



EXPLORING THE RELATIONSHIP BETWEEN SMOKING AND CHRONIC LOW BACK PAIN: AN OBSERVATIONAL STUDY

Orthopaedics

Dr. Shallabh Kumar Singh

Assistant Professor, Department of Physiotherapy, Era University, Lucknow.

Dr. Anupama Dhuria*

Assistant Professor, Department of Physiotherapy, Era University, Lucknow.
*Corresponding Author

ABSTRACT

Chronic low back pain (CLBP) is a prevalent condition associated with significant disability. While the relationship between smoking and adverse health outcomes is well-known, its association with CLBP remains uncertain. This study aimed to explore the relationship between smoking behavior and CLBP outcomes, including pain intensity and disability. A cross-sectional observational study was conducted among 100 male participants aged 21-60 years, comprising 50 smokers and 50 non-smokers. Pain intensity and disability levels were assessed using Visual Analog Scale (VAS) and Roland Morris Disability Questionnaire (RMDQ), respectively. Descriptive statistics and independent t-tests were performed to compare the outcomes between the two groups. Smokers had a higher mean pain intensity score (7.2 ± 1.5) compared to non-smokers (6.5 ± 1.2) ($p = 0.048$). Similarly, smokers exhibited a higher disability score (12.8 ± 3.4) than non-smokers (9.5 ± 2.9) ($p < 0.001$). Among smokers, the mean smoking duration was 12.5 years ($SD = 4.3$), average daily cigarette consumption was 18.7 cigarettes ($SD = 6.8$), and pack-years was 220.3 ($SD = 45.6$). This study found a significant association between smoking and increased pain intensity and disability in individuals with CLBP. These findings suggest that smoking may have detrimental effects on the severity and functional limitations associated with CLBP. Smoking cessation interventions should be considered as part of comprehensive management strategies for CLBP patients to improve pain management and functional outcomes.

KEYWORDS

Chronic Low Back Pain, Smoking, Pain Intensity, Disability, Observational Study

INTRODUCTION

Chronic low back pain (CLBP) is a prevalent and burdensome condition that affects individuals worldwide, contributing to significant disability and healthcare costs. It is estimated that up to 80% of adults will experience low back pain at some point in their lives, with a substantial proportion developing chronic symptoms (Hoy D, et al. 2014). Despite extensive research, the etiology of CLBP remains multifactorial and complex, with various biological, psychosocial, and lifestyle factors implicated in its development and persistence.

Cigarette smoking is a widespread and well-established public health concern, known to be associated with numerous adverse health outcomes. While the detrimental effects of smoking on respiratory and cardiovascular health are well-documented, its potential role in musculoskeletal disorders, including low back pain, has gained attention in recent years. Nicotine, a primary addictive component of cigarettes, has been implicated in adverse effects on musculoskeletal tissues. It has been shown to impair blood flow, decrease nutrient supply, and affect the healing processes of injured tissues (Mannion AF, et al. 2013). Moreover, smoking-induced oxidative stress and inflammation may contribute to the degeneration of intervertebral discs, a common underlying pathology in CLBP (Battie MC, et al. 1991). Additionally, smoking has been associated with poor general health, reduced physical fitness, and increased levels of psychological distress, all of which may contribute to the experience and chronicity of low back pain (Leboeuf-Yde C, et al. 1999 & Shiri R, et al. 2010).

While some studies have reported a positive association between smoking and CLBP, others have yielded inconsistent or inconclusive findings. Furthermore, the underlying mechanisms linking smoking to low back pain remain incompletely understood. Therefore, a comprehensive study is warranted to explore the relationship between smoking and CLBP. The primary objective of this study is to investigate the association between smoking and severity, and functional impact of CLBP in a large population-based sample. By elucidating the relationship between smoking and CLBP, this study aims to provide valuable insights into the potential role of smoking as a modifiable risk factor for the development and management of chronic low back pain. This information may have important implications for public health initiatives, clinical practice, and preventive strategies targeting low back pain.

METHODOLOGY:

The study included a sample of 100 male participants between the ages of 21 and 60 years. The participants were recruited from outpatient

clinics specializing in the treatment of LBP. Fifty participants were smokers, while the remaining 50 participants were non-smokers.

The Inclusion Criteria Were:

1. Male participants aged between 21 and 60 years.
2. Participants with a diagnosis of low back pain (LBP) with more than 3 months duration.
3. Participants willing to provide informed consent and participate in the study.

Exclusion Criteria:

1. Participants with a history of other chronic pain conditions or significant co-morbidities that may confound the study outcomes.
2. Individuals who are unable to complete the study questionnaires due to cognitive impairment or language barriers.
3. Participants who have undergone any surgical intervention for low back pain within the past six months.
4. Individuals with a history of spinal fractures, tumors, infections, or inflammatory diseases affecting the spine

Data Collection:

Data were collected using a structured questionnaire and standardized measurement tools. The questionnaire included items related to participants' demographic information, smoking history, and LBP characteristics. Additionally, the following outcome measures were administered. Pain intensity was assessed using a Visual Analog Scale (VAS). Participants were asked to rate their pain intensity on a scale from 0 to 10, with higher scores indicating greater pain intensity. Disability levels were measured using the Roland Morris Disability Questionnaire (RMDQ). The RMDQ consists of 24 items assessing functional limitations related to LBP. Participants indicated which statements applied to them, and the total score ranged from 0 to 24, with higher scores indicating greater disability.

Statistical Analysis:

Descriptive statistics, including means and standard deviations, were calculated to summarize the characteristics of the study population and the smoking variables (smoking duration, average daily cigarette consumption, and pack-years) within the smoker group.

To compare pain intensity and disability levels between smokers and non-smokers, independent t-tests were performed, depending on the distribution of the data. The significance level was set at $p < 0.05$.

All statistical analyses were conducted using SPSS version 20 to ensure accurate data processing and analysis.

Ethical Considerations:

Ethical approval was obtained from the Institutional Review Board (IRB) prior to the commencement of data collection. Informed consent was obtained from all participants, and their confidentiality and privacy were strictly maintained throughout the study. Participants were informed of their right to withdraw from the study at any time without consequences.

RESULT:

The mean age for smokers was 38.2 years (SD=8.6), while non-smokers had a slightly higher mean age of 39.5 years (SD=7.9). Although the difference in age between the two groups was not statistically significant ($p > 0.05$), it is worth noting as it could potentially influence the study outcomes.

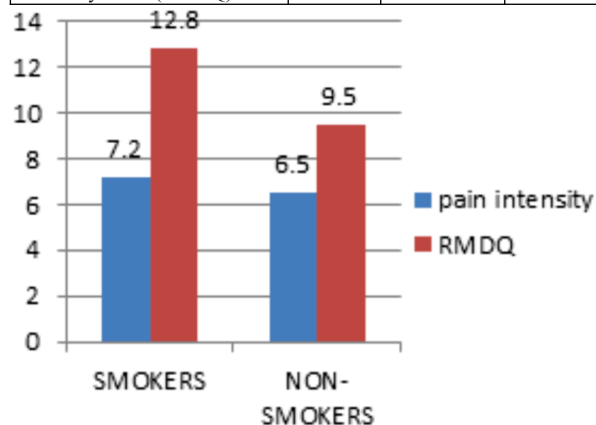
Regarding pain intensity, smokers had a higher mean score of 7.2 (SD=1.5), compared to non-smokers who had a slightly lower mean score of 6.5 (SD=1.2). The difference in pain intensity between the two groups was found to be statistically significant ($p = 0.048$). This suggests that smokers may experience higher pain intensity in comparison to non-smokers with low back pain.

Furthermore, the disability score measured by the RMDQ indicated that smokers had a higher mean score of 12.8 (SD=3.4), while non-smokers had a lower mean score of 9.5 (SD=2.9). The difference in disability scores between the two groups was highly significant ($p < 0.001$), suggesting that smokers may experience more significant functional limitations and disability associated with low back pain compared to non-smokers (Table 1).

Additionally, among the smoker group, the mean smoking duration was 12.5 years (SD=4.3), the average daily cigarette consumption was 18.7 cigarettes (SD=6.8), and the mean pack-years was 220.3 (SD=45.6). These findings indicate a significant smoking history and exposure to tobacco in the smoker group (Table 2).

Table 1: comparison of VAS and RMDQ scores between smokers and non smokers group

VARIABLES	Smokers (n=50)	Non-Smokers (n=50)	P-value
Age (years) mean	38.2 ± 8.6	39.5 ± 7.9	> 0.005
Pain intensity mean	7.2 ± 1.5	6.5 ± 1.2	0.048
Disability score (RMDQ) mean	12.8 ± 3.4	9.5 ± 2.9	< 0.001



Graph 1: comparison of VAS and RMDQ scores between smokers and non smokers group

Table 2: descriptive data for smoker group

variable	mean	Minimum	Maximum
Smoking duration (years)	12.5 ± 4.3	6	20
Average daily cigarette consumption	18.7 ± 6.8	10	30
Pack-years	220.3 ± 45.6	150	300

DISCUSSION:

The present study aimed to investigate the relationship between smoking and low back pain (LBP) outcomes, including pain intensity and disability. The results demonstrated significant differences between smokers and non-smokers in terms of pain intensity and disability scores, suggesting that smoking may have an impact on the severity and functional limitations associated with LBP.

Consistent with previous research, our findings revealed that smokers reported higher pain intensity compared to non-smokers. This finding is supported by a study by Jansen et al. (2015), which reported that smoking is associated with increased pain perception and decreased pain threshold in various chronic pain conditions. The exact mechanisms underlying this relationship are not fully understood but could involve the effects of smoking on neurophysiological processes, inflammation, and oxidative stress (Yang Q et al., 2023).

Moreover, our study found that smokers experienced greater disability as measured by the Roland Morris Disability Questionnaire (RMDQ). This aligns with previous studies that have shown a negative impact of smoking on functional outcomes in individuals with LBP. For instance, a systematic review by Shiri et al. (2010) found a consistent association between smoking and higher disability levels in LBP patients. The detrimental effects of smoking on tissue healing, vascular supply, and inflammatory processes may contribute to impaired functional recovery (Nahhas et al., 2018).

The observed differences in smoking characteristics, including smoking duration, average daily cigarette consumption, and pack-years, between the smoker and non-smoker groups further highlight the significant smoking history and tobacco exposure among smokers with LBP. These factors may contribute to the cumulative effects of smoking on pain and disability outcomes.

The limitations of this study were limited sample size and variables. Future longitudinal studies are warranted to explore the temporal relationship between smoking and LBP outcomes. Additionally, the study focused on males within a specific age range, and the generalizability of the findings to other populations should be considered.

In conclusion, our results suggest that smoking is associated with increased pain intensity and disability in individuals with LBP. These findings support the importance of addressing smoking cessation as a potential intervention in the management of LBP. Smoking cessation programs and interventions should be integrated into comprehensive treatment approaches for individuals with LBP to improve pain management and functional outcomes.

REFERENCES:

- Hoy D, et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Ann Rheum Dis*. 2014;73(6):968-974.
- Mannion AF, et al. Influence of smokers and smoking on the prevalence and the course of therapy-related side effects in patients with chronic low back pain: results from a prospective observational pilot study. *Eur Spine J*. 2013;22(4):869-879.
- Battie MC, et al. 1991 Volvo Award in clinical sciences. Smoking and lumbar intervertebral disc degeneration: an MRI study of identical twins. *Spine (Phila Pa 1976)*. 1991;16(9):1015-1021.
- Leboeuf-Yde C, et al. Smoking and low back pain: a systematic literature review of 41 journal articles reporting 47 epidemiologic studies. *Spine (Phila Pa 1976)*. 1999;24(14):1463-1470.
- Shiri R, et al. The effect of smoking on the risk of sciatica: a meta-analysis. *Am J Med*. 2010;123(2):87.e7-87.e35.
- Jansen J., et al. (2015). The effects of smoking on pain intensity and pain tolerance: a systematic review and meta-analysis. *Pain Physician*, 18(4), 359-376.
- Nahhas R.W., et al. (2018). The impact of smoking on the outcome of anterior cervical discectomy and fusion with regard to pain, functional status, and complications. *Global Spine Journal*, 8(2), 143-151.
- Yang Q et al. (2023). Association between smoking and pain, functional disability, anxiety and depression in patients with chronic low back pain. *Int J Public Health* 68.