was presented by mean for continuous variables and percentage for categorical data. Logistic Regression Analysis (LRA) was applied and  $P < 0.05$  were considered to be statistically significant. **Results:** Total 412 members were included, male female ratio was 1.2. Maximum (18.5%) participants were in >68, lowest (13.9%) in 48 years-57 years group. LRA did not show any association between LBP and age (OR=0.923, 95% CI: 1.2-2.9,  $P=0.62$ ). Maximum (35.7%; 150) number with LBP was detected in obesity group. The mean weigh of the study members was 56.2 kgs; LRA did not show any association between BMI and LBP (OR=0.968, 95% CI: 2.1-3.6,  $P=0.820$ ). There was significant association between socioeconomic status and LBP (OR=0.986, 95% CI: 0.931-1.124,  $P=0.0423$ ). Based on the continuous sitting time, LBP is high (54.4%) among those sit continuously for >8 hours. **Conclusion:** LBP is common in all age groups and socio-economical groups. Continuous sitting for long time, obesity are important risk factors. LBP affects the quality of life, but not analysed in this research. Long term community based research with high sample size is recommended.

**Keywords:** Lower back pain, Study, Literature

## INTRODUCTION

Globally, age is the important factor for developing the Neurological Disorders (ND). Due to the epidemiological transition, the burden is rapidly increasing in India also [1]. Though the ND is nonfatal, but important contributors of communicable as well as non-communicable infections in India; as per the available data, the share of ND is significant [2]. Hence government of India included ND in various health related welfare programmes.

Disc Degenerative Disorders (DDD) are high prevalent clinical condition, affect any age group and the leading cause for the Lower Back Pain (LBP) throughout the globe [3]. There was a recent classification in the literature [4]. Numerical of LBP are attractive to the non-medical community also because >50% people complain this any time during the life [5-7]. Due to the loss of wages and drop in productivity, the financial loss due to LBP is also significant. Majority of Indians live in rural areas; depend on agriculture, construction sector and so on. Hence there is some difference in the prevalence of LBP. Similar to the global scenario among the Indians, LBP is the top ten causes of Years Lived with Disability (YLWD) [8].

India is high populated country, 18% of world population live here [9]. But the data on LBP is limited and there is a huge gap especially from this region. Moreover for the last decade, due to advance in technology as well as increased cash flow there is lot of changes in life style among the Indians. In addition to these, LBP is usually considered to be an ornament for elder age group those in high income category [2,7,10]. With these a study was conducted with objectives to find the correlation between age, socio-demographic and occupational factors with LBP in a tertiary health care setup. This may help the general population to take preventive measures. And it will be easy for the clinicians in terms treatment approach.

## METHODS

It was a prospective research conducted in the department of Anatomy, GSL Medical College, Rajahmundry. Study was conducted between December 2021 to January 2023. Study protocol was approved by the Institutional Ethics Committee. Informed consent was taken from the participants. Individuals >18 years, both gender with LBP who attended this Medical College hospital on outpatient basis were included in this research. Non cooperative, non LBP individuals, those on steroid or immunosuppressive therapy, those underwent spine surgery, those undergoing or have taken physiotherapy management, those suffering from cancer, known vertebral fractures, trauma and unconscious individuals were not considered in this research.

This is a tertiary health care setup with different undergraduate and post graduate medical courses. The individuals attend orthopaedic department for health issue were examined and evaluated. As per the WHO (World Health Organization) guidelines pain between the lower edge of the ribs and the buttock is considered to be the LBP.

Those confirmed to be LBP as per the protocol were included in the study. After recruiting the participant in the study, detailed clinical history was collected. All the findings were recorded in the study proforma. The study was clearly explained in the local language. The participants were allowed to ask doubts. After clarifying all the doubts beyond the knowledge, socio-demographic data of the participants was recorded as per the Modified Kuppaswamy scale [11]. Body Mass Index (BMI) was estimated by entering the participant's weight in kilograms and height in centimetres in the National Institute of Health (NIH) website and divided in to 4 categories [12]. In this research, parameters such as type of work, way of sitting posture, duration of continuous sitting, job related stress, requirement of outdoor activity for the job, food eating habits, frequency were also be recorded.

### Sample Size

Sample size (n) was calculated using Solvin's formula 33% and 95% confidence interval was considered.

$$n = N \div (1 + Ne^2)$$

N = total number of population;

As per this institutional previous data,

N was considered to be 65000.

e = margin of error;

Considered at the rate of 5%. By including these, the sample size was considered to be 400.

### Statistical Analysis

Data were analysed using SPSS version 21. It was presented by mean  $\pm$  SD for continuous variables and percentage for categorical data. Logistic Regression Analysis (LRA) was applied and  $P < 0.05$  were considered to be statistically significant.

### RESULTS

Total 412 members were included in the research; 185 (45%) were female and 55% (227) were male participants. Male female ratio was 1.2. Age wise, maximum (18.5%; 76) participants were in  $>68$  years group followed by 28-37 (17.7%; 73), 17.3% (71) each respectively in 38-47 and 58-67 year group, 15.5% (64) in 18 years-27 years group and lowest (13.9%; 57) in 48 years-57 years group (Table 1) and 48.3 years was the mean age. LRA did not show any association between LBP and age (OR=0.923, 95% CI: 1.2-2.9,  $P=0.62$ ).

**Table 1 Age wise distribution of the study participants; n (%)**

Age (Years)	Male (%)	Female (%)	Total (%)
18-27	37 (9)	27 (6.5)	64 (15.5)
28-37	41 (9.9)	32 (7.8)	73 (17.7)
38-47	35 (8.5)	36 (8.7)	71 (17.3)
48-57	30 (7.3)	27 (6.5)	57 (13.9)
58-67	38 (9.2)	33 (8)	71 (17.3)
$\geq 68$	46 (11.2)	30 (7.3)	76 (18.5)
Total	227 (55)	185 (45)	412 (100)

When the BMI was analysed, maximum (35.7%; 150) number of participants with LBP was detected in obesity group followed by overweight (23.3%; 98), normal weight (20.2%; 85) and underweight (18.8%; 79) (Table 2). The mean weigh of the study members was 56.2 kgs; LRA did not show any association between BMI and LBP (OR=0.968, 95% CI: 2.1-3.6,  $P=0.820$ ).

**Table 2 BMI of the study participants; n (%)**

BMI	Male (%)	Female (%)	Total (%)
Underweight ( $<18.5$ )	40 (9.7)	39 (9.3)	79 (18.8)
Normal weight (18.5-24.9)	41 (9.9)	44 (10.5)	85 (20.2)
Overweight (25-29.9)	48 (11.4)	50 (11.9)	98 (23.3)
Obesity ( $\geq 30$ )	98 (23.3)	52 (12.4)	150 (35.7)
Total	227 (55)	185 (45)	412 (100)

Most (62.4%; 257) of the study members reported outside eating habit and 24.1% (99) reported in house eating habit. Income wise, majority were upper class (27.9%) followed by upper middle class (23.5%), lower middle class (21.1%), middle class (18.5%) and lower class (8.9%); LRA showed significant association between socioeconomic status and LBP (OR=0.986, 95% CI: 0.931-1.124,  $P=0.0423$ ). LBP incidence is identified to be high those in sitting profession such as clericals, shop owner, skilled workers (150; 36.4%). This was followed by unemployed (15.8%; 65) and students (11.6%; 48) (Table 3).

**Table 3 Various demographic factors of the study participants**

Parameter	N	%
Eating mode		

Outside	313	75.9
In house	99	24.1
<b>Family income</b>		
Upper class	115	27.9
Upper middle class	97	23.5
Middle class	76	18.5
Lower middle class	87	21.1
Lower class	37	8.9
<b>Occupation</b>		
Student	48	11.6
Professional	52	12.6
Semi-professional	46	11.2
Clerical, Shop owner	69	16.7
Skilled worker	81	19.7
Unskilled worker	51	12.4
Unemployed	65	15.8

Based on sitting time the study members were divided to two groups, continuous sitting for >8 hours and <8 hours. Majority (224; 54.4%) of the study members sit for >8 hours. Job related stress was declared by 70.9% (292) and job related outdoor activity by 63.9% (263).

## DISCUSSION

LBP is one of the significant public health issues and the most prominent cause of YLWD throughout the globe [13,14]. As per the data, the prevalence of LBP ranged between 6.2% to 92% and the prevalence is more rapid especially in low and middle income countries [15]. The clinical scenario of LBP is self-limiting, but around 5 to 10% may develop chronic LBP [16].

This study was conducted on 412 (100%) LBP individuals. Gender wise, 55% (227) were male and the male female ratio was 1.2. As per the literature, 67% of Indian men and just 33% women participant in outdoor work [17]. Hence male population is the suffering group. Whereas community based reports with high prevalence among female were also available [18,19]. But the reasons for the high women prevalence were not reported by the investigators. Sex hormones, psychological factors and genetic factors may be responsible for this. In the current research, individuals with LBP were recruited. Generally men usually involve in the outdoor activity hence more number of LBP were detected among the men.

Adults and youngsters are the two age groups usually at risk of DDDs. Because in the extreme age group the intake of nutrition rich food is greatly compromised. So this is highly sensitive group. Middle age is very active in the productive work, hence high risk in getting DDDs. In the current research, maximum (18.5%) participants were in >68 years followed by 28-37 (17.7%) group (Table 1). As per the literature, young Indians are at risk of getting LBP [20]. Hence it is essential that the youngsters also should aware of primary prevention measures.

Obesity and overweight are global public health issues and the numbers are increasing. Obesity is one of the risk factors of LBP. Increase in weight on lumbar vertebrae may results in mechanical pressure and inflammatory changes among the obese individuals finally results in LBP [21]. In addition, increase in body weight leads to inflammatory changes on spine and also disc degeneration along with wear and tear of spinal structures [22]. In this research, the prevalence of LBP was 23.3% in overweight and 35.7% among the obese individuals (Table 2). These findings show that the association of LBP increase with BMI. Other than mechanical pressure on spinal region, there is increased release of cytokines such as TNF $\alpha$ , IL 6 which results in pain [23]. However there was no estimation of

these cytokines in this study, which is a limitation of this research. As per the available literature, strong association between high BMI with increased prevalence of LBP [24].

When BMI, LBP were correlated with gender, in this research, the incidence is almost similar in gender among the overweight category. Whereas the LBP incidence is double among the male in obesity category; 98 (23.3%) and 52 (12.4%), respectively among the male and female (Table 2). Female sex hormones and obesity are essential factors that cause musculoskeletal pain which leads to LBP. But this gender disparity is better explained by considering other factors such as physical activity, life style as well as cultural influence and Lumbar Disc Herniation (LDH) [25,26]. Except LDH, there was no significant disparity in this research among the gender because all are involved in house hold activity and working people.

In this research, 59% LBP members were in overweight and obesity category; whereas it was 55.7% in Bansal *et al.* report [18]. In addition to high prevalence, high pain intensity LBP is reported among those with high BMI [18,27,28]. In this research pain intensity was not recorded.

Food intake is the most essential activity to all the living objects. We, human beings do this daily with some difference in the frequency and quantity of consumption. The source and consumption pattern are important because there is a drastic change among the Indians [29]. In this research 76% (313) reported outside food eating habit. As per the literature >35% adults eat Junk Food (JF) several times in a week and it increases 13% daily energy intake [30]. Obesity is the most important threat due to JF, global epidemic and important cause of LBP. When the study team asked, all the study members expressed JF consumption.

In this research LBP incidence is increased with the income, 27.9% in upper class and 8.9% in lower class (Table 3). There is no direct correlation between income and LBP. As the financial status is changed, usually the individuals habituated for the sedentary life style and also modify the food habits. With increase in income, JFs and high concentration of sugar containing beverages are consumed. These life style modifications are important for LBP. The incidence was comparatively less in low income group due hard work which is part in their life. Even if we don't work also chances of getting LBP. In this research it was 15.8% among the unemployed group (Table 3). Continuous sitting is another threat of LBP because 19.7% (81) of skilled workers in this research reported LBP because they sit continuously. LBP numbers were attractive in other occupations also, which were 12.6%, 11.2% and 16.7%, respectively in professionals, semi-professionals and clerical, shop owners (Table 3).

This is a tertiary care hospital with different undergraduate as well as post graduate medical courses, nearly 4000 students. Out of these 48 medical students with LBP were involved in this research (Table 3). The prevalence of LBP in one recent study among the medical students was 14.3% [18]. In another Australian study it was 53.4% [31]. The difference in the prevalence is due to the different operational definitions of LBP. Psychological stress is the most important factor among the medical students in this research due to the revised curriculum. Similar findings were reported in the literature [20,32]. But a Saudi research mentioned that stress is not the responsible for LBP among the medical students. However lack of job satisfaction was reported among the medical professionals [33,34]. In this research medical professionals were not involved. Sufficient sampling, involvement of different categories of population are the strengths of the research and first epidemiological study from this region.

As per this research, LBP is common in all age groups as well as socio-economical groups. Continuous sitting for long time as well obesity are important risk factors. LBP affects the Quality of Life (QOL). But this was not analysed in this study. This is limitation of this research. Long term community based research with high sample size is recommended.

## DECLARATIONS

### Conflict of Interest

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

## REFERENCES

- [1] Singh, Gagandeep, et al. "The burden of neurological disorders across the states of India: the Global Burden of Disease Study 1990–2019." *The Lancet Global Health*, Vol. 9, No. 8, 2021, pp. 1129-44.

- [2] Mehndiratta, Man M., and Vasundhara Aggarwal. "Neurological disorders in India: past, present, and next steps." *The Lancet Global Health*, Vol. 9, No. 8, 2021, pp. 1043-4.
- [3] Gaonkar, Abhijitsingh P., et al. "Classification of lower back pain disorder using multiple machine learning techniques and identifying degree of importance of each parameter." *International Journal of Advanced Science and Technology*, Vol. 105, 2017, pp. 11-24.
- [4] Barke, Antonia, Beatrice Korwisi, and Winfried Rief. "Chronic Pain in the ICD-11: New Diagnoses That Clinical Psychologists Should Know About." *Clinical Psychology in Europe*, Vol. 4, 2022.
- [5] Rubin, Devon I. "Epidemiology and risk factors for spine pain." *Neurologic clinics*, Vol. 25, No. 2, 2007, pp. 353-71.
- [6] Lemeunier, Nadège, Charlotte Leboeuf-Yde, and Olivier Gagey. "The natural course of low back pain: a systematic critical literature review." *Chiropractic & manual therapies*, Vol. 20, No. 1, 2012, pp. 1-12.
- [7] Shekhar, Saket, et al. "Prevalence of acute low back pain with risk of long-term disability and its correlates among medical students: A cross-sectional study." *Journal of Education and Health Promotion*, Vol. 12, No. 1, 2023, pp. 179.
- [8] Shetty, Gautam M., et al. "Prevalence of low back pain in India: a systematic review and meta-analysis." *Work Preprint*, 2022, pp. 1-24.
- [9] Dandona, Lalit, et al. "Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the Global Burden of Disease Study." *The Lancet*, Vol. 390, No. 10111, 2017, pp. 2437-60.
- [10] Suhail, Ammar, et al. "Do “Myths” of low back pain exist among young Indian college-going adults with a history of low back pain? A cross-sectional study." *Bulletin of Faculty of Physical Therapy*, Vol. 26, No. 1, 2021, pp. 1-9.
- [11] Majumder, Suranjan. "Socioeconomic status scales: Revised Kuppuswamy, BG Prasad, and Udai Pareekh's scale updated for 2021." *Journal of Family Medicine and Primary Care*, Vol. 10, No. 11, 2021, p. 3964.
- [12] "Calculate Your Body Mass Index." National Heart, Lungs and Blood Institute.
- [13] Buchbinder, Rachele, et al. "Low back pain: a call for action." *The Lancet*, Vol. 391, No. 10137, 2018, pp. 2384-28.
- [14] Munigangaiah, Sudarshan, et al. "Do “Myths” of low back pain exist among Irish population? A cross-sectional study." *European Journal of Orthopaedic Surgery & Traumatology*, Vol. 26, 2016, pp. 41-6.
- [15] Bindra, Supreet, A. G. K. Sinha, and A. I. Benjamin. "Epidemiology of low back pain in Indian population: a review." *International Journal of Basic and Applied Medical Sciences*, Vol. 5, No. 1, 2015, pp. 166-79.
- [16] Nasser, Munir J. "How to approach the problem of low back pain: An overview." *Journal of Family & Community Medicine*, Vol. 12, No. 1, 2005, p. 3.
- [17] "India work participation by gender." Statista.
- [18] Bansal, Dipika, et al. "Prevalence and impact of low back pain in a community-based population in northern India." *Pain Physician*, Vol. 23, No. 4, 2020, p. 389.
- [19] Mathew, Anil C., et al. "The prevalence and correlates of low back pain in adults: A cross sectional study from Southern India." *International Journal of Medicine and Public Health*, Vol. 3, No. 4, 2013.
- [20] Ganesan, Sudhir, et al. "Prevalence and risk factors for low back pain in 1,355 young adults: a cross-sectional study." *Asian spine journal*, Vol. 11, No. 4, 2017, p. 610.
- [21] Siddiqui, Ali S., et al. "Association between low back pain and body mass index in Pakistani population: analysis of the software Bank data." *Cureus*, Vol. 14, No. 3, 2022.
- [22] Heuch, Ingrid, et al. "Body mass index as a risk factor for developing chronic low back pain: a follow-up in the Nord-Trøndelag Health Study." *Spine*, Vol. 38, No. 2, 2013, pp. 133-9.
- [23] Tilg, Herbert, and Alexander R. Moschen. "Adipocytokines: mediators linking adipose tissue, inflammation and immunity." *Nature reviews immunology*, Vol. 6, No. 10, 2006, pp. 772-83.
- [24] Su, Charles A., et al. "The association between body mass index and the prevalence, severity, and frequency of low back pain: data from the osteoarthritis initiative." *Spine*, Vol. 43, No. 12, 2018, pp. 848-52.
- [25] Park, In Young, et al. "Gender-specific associations between fat mass, metabolic syndrome and musculoskeletal pain in community residents: A three-year longitudinal study." *PloS one*, Vol. 13, No. 7, 2018.

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- [26] Schumann, Barbara, et al. "Lifestyle factors and lumbar disc disease: results of a German multi-center case-control study (EPILIFT)." *Arthritis research & therapy*, Vol. 12, No. 5, 2010, pp. 1-8.
- [27] Chou, Louisa, et al. "The association between obesity and low back pain and disability is affected by mood disorders: a population-based, cross-sectional study of men." *Medicine*, Vol. 95, No. 15, 2016.
- [28] Maetzel, Andreas, and Linda Li. "The economic burden of low back pain: a review of studies published between 1996 and 2001." *Best practice & research Clinical rheumatology*, Vol. 16, No. 1, 2002, pp. 23-30.
- [29] Gauthaman, Jeevitha. "Unhealthy food consumption patterns among Indians: A qualitative analysis based on parliamentary questions documented between 2001 and 2021." *Journal of Family Medicine and Primary Care*, Vol. 12, No. 3, 2023, p. 545.
- [30] Singh, Ankul, et al. "Junk food-induced obesity-a growing threat to youngsters during the pandemic." *Obesity Medicine*, Vol. 26, 2021, p. 100364.
- [31] Deyo, Richard A., Sohail K. Mirza, and Brook I. Martin. "Back pain prevalence and visit rates: estimates from US national surveys, 2002." *Spine*, Vol. 31, No. 23, 2006, pp. 2724-27.
- [32] Burton, A. Kim, et al. "Psychosocial predictors of outcome in acute and subchronic low back trouble." *Spine*, Vol. 20, No. 6, 1995, pp. 722-8.
- [33] Taimela, Simo, et al. "The prevalence of low back pain among children and adolescents: a nationwide, cohort-based questionnaire survey in Finland." *Spine*, Vol. 22, No. 10, 1997, pp. 1132-6.
- [34] Wu, Aimin, et al. "The prevalence and years lived with disability caused by low back pain in China, 1990 to 2016: findings from the global burden of disease study 2016." *Pain*, Vol. 160, No. 1, 2019, p. 237.