Frequency and Determinants of Low Back Pain among Office Workers in Lahore, Pakistan

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Abstract

Background: Low back pain (LBP) is a major global health burden, particularly among sedentary office workers. Prolonged sitting, poor posture, physical inactivity, and psychosocial stress are key occupational risk factors contributing to its increasing prevalence.

Objective: To determine the frequency of Low back pain and identify its associated determinants among office workers.

Methodology: A cross-sectional analytical study was conducted at the Orthopedic Outpatient Department of Chaudhary Muhammad Akram Teaching Hospital/Azra Naheed Medical College from June to December 2023. A convenience sample of 264 office workers aged 18-60 years was recruited. Data were collected using standardized tools, including the Nordic Musculoskeletal Questionnaire (NMQ), International Physical Activity Questionnaire (IPAQ), Rapid Entire Body Assessment (REBA), and Perceived Stress Scale (PSS-10). Bivariate and multivariable logistic regression analyses were performed to identify significant predictors of LBP.

Results: The frequency of LBP was found to be 207 (78.4%) among office workers. Independent predictors of LBP included working more than 8 hours per day (AOR = 2.71), low physical activity level (AOR = 3.14), medium/high ergonomic risk (AOR = 3.92), and moderate/high perceived stress levels (AOR = 2.85) ($p < 0.05$ for all).

Conclusion: This study highlights a high frequency of LBP among office workers, significantly associated with prolonged working hours, physical inactivity, ergonomic risk, and psychosocial stress. These findings underscore the need for workplace interventions such as ergonomic modifications, physical activity promotion, and stress management programs.

Keywords: Ergonomics, Low back pain, Occupational health, Office workers, Physical activity, Psychosocial stress

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Introduction

Low back pain (LBP) remains one of the most prevalent musculoskeletal conditions globally, contributing significantly to disability and healthcare burden.[1] According to the Global Burden of Disease Study 2019, LBP ranked among the top causes of years lived with disability (YLDs), affecting approximately 568 million people worldwide.[2] Its impact extends beyond individual suffering to substantial economic costs due to reduced productivity, absenteeism, and increased healthcare utilization.[3]

The rise in sedentary work environments, particularly among office workers, has further amplified the prevalence of LBP.[4] Prolonged sitting, poor posture, insufficient physical activity, and psychosocial stressors at work are increasingly recognized as key contributors to the development and persistence of LBP in this population.[5] These occupational risk factors are compounded by ergonomic deficiencies in workstation design, lack of movement breaks, and limited awareness of preventive strategies.[6] Despite the growing recognition of LBP as an occupational health issue, there remains a significant gap in comprehensive, region-specific data on its frequency and associated determinants among office workers.[7] Most existing studies have been conducted in high-income countries, leaving low and middle-income regions underrepresented.[8] Furthermore, while several modifiable risk factors have been identified, their relative contributions in different occupational settings remain inadequately explored.[9]

Therefore, this study addresses this knowledge gap by assessing the frequency of Low Back Pain among office workers and identifying its key determinants, including occupational habits, physical activity levels, ergonomic practices, and psychosocial

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factors. The findings may inform the development of targeted interventions aimed at improving workplace ergonomics, promoting active lifestyles, and reducing the burden of LBP in sedentary occupational settings. The aim of this study was to determine the frequency of low back pain among office workers and to identify its associated determinants, including socio-demographic and occupational factors.

Methodology

This cross-sectional analytical study was conducted at the Orthopedic Outpatient Department of Chaudhary Muhammad Akram Teaching Hospital/Azra Naheed Medical College from June to December 2023, aimed at determining the frequency and determinants of low back pain (LBP) among office workers after taking approval from the Institutional Ethical Review Committee (IRB/ANMC/2023/16, Dated: 02-05-2023) and informed consent from each patient. The sample size of 264 was calculated assuming a prevalence of LBP among office workers of 78%[9] confidence level 95%, and a margin of error of 5%. A convenience sampling technique was employed to recruit eligible individuals aged between 18 and 60 years who were currently working at least 30 hours per week in an office setting and capable of understanding and completing the study questionnaire. Individuals with a history of spinal surgery, serious spinal pathology such as spondylolisthesis, tumor, or infection, or those experiencing pregnancy-related LBP were excluded from the study.

Data collection was carried out using a structured, pretested questionnaire divided into several sections. The first section gathered socio-demographic and occupational information, including age, gender, educational level, job type, working hours, and work experience. Low back pain was assessed using the standardized Nordic Musculoskeletal Questionnaire (NMQ), which evaluates the presence and frequency of musculoskeletal symptoms in different body regions over specified time periods. Ergonomic risk factors were evaluated using the Rapid Entire Body Assessment (REBA) tool, which provides a systematic evaluation of postural risks during work tasks. Physical activity levels were measured using the International Physical Activity Questionnaire (IPAQ), a validated instrument that categorizes physical activity into low, moderate, and high intensity levels. Psychosocial factors such as stress and perceived workload were assessed using the Perceived Stress Scale (PSS-10), a widely used and validated psychological instrument.

All data were collected through face-to-face interviews and direct observation. Completed questionnaires were reviewed for completeness and consistency before entry into a digital database. Statistical analysis was performed using IBM SPSS Statistics Version 26.0. Descriptive statistics were computed to summarize socio-demographic characteristics, prevalence of LBP, and associated variables. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as means and standard deviations. Bivariate analysis using Chi-square tests and independent samples t-tests was conducted to identify potential associations between LBP and various independent variables. Variables found to be statistically significant in bivariate analysis were further subjected to multivariable logistic regression to determine independent predictors of LBP, and a p-value < 0.05 was considered statistically significant.

Results

A total of 264 office workers participated in this cross-sectional analytical study. The majority of participants were aged between 31-45 years 102 (38.6%), followed by those aged 18-30 years 98 (37.1%) and 46-60 years 64 (24.2%). There was a slightly higher proportion of male participants 142 (53.8%) compared to females 122 (46.2%). Most participants had completed graduation or higher education 150 (56.8%), while 66 (25%) had intermediate-level education and 48 (18.2%) had matriculation or less. A greater proportion of participants worked in private sector jobs 154 (58.3%) compared to government positions 110 (41.7%). In terms of work experience, 104 (39.4%) of respondents had 5-10 years of experience, 90 (34.1%) had less than 5 years, and 70 (26.5%) had more than 10 years of service. About one-third of the sample 90 (34.1%) reported working more than 8 hours per day. (Table-I)

Table-I: Socio-demographic and Occupational characteristics of Participants (n=264)

Variable	Category	Frequency (%)
Age (years)	18-30	98 (37.1%)
	31-45	102 (38.6%)
	46-60	64 (24.2%)
Gender	Male	142 (53.8%)
	Female	122 (46.2%)
Educational Level	Matriculation or less	48 (18.2%)
	Intermediate	66 (25.0%)
	Graduates	150 (56.8%)
Job Type	Government	110 (41.7%)
	Private	154 (58.3%)
Work Experience (years)	<5	90 (34.1%)
	5- 10	104 (39.4%)
	>10	70 (26.5%)
Daily Working Hours	=8 hours	174 (65.9%)
	>8 hours	90 (34.1%)

The frequency of low back pain (LBP) among office workers was found to be 207 (78.4%). Among those with LBP, 69 (33.3%) experienced symptoms for less than a week, 84 (40.6%) for one week to one month, and 54 (26.1%) for more than one month. Approximately 64 (30.9%) of participants reported that LBP interfered with their daily activities, and 102 (49.3%) had consulted a healthcare provider for their symptoms. (Table-II)

Table-II: Frequency and characteristics of Low Back Pain (n=264)

Variable	Frequency (%)
Ever had LBP in last 12 months	207 (78.4%)
Duration of LBP	
Less than a week	69 (33.3%)
One week to 1 month	84 (40.6%)
More than 1 month	54 (26.1%)
Interference with daily activity	64 (30.9%)
Consulted a Healthcare provider	102 (49.3%)

Assessment of physical activity using the International Physical Activity Questionnaire (IPAQ) revealed that 106 (40.2%) of participants had low physical activity levels, 94 (35.6%) had moderate activity, and only 64 (24.2%) engaged in high-intensity activity. Ergonomic risk assessment using the Rapid Entire Body Assessment (REBA) tool indicated that 58 (22%) of participants were at low ergonomic risk, 128 (48.5%) at medium risk, and 78 (29.5%) at high risk. Psychosocial stress levels measured via the Perceived Stress Scale (PSS-10) showed that 74 (28%) of participants had low stress, 122 (46.2%) moderate stress, and 68 (25.8%) high stress levels. (Table-III)

Table III: Distribution of Participants by Physical activity, Ergonomic risk, and Stress level (n=264)

Variable	Category	Frequency (%)
IPAQ Physical Activity	Low	106 (40.2%)
	Moderate	94 (35.6%)
	High	64 (24.2%)
REBA Score	Low Risk	58 (22%)
	Medium Risk	128 (48.5%)
	High Risk	78 (29.5%)
PSS-10 (Stress Level)	Low Stress	74 (28.0%)
	Moderate Stress	122 (46.2%)
	High Stress	68 (25.8%)

Bivariate analysis using Chi-square tests demonstrated statistically significant associations between LBP and several variables. Working more than 8 hours per day was significantly associated with LBP (p=0.02). Similarly, lower levels of physical activity (p=0.001), higher ergonomic risk (p=0.001), and increased perceived stress levels (p=0.001) were all significantly linked with the presence of LBP. No statistically significant association was observed between age group and LBP (p=0.24). (Table-IV)

Multivariable logistic regression analysis confirmed that certain factors independently predicted the occurrence of LBP after adjusting for confounding variables. These included working more than 8 hours per day (adjusted odds ratio [AOR] =2.71; 95% CI: 1.35–5.45; p=0.005), low physical activity level (AOR = 3.14; 95% CI: 1.88–5.24; p<0.001), medium or high ergonomic risk (AOR = 3.92; 95% CI: 2.15–7.16; p<0.001), and moderate to high perceived stress levels (AOR = 2.85; 95% CI: 1.73–4.71; p<0.001). (Table-V)

Table-IV: Bivariate analysis of factors associated with Low Back Pain (n=264)

Variable	With LBP	Without LBP	p-value
Age Group			0.24
18-30	74 (75.5%)	24 (24.5%)	
31-45	82 (80.4%)	20 (19.6%)	
46-60	51 (79.7%)	13 (20.3%)	
Daily Working Hours			0.02
=8 hrs	128 (73.6%)	46 (26.4%)	
>8 hrs	79 (87.8%)	11 (12.2%)	
Physical Activity Level			0.001
Low	90 (84.9%)	16 (15.1%)	
Moderate/high	117 (62.2%)	70 (37.2%)	
Ergonomic Risk (REBA)			0.001
Low	36 (62.1%)	22 (37.9%)	
Moderate/high	171 (80.3%)	42 (19.7%)	
Perceived Stress Level			0.001
Low	44 (59.5%)	30 (40.5%)	
Moderate/high	163 (81.5%)	37 (18.5%)	

Table-V: Multivariable logistic regression analysis for predictors of Low Back Pain (n=264)

Predictor Variables	AOR (95% CI)	p-value
Working Hours (>8 hrs/day)	2.71 (1.35–5.45)	0.005
Low Physical Activity	3.14 (1.88–5.24)	<0.001
Ergonomic Risk (Medium/High)	3.92 (2.15–7.16)	<0.001
Perceived Stress (Moderate/High)	2.85 (1.73–4.71)	<0.001

Discussion

The findings of this study revealed a high frequency of low back pain (LBP) among office workers, with 78.4% reporting symptoms in the past 12 months. This prevalence is consistent with recent regional and global reports on musculoskeletal disorders among sedentary professionals.[10,11,12] The observed burden signifies the urgent need for workplace health interventions tailored to urban office environments. The association between LBP and prolonged working hours (>8 hours/day) aligns with previous evidence suggesting that extended sitting time contributes to spinal loading, muscular fatigue, and poor posture.[13] Our multivariable analysis confirmed that working more than 8 hours per day significantly increased the likelihood of LBP (AOR: 2.71), reinforcing the importance of structured breaks and ergonomic workstation design.

Physical inactivity emerged as a strong independent predictor of LBP, with individuals having low physical activity levels being over three times more likely to report LBP. These results are corroborated by recent cross-sectional data from Pakistan and other South Asian countries, where sedentary behavior has been linked to an increased risk of musculoskeletal complaints.[14,15] Encouraging regular exercise and active commuting could therefore serve as cost-effective preventive strategies.

Ergonomic risk assessment using REBA indicated that nearly 78% of participants were at medium or high risk, which was strongly associated with LBP. Similar findings have been reported in other studies, where suboptimal chair height, monitor placement, and lack of lumbar support were identified as major contributors.[16,17] These findings call for mandatory ergonomic assessments and training programs in office settings.

Psychosocial stress, assessed via PSS-10, was also independently associated with LBP. This supports the biopsychosocial model of chronic pain, wherein psychological distress amplifies pain perception and disability.[18] High-stress work environments may thus exacerbate physical symptoms, necessitating integrated approaches that include mental health promotion alongside ergonomic improvements.

This study has many strengths including the use of standardized and validated tools like the Nordic Musculoskeletal Questionnaire (NMQ) for assessing low back pain, the International Physical Activity Questionnaire (IPAQ), the Rapid Entire Body Assessment (REBA) for ergonomic risk, and the Perceived Stress Scale (PSS-10) ensured reliable and consistent measurement of key variables. The inclusion of both government and private sector employees contributed to a more diverse sample, enhancing the generalizability of findings within urban office settings. The application of multivariable logistic regression allowed for adjustment of potential confounders, thereby strengthening the validity of associations identified between various determinants and the occurrence of low back pain.

Despite these strengths, the study also has limitations. As a cross-sectional design, data was collected at single point in time, which limits the

ability to infer causality or establish temporal relationships between risk factors and low back pain. Additionally, the reliance on self-reported outcomes for low back pain may introduce recall bias, potentially affecting the accuracy of estimates. The use of convenience sampling may restrict the external validity of the findings, as the sample may not fully represent broader populations beyond the study setting.

Conclusion

This study highlights a high frequency of low back pain among office workers, with significant associations with prolonged working hours, low physical activity, high ergonomic risk, and psychosocial stress. Interventions focusing on ergonomics, physical activity promotion, and stress management are essential to mitigate this growing occupational health issue.

Authors Contribution: SDM: Conception of work and Drafting. **MSF:** Design of work and revising. **NS:** Interpretation of data and revising. **MRS:** Analysis of data and drafting. **FM:** Acquisition and analysis of data and revising.
All authors critically revised and approve its final version.

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