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## **The comparative analysis among male and female patient with chronic lumbar spondylosis**

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**Abstract**--The aim of this study was to compare depression, anxiety, stress, and resting physiological measurements (systolic blood pressure (S.B.P), diastolic blood pressure (D.B.P), pulse rate, and respiratory rate) between male and female patients with chronic lumbar spondylosis. The study included a total of 150 male participants (mean age:  $60.03 \pm 9.89$  (yrs), mean body height:  $1.73 \pm 0.047$  (m), mean body weight:  $79.70 \pm 7.01$  (kg), and mean BMI:  $26.59 \pm 1.46$  (kg/m<sup>2</sup>)) and 150 female participants (mean age:  $59.35 \pm 11.18$  (yrs), mean body height:  $1.66 \pm 0.043$  (m), mean body weight:  $79.70 \pm 7.01$  (kg), and mean BMI:  $27.408 \pm 1.906$  (kg/m<sup>2</sup>)). The participants belonged to the middle to elderly age group of 40–80 years. The study utilized a validated DASS 21 scale to measure the levels of depression, anxiety, and stress in patients with chronic lumbar spondylosis. Statistical analysis of the data was performed using the (SPSS) version 22.0. The results revealed statistically significant differences ( $P = .01$ ) between males and females in terms of depression and stress levels. However, no significant differences were observed for anxiety ( $P = .228$ ) between males and females. Furthermore, statistically significant differences ( $P = .01$ ) were found between males and females in resting S.B.P, resting D.B.P, and resting pulse rate. On the other hand, no significant differences were observed for resting respiratory rate ( $P = .323$ ) between the two population groups. Study confirmed gender-related variations in psychological and physiological aspects of chronic lumbar spondylosis. Healthcare professionals should consider these findings when developing comprehensive treatment strategies for patients with this condition, addressing both physical and psychological aspects.

**Keywords**---lumbar spondylosis, depression, anxiety, stress, resting SBP, resting D.B.P, resting pulse rate, resting respiratory rate.

## **Introduction**

Low back pain (LBP) is one of the most common reasons of hospital visits and is major global cause of activity limitation and absence from work. It is one of the most prevalent musculoskeletal conditions that affect significant proportion of population at some point in their life. Lumbar spondylosis, which is a degenerative condition affecting the vertebral column of lower back, is one of the commonest causes of the lower back ache, it refers to the presence of osteophytes, or bone spurs, that develop from the lumbar vertebrae. Low back pain (LBP) is a prevalent condition, affecting approximately 60-85% of adults at some point in their lives [1, 2, 3]. Fortunately, for the majority of individuals, LBP is mild and temporary, with symptoms subsiding within six weeks for about 90% of cases [4]. However, chronic low back pain, which is defined as pain persisting beyond three months, affects an estimated 15-45% of the population, with chronic lumbar spondylosis being more prevalent in elderly individuals, leading to pain, stiffness, and mobility issues. Pain which persists for longer period has its adverse effects, including psychological and physiological disturbances which get worsen with time. [5, 6]. Psychological factors, both affective (related to emotions) and cognitive (related to thinking processes), can influence the multidimensional experience of pain, affecting how individuals perceive and adjust to ongoing pain-related disability. Affective factors often involve negative emotions, such as depression, anxiety specific to pain, and anger. Cognitive factors encompass various aspects, including catastrophizing (exaggerating the significance of pain), fear, feelings of helplessness, reduced self-efficacy, pain coping strategies, readiness for change, and acceptance [7, 8]. Chronic pain is often accompanied by diminished functioning, such as physical disability and interference with work, as well as psychosocial factors like depressed mood, anxiety, pain-related fear, and limited social support. These factors contribute to a disrupted quality of life for individuals with chronic pain. Previous research has primarily focused on identifying risk and vulnerability factors associated with the maintenance and exacerbation of pain. For instance, negative psychological factors, such as negative affective states, have consistently been shown to facilitate pain and disability. Depression and anxiety frequently coexist with chronic pain and can significantly impact the pain experience, leading to greater pain severity, impaired functioning, and reduced quality of life [9, 10]. In fact, evidence suggests that depression uniquely contributes to an increased risk of developing disabling back pain in older adults [11]. Similarly, reciprocal relationships have been demonstrated between symptoms of anxiety and depression and greater interference from pain in the aging population [12]. Whereas the chronic pain has been found to have greater implications on patient's physiological parameters, including blood pressure, pulse rate and respiratory rate [13, 14] here is emerging evidence that males and females respond differently to chronic pain and thus differ in mental and physical problems associated with the chronic pain. The females are at greater risk of developing psychological ailments due to chronic pain than the males. There is substantial lack of studies carried out for chronic lumbar spondylosis specifically regarding the effect of chronic lumbar spondylosis

on physiological and mental health factors among the patients specifically with gender differences. There is a complex interaction between chronicity of lumbar spondylosis with that of depression, anxiety, and psychological stress and resting blood pressure, pulse rate, and respiratory rate. The present study is aimed at to examine the Gender differences among patients with chronic lumbar spondylosis with regard to depression, anxiety, stress, blood pressure, pulse rate, and respiratory rate.

## Methodology

Study included 150 Male (Mean  $\pm$  SD: Age 60.03 $\pm$ 9.89 (yrs), Body Height 1.73 $\pm$ 0.047 (m), Body Weight 79.70 $\pm$ 7.01 (Kg) & BMI 26.59 $\pm$ 1.46 (Kg/m<sup>2</sup>) and 150 Female (Mean  $\pm$  SD: Age 59.35 $\pm$ 11.18 (yrs), Body Height 1.66 $\pm$ 0.043 (m), Body Weight 79.70 $\pm$ 7.01(Kg) & BMI 27.408 $\pm$ 1.906 (Kg/ m<sup>2</sup>)) in middle to elderly age group of 40-80 years.

Table-1: Male subject's demographics of age, body height, body weight and BMI.

Variables	Sample Size (N=300)
	Total (N=150)
Age (yrs)	60.03 $\pm$ 9.89
Body Height (m)	1.73 $\pm$ 0.047
Body Weight (Kg)	79.70 $\pm$ 7.01
BMI (Kg/ m <sup>2</sup> )	26.59 $\pm$ 1.46

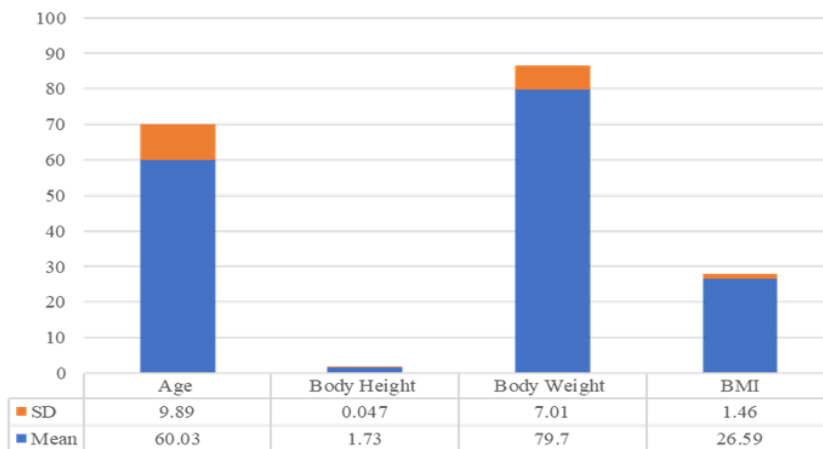


Figure-1: Graphical distribution of male subject's demographics of age, body height, body weight and BMI.

Table-2: Female subject's demographics of age, body height, body weight and BMI.

Variables	Sample Size (N=300)
	Total (N=150)
Age (yrs)	59.35±11.18
Body Height (m)	1.66±0.043
Body Weight (Kg)	76.04±5.96
BMI (Kg/ m <sup>2</sup> )	27.408±1.906

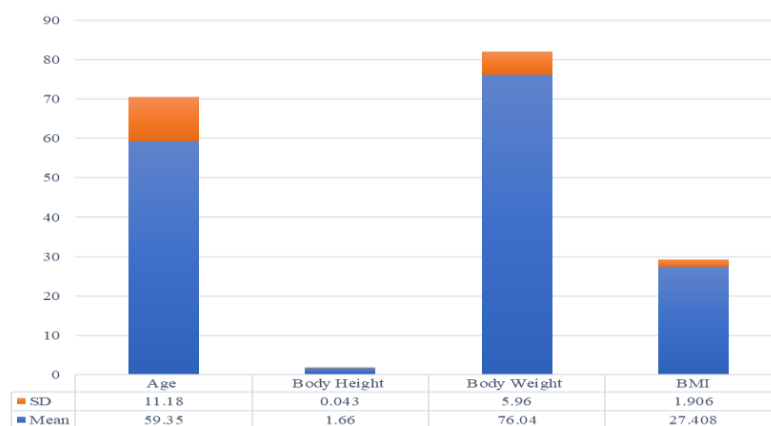


Figure-2: Graphical distribution of female subject's demographics of age, body height, body weight and BMI.

### Inclusion and Exclusion Criteria

The criteria for inclusion and exclusion of subjects in the study is presented in Table-3.

Table-3: Criteria for inclusion and exclusion of subjects in the study.

Criteria for Inclusion	Criteria for Exclusion
Age of subjects 40 years and above.	Age below 40 years.
Patients with known history of Chronic Lumbar Spondylosis.	Patients with known Psychiatric ailments (Psychosis, Neurosis and GAD or any other disorder).
Subjects should not have under gone any surgical treatment for Low Back.	Patients with history of hypertension, Cardiac or respiratory ailment.
Lumbar spondylosis for more than 3 months duration.	Any recent emotional outburst (e.g., Death of dear one).
	Any traumatic history to low back.
	History of any congenital or infective condition of Lumbosacral spine.

Study utilized validated scale DASS 21 to record the level of depression, anxiety and stress among patients with chronic lumbar spondylosis. For each patient basic vital sign i.e., resting pulse rate, resting respiratory rate, and resting systolic and resting diastolic blood pressure (S.B.P and D.B.P) were recorded. Data were analyzed using SPSS version 22.0

## Results

Table-4: Comparative analysis among Male and Female patient with Chronic Lumbar Spondylosis for Depression, Anxiety and Stress.

	Male (N=150)		Female (N=150)		x <sup>2</sup>	P value
	Mean	S.D.	Mean	S.D.		
Depression	11.39	3.38	13.96	3.05	50.175	.01
Anxiety	15.75	3.17	15.62	2.73	8.849	.228
Stress	14.80	2.57	14.13	3.11	13.434	.014

Table 5 presents the descriptive statistics comparing the results between male and female patients. In terms of anxiety, males had a slightly higher mean value of 15.75 compared to females with a mean value of 15.62. Similarly, for stress, males had a higher mean value of 14.80 while females had a mean value of 14.13. On the other hand, for depression, males had a lower mean value of 11.39 compared to females with a higher mean value of 13.96. Statistical analysis revealed significant differences ( $P = .01$ ) between males and females for both depression and stress. However, no significant differences were found for anxiety ( $P = .228$ ) between males and females. Findings indicate that there are gender-based variations in the levels of depression, anxiety, and stress experienced by patients with chronic lumbar spondylosis. Males tend to have lower levels of depression but higher levels of anxiety and stress compared to their female counterparts.

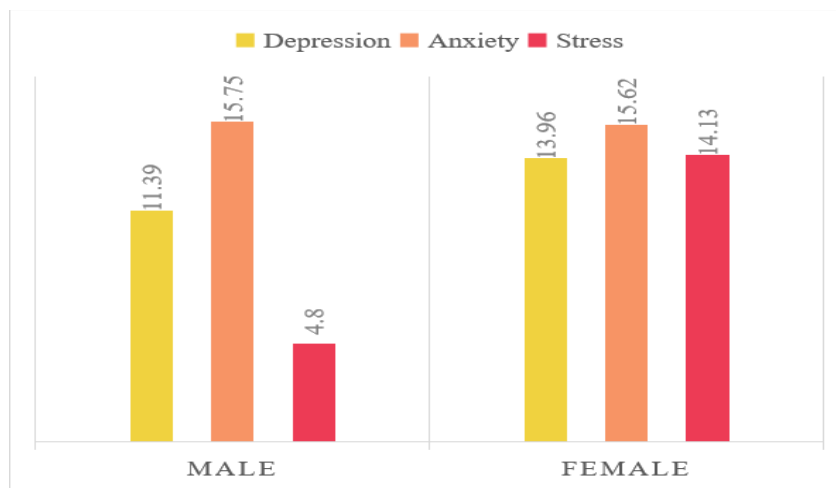


Figure-3: Mean comparison among Male and Female patient with Chronic Lumbar Spondylosis for Depression, Anxiety and Stress.

Table-5: Comparative analysis among Male and Female patient with Chronic Lumbar Spondylosis for Resting SBP, Resting D.B.P, Resting Pulse Rate and Resting Respiratory Rate.

	Male (N=150)		Female (N=150)		T value	P
	Mean	S.D.	Mean	S.D.		
Resting S.B.P.	135.51	8.88	133.16	7.48	2.478	.0137
Resting D.B.P.	85.25	4.56	86.36	4.24	2.181	.0299
Resting Pulse Rate	77.09	5.44	75.80	4.95	2.147	.0325
Resting Respiratory Rate	17.36	1.47	29.22	146.87	.989	.3235

Table 5. presents the descriptive statistics comparing the results between male and female patients. Male patients exhibited higher mean values for resting systolic blood pressure (S.B.P.) and resting pulse rate, with values of 135.51 and 77.09 respectively, compared to their female counterparts who had mean values of 133.16 for resting S.B.P. and 75.80 for pulse rate. On the other hand, male patients had lower mean values for resting diastolic blood pressure (D.B.P.) and resting respiratory rate, with values of 85.25 and 17.36 respectively, whereas female patients had mean values of 86.36 for resting D.B.P. and 29.22 for resting respiratory rate. Statistical analysis revealed significant differences ( $P=.01$ ) between males and females for resting S.B.P., resting D.B.P., and resting pulse rate. However, no significant differences were found for resting respiratory rate ( $P=.323$ ) between the two population groups with females having higher mean values for resting respiratory rate with 29.22 and that of males with 17.36.. These findings indicate that there are gender-based variations in the resting physiological measurements, specifically systolic blood pressure, diastolic blood pressure, and pulse rate, among patients with chronic lumbar spondylosis. Males tend to have higher values for resting S.B.P. and pulse rate, while females tend to have higher values for resting D.B.P. and resting respiratory rate.

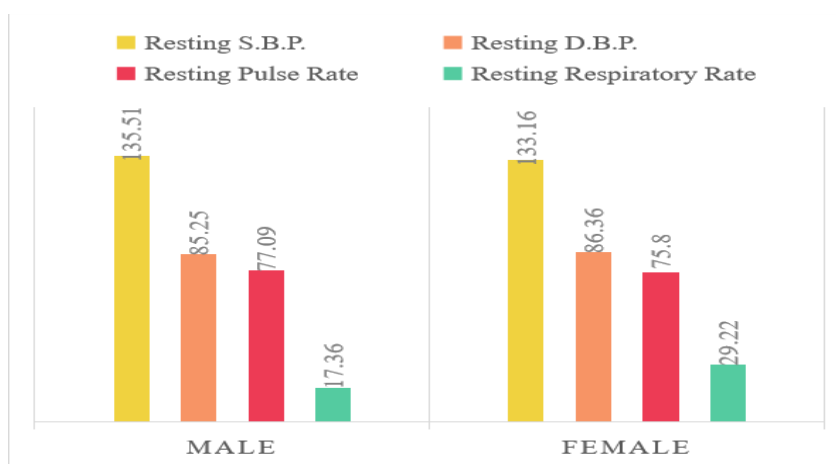


Figure-4: Mean comparison among Male and Female patient with Chronic Lumbar Spondylosis for Resting SBP, Resting D.B.P, Resting Pulse Rate and Resting Respiratory Rate.

## Discussion

The results of present study are comparable to the studies reported by Dutta et al, 2013 found 30.67% patients having Major depressive syndrome with women having more depressive syndrome than men with ratio of 3:2.[15] Also there existed a significant association with intensity of pain ( $P < .05$ ) but no such association with duration of pain. Munce et al., 2007 in their study on gender differences in prevalence of depression among 131,535 adults with chronic pain found that women (9.1%) tend to have more depressive symptoms almost twice than males (5%) with chronic pain.[16] The difference in levels of depression among males and females can be attributed to biological factors such as variations in female hormones levels specially decrease in oestrogen which tend to cause more depression and anxiety among females, social factors, family factors[17]. Despite this difference the existing study demonstrates that chronic lumbar spondylosis is associated with depression, more among females than males.

Results of our study are in alignment with the study of Robinson, et al, 2005 had studied sex differences in pain related anxiety among 53 patients with chronic low back pain and found strong association between pain and anxiety in both sexes, with more anxiety among males. Strong relationships were found between pain related anxiety and self-report of low back pain more among men than in women with  $P < .05$ . [18]. Present study demonstrates higher mean values for stress among Male patients which is in accordance with the study of Sungwoo, et al. 2021, which reported that chronic low back pain has more association with stress among males [19]. Men tend to show greater stress response to same stressor than their female counterparts [20]

Results of our study show higher resting systolic blood pressure among males which is supported by evidence that men showed more increase in systolic blood pressure and mean arterial pressure with cold pressor with  $p$  value  $< .05$  and showed post task resting systolic blood pressure and mean arterial pressure were larger in men than in women with  $p$  value of  $< .05$  [21] Studies have demonstrated that women have low average resting SBP than their male counterparts where as men have been found to have reduced pain sensitivity and increased bloods pressure than women [22,23] Current research regarding resting Diastolic Blood Pressure and Chronic pain among females is limited, as majority of the studies show correlation between chronic pain and Systolic Blood Pressure among females. In our study we have found higher Resting Diastolic Blood Pressure among Females than their male counterparts, which is in accordance with the study of which reported 5% of Females and 1% males (Female>Males) having isolated diastolic hypertension among Belgium adolescents.[24] Whereas there are studies which have reported negative association between resting Diastolic Blood Pressure and pain unpleasantness among males and females [25]. The results of the present study show mild difference in pulse rate among males and females with chronic lumbar spondylosis, this can be attributed to increased sympathetic activity and hypothalamic pituitary adrenal axis activity in males than females. This altered pulse rate is the result of increased sympathoadrenal response [26]. Scant data is available with respect to effect of chronic pain on Respiratory rate. The results in are in alignment with the study of that more the

severity of pain, more is the respiratory rate, this increase in respiratory rate in patients with chronic pain is significant when compared to those without pain [27]. This increase in respiratory rate in response to chronic pain can be attributed to uncontrolled emotional response and feeling of fear and pain due to adverse event of pain which is the result of stimulation of amygdala rather than nociception [14]. Higher mean values for resting respiratory rate among female group can be attributed to anatomical differences such as airway diameter, lung volume, expiratory flow rates, tracheal diameter.

### **Conclusion**

Study confirmed gender-related variations in psychological and physiological aspects of chronic lumbar spondylosis. Healthcare professionals should consider these findings when developing comprehensive treatment strategies for patients with this condition, addressing both physical and psychological aspects.

### **Acknowledgement**

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### **Conflict of interest**

The authors declare that there is no conflict of interests.

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