



A CROSS-SECTIONAL STUDY ON LOW BACK PAIN AND ITS ASSOCIATED RISK FACTORS AMONG SECONDARY SCHOOL TEACHERS OF ROPAR DISTRICT, PUNJAB

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ABSTRACT

Background: Low back pain is a widespread health complication affecting all the strata of our society. Sedentary population is severely affected by these conditions. **Objectives:** The present investigation aimed to explore the prevalence of low back pain (LBP) along with its contributing risk factors among secondary school teachers in Ropar district, Punjab. **Methodology:** A total of 506 teachers aged between 25 and 60 years were recruited from various schools across the district. Out of these, 209 teachers (88 males and 121 females) were identified with low back pain based on a self-reported questionnaire. To assess pain and related functional limitations, the Nordic Musculoskeletal Questionnaire, Modified Oswestry Low Back Pain Disability Questionnaire, and a self-developed socio-demographic and economic questionnaire were utilized. **Results:** Findings indicated that the overall 12-month prevalence of LBP was 41.30%, with female teachers (59.90%) being more affected compared to male teachers. Several determinants such as heavy workload, disturbed sleep (particularly among females), long hours of standing during classroom teaching, and lack of physical activity were linked with the condition. Analysis further revealed that the majority of male (75.00%) and female (58.26%) teachers were categorized as having minimal disability according to the Oswestry Disability Index. **Conclusion:** It can be inferred that addressing both occupational and individual factors are crucial to lessen the burden of low back pain among teachers.

KEYWORDS: Low back pain. Prevalence. Contributing factors. Secondary school teachers. Ropar district, Punjab.

INTRODUCTION

Low back pain (LBP) is recognized as the most common musculoskeletal disorder across the globe.^[1] Approximately 70%–85% of individuals worldwide experience LBP at some stage in life.^[2] In developed countries, 60%–70% of the population report the condition, with annual prevalence ranging between 15%–45% and an incidence rate of about 5%.^[3] Also referred to as “lumbago,” LBP is particularly frequent among working populations, including school teachers, and is associated with reduced quality of life, frequent absenteeism, functional limitations, and premature retirement.^[4]

Teaching is considered a service-oriented profession that inherently carries a high risk for musculoskeletal disorders.^[5] Research highlights teaching as a stressful occupation, with tasks often requiring a sustained “head-down” posture during activities like lesson planning,

grading, and writing on boards. Poor posture and improper lifting techniques are two major contributors to back pain. Handling heavy instructional materials—such as books, projectors, and classroom equipment—further aggravates the risk.

The prevalence of LBP among teachers is reported to be higher than in many other occupations, ranging from 12% to 95%. Those involved in physically demanding tasks, such as sports and physical education, are especially vulnerable to both acute and chronic injuries, sometimes leading to long-term disability.^[3]

Existing literature shows that teachers frequently encounter stressful work conditions, predisposing them to musculoskeletal issues. However, data on the prevalence and determinants of LBP among secondary school teachers in Ropar district, Punjab, remains

insufficient. Thus, the present study was undertaken to fill this gap.

MATERIALS AND METHODS

A cross-sectional design was employed between April and July 2025 in the Ropar district of Punjab, India. A total of 506 secondary school teachers (male and female) aged 25–60 years, with at least one year of teaching experience, were surveyed. Among them, 209 (88 males and 121 females) reported low back pain through a structured self-assessment questionnaire. Teachers with pre-existing chronic conditions (neurological, musculoskeletal, cardiovascular, or psychiatric illnesses) or those under long-term medication were excluded. Written informed consent was obtained, and ethical approval was granted by the Institutional Ethics Committee.

Anthropometric Measures

Body height and weight were recorded following Lohmann *et al.*^[6] Body Mass Index (BMI) was calculated as:

$$\text{BMI} = \text{weight (kg)} / \text{height}^2 (\text{m}^2).$$

Nordic Musculoskeletal Questionnaire (NMQ)

The NMQ was applied to determine musculoskeletal pain in nine body regions (neck, shoulders, elbows, wrists/hands, upper back, lower back, thighs, knees, and ankles). Participants responded “yes” or “no” to indicate pain within the past 12 months and whether it restricted activity.^[7]

Modified Oswestry Low Back Pain Disability Pain Questionnaire (MOLBPDPQ)

The Oswestry Disability Index (ODI) was originally developed as a self-reported questionnaire to evaluate the degree of disability caused by low back pain. In this study, the MOLBPDPQ version was used to provide therapists with an understanding of how low back pain affects the daily functioning of participants. Each participant was asked to answer all questions by selecting the most suitable option, and the total score obtained was multiplied by two to calculate the disability percentage. The results were then interpreted within five ranges: less than 20 percent indicated minimal disability, 21 to 40 percent represented moderate disability, 41 to 60 percent reflected moderate to severe disability, 61 to 80 percent showed severe disability, and 81 to 100 percent corresponded to very severe or total disability. The ODI is considered a valid and reliable tool, with good face validity, acceptable content validity, and satisfactory internal consistency, making it a widely used measure in clinical and research settings.

Work-Related Characteristics (WRC)

Seventeen questions were included to identify occupational factors associated with LBP. These covered aspects such as prolonged standing during teaching, hours of standing, teaching frequency (single class vs. multiple class shifts), break duration between sessions,

weekly working hours, sleep duration, causes for prolonged sitting (e.g., exam or assignment marking), type of chair used, work shifts, load carrying, extracurricular involvement, physical exercise, training on workplace safety, and exposure to discouragement, depression, or violence.

Statistical Analysis

Descriptive statistics were presented as percentages. Data were analysed using SPSS version 24.0. A 5% probability level was considered statistically significant.

RESULTS

Table 1 presents the prevalence, socio-demographic, and economic characteristics of secondary school teachers in Ropar district, Punjab. Among 506 secondary school teachers, 209 were identified with low back pain, accounting for 41.30%. More than half of the teachers (59.21% male and 52.07% female) belonged to the age group above 40 years. In terms of BMI, 54.54% of male and 47.93% of female teachers were classified as underweight. The majority of teachers were Sikhs (51.14% male and 52.89% female) by religion. Regarding educational qualification, most male teachers (57.95%) were postgraduates, whereas the majority of female teachers (55.37%) were graduates. Marital status revealed that 84.09% of male and 77.68% of female teachers were married. With respect to work experience, the largest proportion of male teachers (46.45%) had 25 to 35 years of experience, while the majority of female teachers (42.15%) had 11 to 24 years of experience. In terms of monthly income, the highest proportion of teachers (32.95% male and 27.27% female) earned between Rs 25,000–35,000, and most reported no additional source of income (75.00% male and 85.12% female).

Table-2 highlights the work-related characteristics of teachers. A majority (56.82% male and 84.30% female) reported prolonged standing during teaching, with 77.27% of males and 59.50% of females standing for 2–5 hours. Most male teachers (59.21%) handled only one class per day, whereas 62.81% of female teachers moved from class to class. Break durations between sessions were more than one hour for 48.86% of male teachers, compared with less than 20 minutes for 52.89% of female teachers. The majority (78.41% male and 61.16% female) reported a workload of less than 30 hours per week. Concerning sleep duration, 38.63% of males reported sleeping more than 10 hours per day, while 59.50% of females reported less than 6 hours per day. Prolonged sleeping was noted in 54.54% of males, whereas 71.90% of females reported no prolonged sleeping. The most common reason given for prolonged sitting at work was assignment marking in 42.73% of males, while exam marking was cited by 64.46% of females. Seating arrangements showed that 46.59% of male teachers frequently used both chair and bench, whereas 59.50% of females used a bench only. In terms of work shift patterns, 64.72% of males and 47.11% of

females reported changing their work shift once a week. A majority of teachers (73.86% male and 57.02% female) did not report handling heavy material. Engagement in extracurricular activities was observed in 65.88% of males and 70.25% of females. Regular physical exercise was reported by 56.82% of males, while 78.51% of females did not engage in regular exercise. For those exercising, 38.64% of males and 15.70% of females spent less than five hours per week on physical activity. Training on workplace safety was absent in 57.96% of males but present in 76.86% of

females. A high proportion of teachers (60.23% male and 62.81% female) experienced discouragement and depression. Experiences of verbal or physical violence were absent in 69.32% of males and 65.29% of females.

Table-3 displays the Oswestry Disability Index distribution of participants. The largest proportion of male teachers (75.00%) and female teachers (58.68%) fell within the category of minimal disability.

Table 1: Prevalence, socio-demographic and economic characteristics of secondary school teachers in Ropar district, Punjab.

Variables	Frequency		Percentage	
Low back pain patients	209		41.30	
Gender				
Males	88		42.10	
Females	121		59.90	
Age (years)	Males		Females	
	Frequency	Percentage	Frequency	Percentage
<30	12	13.15	21	17.35
31-40	27	27.63	37	30.58
>40	49	59.21	63	52.07
BMI (kg/m ²)				
<18.5	48	54.54%	58	47.93%
25-29.9	34	38.64%	49	40.50%
>=30	6	6.82%	14	11.57%
Religion				
Sikh	45	51.14%	64	52.89%
Hindu	40	45.45%	53	43.80%
Educational Status				
Secondary	0		1	0.83%
Higher secondary	3	3.41%	1	0.83%
Graduate	34	38.64%	67	55.37%
Post graduate	51	57.95%	51	42.15%
PHD	0		1	0.83%
Marital Status				
Single	14	15.91%	27	22.32%
Married	74	84.09%	94	77.68%
Divorced /Widow	0		0	
Work experience (years)				
<10	12	13.64%	34	28.10%
11-24	36	40.91%	51	42.15%
>=25-35	40	45.45%	36	29.75%
Monthly Salary (Rupees)				
5,000-15,000	1	1.14%	3	2.48%
15,000-25,000	7	7.95%	24	19.83%
25,000-35,000	29	32.95%	33	27.27%
35,000-45,000	17	19.32%	19	15.70%
45,000-55,000	5	5.68%	6	4.96%
55,000-65,000	7	7.95%	14	11.57%
65,000-75,000	22	25.0%	22	18.18%
Extra source of income				
Yes	20	22.73%	18	14.88%
No	59	75.00%	103	85.12%

Table 2: Work-related characteristics of secondary school teachers in Ropar district, Punjab.

Variables	Males		Females	
	Frequency	Percentage	Frequency	Percentage
Prolonged standing during teaching				
Yes	50	56.82%	102	84.30%
No	38	43.18%	19	15.70%
Length of standing during teaching				
2-5hr	68	77.27%	72	59.50%
>5hr	20	22.73%	49	40.50%
Frequency of teaching class				
One class per day	52	59.09%	45	37.19%
Moving from class to class	36	40.91%	76	62.81%
Length of break time between sessions				
<20min	23	26.14%	64	52.89%
Up to 1 hr	22	25.00%	40	33.06%
>1hr	43	48.86%	17	14.05%
Working per week				
<30hr	69	78.41%	74	61.16%
>=30hr	19	21.59%	47	38.84%
Sleeping time per day				
<6hr	29	32.95%	72	59.50%
6-9hr	25	28.41%	36	29.75%
>=10hr	34	38.63%	13	10.74%
Have prolonged sleeping				
Yes	48	54.54%	34	28.10%
No	40	45.45%	87	71.90%
Reason for prolonged sitting at work				
For exam marking	37	42.04%	78	64.46%
For assignment marking	42	47.73%	38	31.40%
Other reason	9	10.23%	5	4.13%
Type of seats frequently used at office				
Swivel chair	7	7.95%	6	4.96%
Normal chair	40	45.45%	43	35.54%
Bench	41	46.59%	72	59.50%
Work shift pattern				
Only morning	15	17.04%	25	20.66%
Whole shift	16	18.18%	39	32.23%
Once for week	57	64.72%	57	47.11%
Shifting of heavy material				
Yes	23	26.14%	52	42.97%
No	65	73.86%	69	57.02%
Have extracurricular activity				
Yes	58	65.88%	85	70.25%
No	30	34.09%	34	29.75%
Have regular physical exercise				
Yes	50	56.82%	26	21.49%
No	38	43.18%	95	78.51%
Time for physical exercise				
<=5hr	34	38.64%	19	15.70%
>5hr	16	18.18%	8	6.61%
No	38	43.18%	94	77.69%
Have training on safety at work				
Yes	37	42.04%	93	76.86%
No	51	57.96%	28	23.14%
Have discouragement & depression				
Yes	53	60.23%	76	62.81%
No	35	39.77%	45	37.19%
Experience of any verbal or physical violence				

Yes	27	30.68%	42	34.71%
No	61	69.32%	79	65.29%

Table 3: Oswestry disability index-wise distribution of the subjects.

Oswestry Disability index category	Males		Females	
	Frequency	Percentage	Frequency	Percentage
Minimal disability	66	75%	71	58.68%
Moderate disability	19	21.59%	40	33.06%
Severe disability	2	2.27%	8	6.61%
Crippled	1	1.14%	2	1.65%
Bed bound	0		0	

DISCUSSION

This study revealed that 41.30% of secondary school teachers in Ropar district reported LBP during the past year. This prevalence is comparable to findings from India (41.79%)^[8], Malaysia (40.4%)^[9] but higher than reports from Japan (20.4% in men and 23.2% in women).^[10] The elevated prevalence in this context may be linked to inadequate facilities, heavy teaching workload, poor socio-economic conditions, and insufficient strategies to manage stress.

The higher occurrence in women (60.20%) compared to men (39.39%) may be attributed to the dual burden of professional and household responsibilities, as well as biological differences such as lower pain thresholds. Disturbed sleep, long teaching hours, and insufficient exercise were identified as significant contributors, consistent with previous studies in Africa and Asia.^[11,12] Prolonged standing and poor posture exert continuous strain on the lumbar spine, and repetitive actions like carrying books, bending, and turning increase the risk.^[13-15] Toumi et al.^[16] reported that musculoskeletal disease affected adversely in working ability. Inactivity weakens supporting muscles, thereby predisposing teachers to pain.^[17]

Prolonged standing in an inappropriate posture for several hours in the classroom might cause excessive strains on the lumbar spine resulting LBP. Activities such as carrying loads (books, copies, overhead projectors etc.) to the classroom, twisting movements (turning from the boards to the class and back again), down head activities (correcting assignments, marking the copies etc.), poking chin while working in computers aggravated LBP in teachers.^[18-20,11]

LBP has been shown to impair both occupational performance and psychological wellbeing.^[21,22] Teachers' roles extend beyond academic delivery to shaping values, attitudes, and behaviours of students, thus making their health and wellness crucial.^[23]

In this study, most teachers experienced minimal disability according to the Oswestry Disability Index, although severity increased with age and years of experience, as previously documented.^[24-27] One limitation of the study is reliance on self-reported

questionnaires without clinical confirmation, which may introduce recall bias, even though validated tools like the NMQ were used.

CONCLUSION

The present study concluded that 41.30% of secondary school teachers in Ropar district suffer from LBP, with females more affected than males. Factors such as heavy workload, insufficient rest, prolonged classroom standing, and inactivity were found to be major contributors. Most teachers had minimal disability, but addressing occupational and lifestyle-related factors is essential to mitigate the impact of LBP.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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