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Association between Smoking Cigarette and Pain Severity in Patients with Chronic Low Back Pain in Mirpur

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"**Association between Smoking Cigarette and Pain Severity in Patients with Chronic Low Back Pain in Mirpur"**

Submitted by **Meherun Nassa Mira** for the partial fulfillment of the requirement for the degree of Bachelor of Science in Physiotherapy.

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DECLARATION

This work has never before been approved in full for a degree, nor is it presently being presented as a candidate for one. A portion of the criteria for the B.Sc. in Physiotherapy degree are being met by submitting this dissertation.

I confirm that I will receive an inadequate rating and be subject to disciplinary action from the appropriate authorities if it is found in my work that I have plagiarized or otherwise cheated. I guarantee that the bound copy of the thesis and the electronic version are the same.

If the results of this project are published in the future, the research supervisor will be very concerned. The physiotherapy department of SAIC College of Medical Science and Technology (SCMST) will provide consent, and the project will be properly recognized as a graduate thesis.

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LIST OF ACRONYMS

Acronym		Full Form
BMI	:	Body Mass Index
CI	:	Confidence Interval
CLBP	:	Chronic Low Back Pain
CNS	:	Central Nervous System
GATS	:	Global Adult Tobacco Survey
GBD	:	Global Burden of Disease
HTN	:	Hypertension
LBP	:	Low Back Pain
LMICs	:	Low- and Middle-Income Countries
NRS	:	Numerical Rating Scale
ODI	:	Oswestry Disability Index
OR	:	Odds Ratio
OTC	:	Over-the-Counter
PT	:	Physiotherapy
ROM	:	Range of Motion
SD	:	Standard Deviation
SPSS	:	Statistical Package for the Social Sciences
TENS	:	Transcutaneous Electrical Nerve Stimulation
TNF-α	:	Tumor Necrosis Factor-Alpha
VAS	:	Visual Analogue Scale
VLD	:	Vertebral Lumbar Degeneration
WHO	:	World Health Organization
YLDs	:	Years Lived with Disability

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ABSTRACT

Introduction: Chronic low back pain (CLBP) is a major musculoskeletal disease with a substantial impact on disability and poor quality of life. Cigarette smoking has been also described as an underlying risk factor that could contribute to pain severity, possibly due to systemic inflammation, impaired healing through endothelial dysfunction, and musculoskeletal degeneration. Nonetheless, there is limited evidence of this association in the urban Bangladeshi context specifically in Mirpur, Dhaka. **Objectives:** The study aimed to analyze the association between smoking and the severity of pain in patient with CLBP at Mirpur, Dhaka. **Methodology:** A case control study was performed from June 2024 till July 2025 at Saic College of Medical Science and technology Mirpur. We recruited 57 subjects with CLBP, of whom 28 were smokers (cases) and 29 were non-smokers (controls) using convenient sampling. Material and methods data were installed through structured questionnaires such as Oswestry Disability Index (ODI) and analyze by SPSS 22.0 by using descriptive statistic as well as inferential statistic. **Results:** We found a significant correlation between smoking and pain intensity. All cases (100%) were smokers, of which 27 (90%) smoked 6–10 cigarettes / day and 30 (100%) had a smoking history between10–20 years. Smokers exhibited greater pain intensity and increased functional limitations than non-smokers ($p < 0.001$). On the other hand, living with another smoker and longer pain duration were also significantly related to higher pain severity. **Conclusion:** Smoking of cigarette substantially increases the severity of pain in patients of CLBP in Mirpur. The findings of the study identify smoking as an important, modifiable risk factor that adversely affects pain outcomes, which suggest that attempts to include smoking cessation strategies along with management and physiotherapy programs for low back pain should be implemented in urban Bangladesh.

Key words*: Chronic Low Back Pain, Smoking Cigarette, Pain Severity, Physiotherapy.*

CHAPTER-I: INTRODUCTION

Background:

Chronic low back pain (CLBP) is commonly defined as low back pain that persists for more than 12 weeks, reflecting a transition from acute or subacute symptoms to a long-term condition with complex biopsychosocial drivers (Zhou et al. 2024, p. 678). CLBP remains a leading cause of disability worldwide and carries substantial personal and societal burden, including reduced quality of life and diminished work capacity. The World Health Organization estimates that 619 million people were affected by low back pain (LBP) in 2020, with projections suggesting an increase to 843 million cases by 2050, underscoring the urgency of addressing modifiable risks. Contemporary clinical guidelines similarly emphasize the chronicity threshold of greater than 12 weeks and advocate multidimensional assessment and management approaches (Zhou et al. 2024, p. 678).

Cigarette smoking is one of the most prevalent modifiable exposures globally and is increasingly scrutinized for its relationship with back pain outcomes (Guan et al. 2024, p. 05). Multiple lines of evidence indicate that smoking increases the risk of developing back pain and may influence its severity, chronicity, and functional impact (Dai et al. 2021, p. 45). A large prospective analysis from the UK Biobank found that ever smoking, greater cigarettes per day, and higher pack-years were associated with increased incident back pain risk, with nonlinear dose–response patterns (Xu et al. 2023, p. 55). Importantly, these findings complement broader syntheses identifying smoking as a causal or contributory factor among lifestyle risks for back pain (Guan et al. 2024, p. 05).

Beyond incidence, the interface between smoking and pain severity in established CLBP is clinically salient, given that intensity levels guide treatment decisions and predict disability, work absence, and healthcare utilization (Shafshak et al. 2021, p. 755). Validated instruments such as the visual analogue scale (VAS) and numeric rating scale (NRS) reliably capture back pain intensity and show close correspondence in measurement properties (Shafshak et al. 2021, p. 757). Functional consequences of CLBP are typically quantified using the Oswestry Disability Index (ODI) and the Roland–Morris Disability Questionnaire (RMDQ), both of which

demonstrate acceptable reliability and responsiveness in LBP populations (Chiarotto et al. 2016, p. 1620).

In patients with established CLBP, smoking has been linked to worse pain intensity and broader symptom aggravation (Yang et al. 2023, p. 55). In a cross-sectional study of CLBP, smokers reported higher VAS pain scores along with greater disability (ODI and RMDQ) and more pronounced fear-avoidance beliefs compared with nonsmokers (Yang et al. 2023, p.55). Moreover, the daily amount of cigarette consumption correlated with maximum pain intensity (VAS_max), as well as with fear-avoidance and depressive symptoms, hinting at dose-related exacerbation of severity domains (Yang et al. 2023, p. 55). This pattern aligns with broader work showing higher smoking prevalence in chronic pain conditions, including low back pain, compared with general populations (Orhurhu et al. 2016, p. 18).

Prospective evidence indicates that smoking not only increases the risk of back pain onset but exhibits dose–response relationships across consumption metrics (Xu et al. 2023, p. 44). In the UK Biobank cohort, hazard ratios for incident back pain were elevated for current smokers and increased further among those with more than 30 cigarettes per day or more than 30 pack-years, with stronger effects observed in women (Xu et al. 2023, n.p.). Observational syntheses also suggest that risk among former smokers lies between that of current and never smokers, reinforcing a likely gradient with exposure intensity and recency (Dai et al. 2021, p. 78).

Pathophysiologically, smoking may augment pain severity in CLBP via effects on intervertebral disc biology, vertebral endplate integrity, and neuroimmune mechanisms that amplify nociception (Elmasry et al. 2015, p. 19). Experimental and translational studies indicate that tobacco smoke constituents, including nicotine, can impair disc cell metabolism, reduce glycosaminoglycan synthesis, and compromise nutrient diffusion, accelerating degenerative changes (Elmasry et al. 2015, p. 19). Recent preclinical work has identified endplate remodeling characterized by calcification and morphologic changes as a signature of smoke exposure that may diminish perfusion and disc nutrition (Kelley et al. 2025, p. 4). Human imaging data further support greater lumbar disc degeneration among cigarette or waterpipe

smokers compared with nonsmokers, suggesting convergent harm across tobacco modalities (Hanan et al. 2024, p. 954).

Inflammatory signaling provides another plausible mechanistic bridge between smoking and pain amplification in CLBP (Pan et al. 2023, p. 22). Tumor necrosis factor-α and interleukins such as interleukin-6 and interleukin-8 are elevated in degenerative disc conditions and contribute to peripheral and central sensitization, potentially intensifying nociceptive transmission from lumbar structures (Pan et al. 2023, p. 23). Smoking is associated with systemic low-grade inflammation, and cessation reduces inflammatory markers such as C-reactive protein and improves physiological indices within weeks to years, pointing to a modifiable pathway relevant to pain (Derella et al. 2021, p. 2).

Neurobiological interactions are nuanced because nicotine can transiently modulate pain pathways while chronic tobacco use appears to worsen clinical pain over time (Luo et al. 2023, p. 59). Laboratory and human experimental data show that acute nicotine may produce short-lived antinociception, whereas nicotine deprivation increases pain intensity, neurogenic inflammation, and mechanical hyperalgesia among daily smokers' dynamics that can sustain dependence and pain–smoking cycles (Ditre et al. 2018, p. 49). These bidirectional effects suggest that while acute exposure may briefly down-modulate pain, chronic exposure and withdrawal oscillations can ultimately sensitize pain systems (Luo et al. 2023, p 59).

Psychological and central sensitization mechanisms further connect smoking with greater pain severity in CLBP (Chiba et al. 2024, p. 12). Cross-sectional work indicates smoking is independently associated with central sensitization syndrome scores, especially among women, aligning with reports of sex differences in the smoking–pain nexus (Takeuchi et al. 2023, p. 3) Depression, anxiety, and pain catastrophizing frequently co-occurs with CLBP, and depressive symptoms may partially mediate the relationship between smoking and higher pain severity (Greenberg et al. 2022, p. 48). Population data also link greater self-reported stress with higher odds of chronic LBP, suggesting overlapping psychosocial targets (Choi et al. 2021, p. 143).

The interaction of smoking with other lifestyle risks compounds the clinical picture of CLBP severity (Guan et al. 2024, p. 05). Higher body mass index, sleep disturbance, sedentariness, and low physical activity are each associated with greater back pain burden and may confound or mediate smoking–pain relationships (Guan et al. 2024, p. 05). Conversely, improvements in movement behaviors such as replacing sedentary time with activity are linked with lower incident back pain risk, indicating potential synergy between smoking cessation and lifestyle optimization in CLBP care (JOSPT 2024, p. 73).

Structural spinal disease provides another vantage: smokers appear to have higher risk of degenerative spinal disorders, particularly in the lumbar region, consistent with the biological plausibility of microvascular and matrix changes (Rajesh et al. 2022, p. 26). Passive smoking and alternative tobacco exposures have been associated with disc degeneration severity, broadening the range of relevant exposures beyond active cigarette use (Ulger et al. 2021, p. 198.). Emerging evidence of smoke-induced endplate damage adds a potential structural correlate for pain generation and persistence (Kelley et al. 2025, p. 4).

Clinical outcomes research offers convergent, practice-relevant signals (Djurasovic et al. 2024, p. 12). In a large multicenter registry of lumbar decompression, smokers presented with worse baseline back and leg pain and disability scores and experienced slightly smaller improvements postoperatively, although many still achieved clinically important gains—underscoring smoking as a negative prognostic factor rather than an absolute barrier to benefit (Djurasovic et al. 2024, p. 12). Outside of surgery, observational and experimental literature suggests that smoking cessation is associated with reductions in systemic inflammation and with improvements in pain-related outcomes across chronic pain cohorts, although high-quality randomized controlled trials targeting CLBP specifically remain limited (Guan et al. 2024, p. 05).

The heterogeneity of CLBP spanning nociceptive, neuropathic, and nociplastic mechanisms means that smoking's effect on severity likely operates through multiple partially independent pathways (Zhou et al. 2024, p. 678). Peripheral mechanisms include disc cell cytotoxicity, extracellular matrix degradation, and endplate vascular compromise, which may heighten nociceptive input from degenerated motion

segments (Elmasry et al. 2015, p. 19; Kelley et al. 2025, p. 4). Central mechanisms may involve altered descending modulation and enhanced central sensitization, particularly during withdrawal cycles, linking smoking behavior with fluctuating yet persistently elevated pain intensity (Ditre et al. 2018, n.p.; Chiba et al. 2024, n.p.). Psychological comorbidities such as depression and catastrophizing can further augment perceived severity and pain interference, and they appear entwined with smoking behavior and dependency (Hu et al. 2021, p. 10).

From a measurement standpoint, accurately capturing pain severity and functional limitation is pivotal in studies probing smoking–severity associations (Chiarotto et al. 2019, p. 806). The VAS and NRS are both reliable for LBP severity, and neither consistently outperforms the other in psychometric properties across settings, supporting their interchangeable use with attention to measurement error (Shafshak et al. 2021, p. 757; Chiarotto et al. 2019, p. 807). The ODI and RMDQ provide complementary profiles of function and disability, facilitating multidimensional characterization of the burden associated with severity levels (Koivunen et al. 2024, p. 31)

A critical question concerns whether smoking exhibits a consistent, independent association with greater pain intensity in CLBP after accounting for confounding lifestyle and psychosocial factors (Guan et al. 2024, p. 05). The existing CLBP-focused study by Yang et al. reported significantly higher pain and disability among smokers and positive correlations between cigarettes per day and VAS_max and mood or fear-avoidance indices, even after adjustment for potential confounders (Yang et al. 2023, p. 44). However, most large datasets have emphasized incident or recurrent back pain risk rather than severity among those already living with CLBP, creating a gap that warrants targeted investigation (Dunn et al. 2024, p. 294). Furthermore, sex-specific effects, dose thresholds, and potential nonlinearities suggested in incidence cohorts require analogous scrutiny within CLBP populations to clarify clinical risk stratification (Xu et al. 2023, p. 55).

Another unresolved issue is how cessation influences pain severity trajectories among individuals with established CLBP, given evidence that quitting reduces systemic inflammation and that former smokers have lower back pain risk than current smokers

(Derella et al. 2021, p. 2). While acute nicotine's transient analgesia may reinforce smoking as a short-term coping strategy, the longer-term pattern favors greater pain and disability among continuing smokers, suggesting that cessation should be integrated into comprehensive CLBP care plans (Djurasovic et al. 2024, p. 13). Lifestyle clustering further argues for multicomponent interventions that address smoking alongside physical inactivity, poor sleep, and weight gain to reduce severity and improve function (Guan et al. 2024, p. 05).

Synthesizing current knowledge, three propositions motivate the present study (Zhou et al. 2024, p. 678). First, smoking is linked with higher risk of back pain and with adverse structural and inflammatory substrates plausibly related to more intense pain experiences in CLBP (Rajesh et al. 2022, p. 26). Second, limited CLBP-specific data suggest smokers report higher pain intensity and worse function, with indications of dose-related effects on maximal pain (Yang et al. 2023, p. 44). Third, the magnitude and independence of smoking's association with pain severity separable from co-occurring risks and psychosocial mediators remain incompletely characterized in CLBP cohorts (Guan et al. 2024, p. 05).

Therefore, focusing on patients with established CLBP, this study aims to examine the association between cigarette smoking and pain severity while accounting for relevant confounders and mediators suggested by prior work (Yang et al. 2023, p. 44). By emphasizing validated pain-intensity and disability measures, and by exploring potential dose–response patterns, sex differences, and psychosocial covariates, the study seeks to refine risk stratification and identify targets for integrated, lifestyle-oriented management strategies (Shafshak et al. 2021, p. 755) Given the global burden and the modifiability of smoking exposure, elucidating its relationship with pain severity in CLBP could inform individualized counseling, cessation support, and comprehensive rehabilitation planning to reduce suffering and improve functional outcomes (Derella et al. 2021, p. 2).

Justification:

Chronic low back pain (CLBP) is a prevalent and debilitating condition, significantly reducing physical activity and work efficiency, particularly in urban areas like Mirpur, Dhaka. The community here faces physical strain from strenuous work, poor postural habits, and limited healthcare access. Simultaneously, smoking is culturally ingrained, especially among men. However, the potential connection between smoking and CLBP has not been thoroughly investigated.In Mirpur, many residents rely on smoking as a stress-reliever or due to social habits. There is limited research on whether smoking exacerbates chronic pain or interferes with common treatments like physiotherapy. This research is essential as it could help tailor more effective treatments for CLBP sufferers, particularly in urban Bangladesh. Understanding the role of smoking in pain severity and recovery could also emphasize the need for smoking cessation in pain management programs.This study aims to fill a significant evidence gap, contributing to better management strategies for CLBP in urban Bangladesh by exploring how smoking affects pain and recovery outcomes.

Research question:

Is cigarette smoking associated with increased pain severity in patients with chronic low back pain in Mirpur?

Research Hypothesis:

Null hypothesis (H_0):

There is no association between cigarette smoking and pain severity in patients with chronic low back pain.

$\mu_1 - \mu_2 \neq 0$ or $\mu_1 \neq \mu_2$

Alternative hypothesis (H_a):

There is associated with increased pain severity and cigarette smoking in patients with chronic low back pain.

$\mu_1 - \mu_2 = 0$ or $\mu_1 \geq \mu_2$

Here,

H_0 = Null hypothesis

H_a = Alternative hypothesis

μ_1 = Mean of population 1

μ_2 = Mean of population 2

Study objective:

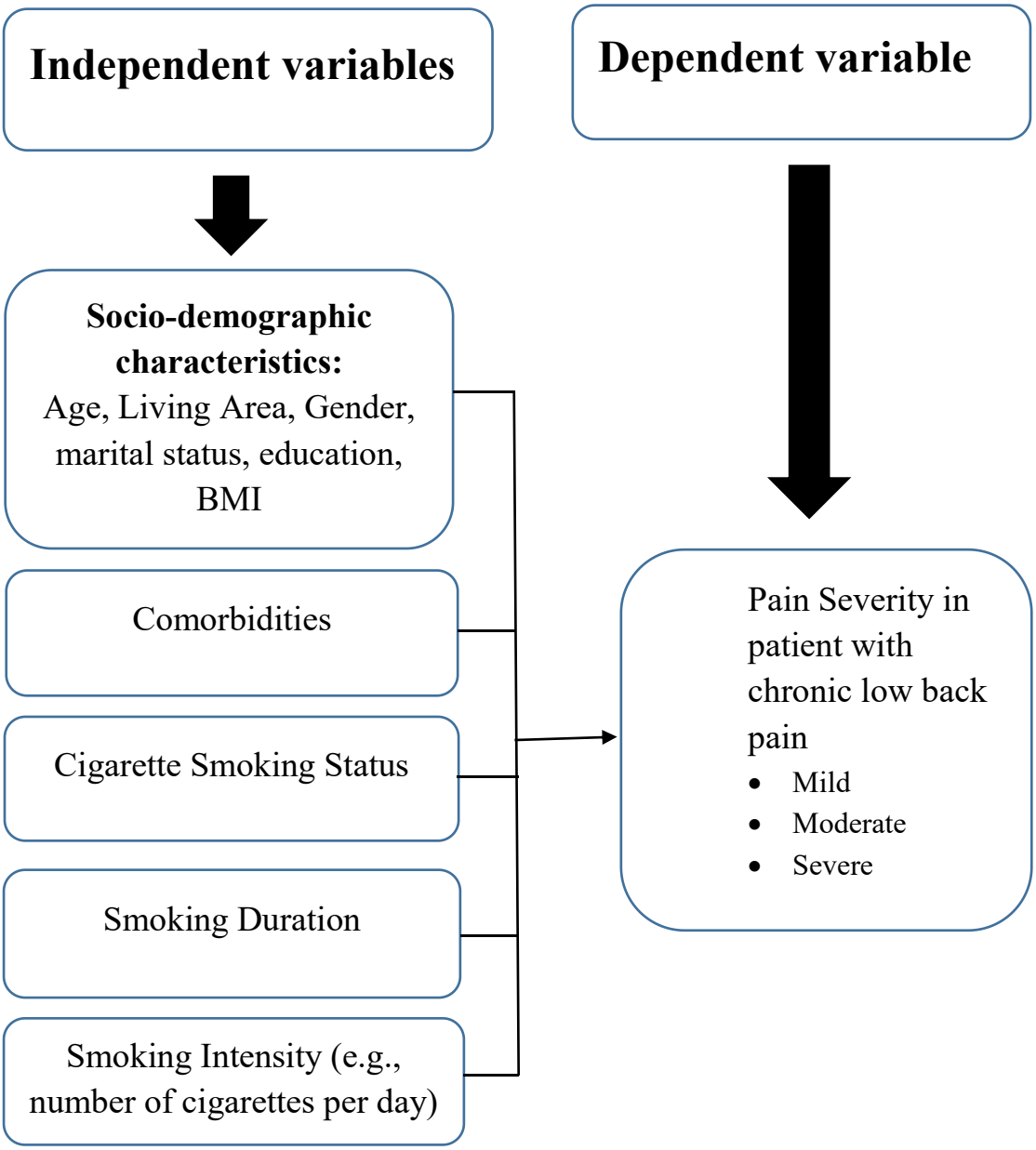
General objective:

To analyze the association between smoking cigarette and the severity of pain in patients with Chronic Low Back Pain at Mirpur.

Specific objectives:

I. To determine the prevalence of smoking among patient with CLBP at Mirpur.
II. To assess and compare pain severity between smokers and non-smokers with CLBP by Visual Analogue Scale.
III. To analyze to relation between smoking habit (frequency, duration, number of cigarette per day) and the severity of CLBP.
IV. To identify demographic variable such as age, gender and occupation that may affect the relationship between smoking in pain severity.
V. To identity any potential confounding factors (Physical activity, BMI, mental health) that could influence the association between smoking pain severity.

1.1 Conceptual framework:



Operational definition:

Chronic Low Back Pain (CLBP):

Pain localized below the costal margin and above the inferior gluteal folds, with or without leg pain (sciatica), persisting for 12 weeks or more regardless of the cause.

Cigarette Smoking:

A participant is defined as a smoker if they currently smoke at least one cigarette per day and have done so for the past 6 months or more.

- **Non-smoker:** Has never smoked or has not smoked in the past 12 months.
- **Former smoker:** Smoked previously but quit more than 12 months ago (may be excluded depending on your design).

Pain Severity:

Measured using a Visual Analog Scale (VAS) or Numerical Rating Scale (NRS) from 0 to 10, where:

- 0 = No pain
- 1–3 = Mild pain
- 4–6 = Moderate pain
- 7–10 = Severe pain

CHAPTER-II: LITERATURE REVIEW

Chronic low back pain (CLBP) is defined as persistent pain in the lower back region lasting more than 12 weeks (Zhou et al. 2024, p. 678). It is one of the most prevalent musculoskeletal disorders worldwide and a leading cause of disability. The impact of CLBP is multifaceted, affecting not only physical health but also quality of life, mental health, and social well-being. A key feature of CLBP is its association with high pain severity, which is often characterized by reduced mobility, depression, and significant limitations in daily activities (Dunn et al. 2024, p. 240).

Several factors contribute to the development and worsening of CLBP, including biomechanical, psychosocial, and lifestyle-related influences. Smoking, a modifiable risk factor, has been consistently linked to both the onset and exacerbation of CLBP severity. As such, exploring the association between smoking and pain severity in individuals suffering from CLBP has become crucial for both clinical and public health interventions (Guan et al. 2024, p. 05).

Smoking has long been recognized as a risk factor for various musculoskeletal conditions, including CLBP. The mechanisms through which smoking may influence pain severity are complex and multifactorial. Cigarette smoke contains numerous harmful substances, including nicotine, carbon monoxide, and free radicals, which have been shown to impair tissue repair, reduce blood flow, and promote inflammation (Xu et al. 2023, n.p.). These factors may contribute to the degeneration of intervertebral discs, leading to an increased risk of pain and disability.

A study by (Elmasry et al. 2015, p. 19) explored the effects of tobacco smoke on intervertebral disc degeneration using a finite element model and found that smoking contributed to the reduction of glycosaminoglycan synthesis, a key component in maintaining disc health. This degeneration accelerates with continued exposure to tobacco smoke, thereby amplifying the severity of back pain in individuals who smoke.

The relationship between smoking and pain severity is not only related to structural degeneration but also involves neuroinflammatory mechanisms. Pan et al. (2023, p. 22) noted that smoking induces systemic inflammation by increasing the production

of pro-inflammatory cytokines such as TNF-α and interleukins, which in turn sensitize pain receptors in the spine, contributing to heightened pain perception in individuals with CLBP. These inflammatory responses may also facilitate central sensitization, wherein the nervous system becomes more responsive to pain stimuli, resulting in amplified pain signals (Chiba et al. 2024, p. 44).

One of the key pathways through which smoking exacerbates CLBP severity is its impact on the structural integrity of the spine. Smoking has been shown to accelerate degenerative changes in the intervertebral discs and the vertebral endplates, both of which are crucial in maintaining spinal health (Rajesh et al. 2022, n.p.). The intervertebral discs are avascular, meaning they rely on nutrient diffusion from surrounding tissues for their health and maintenance. Smoking impairs blood flow and nutrient delivery to these discs, contributing to disc dehydration, weakening, and fissuring (Elmasry et al. 2015, p. 19).

Additionally, smoking-induced changes in the extracellular matrix of the intervertebral discs, including a reduction in the synthesis of collagen and proteoglycans, further exacerbate disc degeneration (Kelley et al. 2025, p. 4). The progressive degeneration of these structures leads to the narrowing of the spinal canal and the formation of bone spurs, which can put pressure on surrounding nerves, increasing the severity of pain (Hanan et al. 2024, p. 15).

As noted earlier, smoking promotes systemic inflammation, which contributes to the pathophysiology of CLBP. Inflammation plays a central role in the progression of disc degeneration and pain. Smoking-induced inflammation can lead to the release of inflammatory mediators such as prostaglandins, which sensitize nerve endings and contribute to pain amplification (Weber et al. 2016, n.p.). Studies have shown that smokers with CLBP have higher levels of inflammatory markers such as C-reactive protein, which correlates with increased pain severity (Derella et al. 2021, p. 2).

Further, Pan et al. (2023, p. 23) highlighted that pro-inflammatory cytokines such as IL-6 and IL-8 are elevated in degenerative disc conditions and contribute to peripheral and central sensitization, which enhances nociceptive transmission. This heightened inflammatory environment makes smokers more susceptible to experiencing intense and prolonged pain episodes.

Nicotine, the primary addictive component of cigarette smoke, can also influence pain perception through direct effects on the nervous system. Nicotine has been shown to modulate pain pathways by acting on nicotinic acetylcholine receptors (Luo et al. 2023, n.p.). While acute nicotine exposure may provide transient pain relief, chronic exposure and subsequent withdrawal cycles may lead to an increase in pain severity. Studies have demonstrated that nicotine deprivation increases pain intensity, neurogenic inflammation, and mechanical hyperalgesia among smokers (Ditre et al. 2018, p. 15).

Chronic smoking may also alter central nervous system responses to pain. Smoking has been associated with central sensitization, a condition in which the brain and spinal cord become more sensitive to pain signals, making individuals more prone to experiencing heightened pain intensity (Chiba et al. 2024, n.p.). This effect is particularly significant in CLBP patients, who may already have heightened pain sensitivity due to the long-term nature of their condition.

In addition to the biological mechanisms outlined above, smoking may exacerbate pain severity through psychological and behavioral pathways. Smoking is often linked with mood disorders, including depression and anxiety, which are common among individuals with CLBP (Hu et al. 2021, p. 106). Depression and anxiety have been found to increase pain perception by altering pain processing pathways in the brain, leading to heightened pain sensitivity and reduced pain tolerance (Greenberg et al. 2022, p. 15).

Moreover, smoking is associated with increased levels of pain catastrophizing, a psychological tendency to ruminate on pain and view it as overwhelming (Yang et al. 2023, n.p.). Pain catastrophizing has been shown to correlate with higher pain intensity and greater disability in individuals with CLBP, suggesting that smoking may worsen pain severity by amplifying negative pain-related thoughts and emotions (Choi et al. 2021, p. 19).

Pain severity in CLBP does not only affect the immediate experience of pain but also influences functional outcomes. Smokers with CLBP tend to experience greater disability than non-smokers, which can severely impact their quality of life. Studies using tools such as the Oswestry Disability Index (ODI) and the Roland-Morris

Disability Questionnaire (RMDQ) have consistently shown that smoking correlates with higher disability scores, indicating that smokers experience more significant limitations in their ability to perform daily tasks (Shafshak et al. 2021, p. 755).

Functional limitations in CLBP are often linked with fear-avoidance behaviors, in which individuals avoid certain movements or activities due to the expectation that these actions will worsen their pain. This is particularly prevalent among smokers, who tend to report higher levels of fear-avoidance beliefs compared to non-smokers (Yang et al. 2023, p. 55). Fear-avoidance can lead to a vicious cycle of deconditioning, where avoiding movement further reduces physical capacity, exacerbating pain and disability over time.

While smoking is associated with worsened pain severity in CLBP, cessation has been shown to improve pain outcomes over time. Evidence suggests that smoking cessation leads to reductions in inflammatory markers, improvements in cardiovascular health, and enhanced functional capacity, all of which can contribute to pain reduction (Derella et al. 2021, p. 2). Studies have demonstrated that former smokers often experience less severe pain and improved physical function compared to current smokers (Dai et al. 2021, p. 55).

However, the relationship between smoking cessation and pain reduction is complex. Some studies have noted that the immediate effects of nicotine withdrawal, such as increased pain sensitivity, may temporarily worsen pain in the short term (Luo et al. 2023, p. 15)

In urban areas such as Mirpur there is the formal and informal sectors and smoking was deeply ingrained at household level. It is frequently considered as a strategy for relieving stress, tiredness and social enhancement. Researches have shown that the incidence of smoking is higher among transport workers, workers of construction sites and men engaged in pulling rickshaw in Dhaka where most of them live or work in places such as Mirpur (Nargis et al. 2014, p. 29). Tobacco is cheap and available virtually everywhere, with street vendors, small grocery shops, and tea stalls, providing single sticks to enable easy access to purchase of cigarettes by the poor and rich alike (Rahman et al. 2022, p. 412).

Demography Drafts show that smoking in Bangladesh is highly gendered and the rate of smoking is much larger than women compared to men as smoking is not allowed for young women according to the cultural perspective and gender roles. But women especially in rural context and older age groups are relatively more consuming smokeless form of tobacco. Youth and young adults are increasingly at risk for early initiation of smoking (often due to peer pressure, social media and minimal regulatory enforcement). While the government has enacted a number of anti-tobacco measures such as smoking bans in public and pictorial health warnings, its implementation has been poor in many urban parts of the country (Hussain et al. 2016, p. 310).

achieved through a blend of physical modalities, therapeutic physical exercises, and patient education. Several clinical guidelines of CLBP, such as American College of Physicians and the National Institute for Health and Care Excellence (NICE), recommend physiotherapy as an initial management for CLBP before receiving pharmacological and s Chronic low back pain (CLBP) is a pervasive condition defined as low back pain that lasts for more than 12 weeks, transitioning from acute or subacute symptoms to a persistent condition with complex biopsychosocial drivers (Zhou et al. 2024, p. 678).

CLBP is recognized globally as one of the most common causes of disability, affecting individuals' physical and mental well-being. The World Health Organization (WHO) reports that approximately 619 million people were affected by low back pain (LBP) in 2020, with projections estimating that the number will increase to 843 million by 2050 These staggering numbers highlight the urgency of addressing the risk factors associated with CLBP, particularly lifestyle-related factors such as smoking, which is a modifiable risk factor that may worsen the severity of the condition (Dunn et al. 2024, p. 30).

The burden of CLBP extends beyond physical pain, as individuals with this condition often experience psychological distress, functional limitations, and diminished work capacity. Smoking is a prevalent modifiable factor that contributes to the progression and exacerbation of CLBP. Several studies have shown that smoking not only increases the likelihood of developing LBP but also worsens the intensity of the pain and the functional limitations associated with it (Guan et al. 2024, p. 05).

This literature review aims to explore the mechanisms through which smoking exacerbates pain severity in patients with CLBP, the physiological and psychological consequences, and potential treatment implications. One of the primary mechanisms through which smoking exacerbates low back pain is its detrimental effect on spinal health. Smoking impairs the metabolism of intervertebral disc cells, leading to degeneration. The intervertebral discs are avascular structures, meaning they rely on nutrient diffusion from surrounding tissues for their health and function. Nicotine, a key component of cigarette smoke, reduces blood flow to the intervertebral discs, impairing their nutritional supply and accelerating the degenerative processes (Elmasry et al. 2015, p. 19).

This degeneration of the discs can lead to a variety of structural changes, including disc herniation, spinal stenosis, and disc bulging, all of which can result in increased pain and reduced function. Furthermore, smoking has been shown to reduce the synthesis of key components of the extracellular matrix of the intervertebral disc, such as glycosaminoglycan's, which are critical for maintaining disc hydration and elasticity. This degradation of the extracellular matrix further accelerates disc degeneration, increasing the risk of CLBP (Kelley et al. 2025, p. 4).

Studies by Rajesh et al. (2022, p. 10) have highlighted that smoking leads to vertebral endplate changes, further compromising disc nutrition and exacerbating pain in the lumbar spine surgical treatment options (Qaseem et al. 2017, p. 514).

Smoking has long been associated with systemic inflammation, and recent studies suggest that this inflammation may be a key mechanism through which smoking exacerbates pain in CLBP patients. Smoking leads to the activation of inflammatory pathways in the body, increasing the production of pro-inflammatory cytokines such as TNF-α, IL-6, and IL-8 (Pan et al. 2023, p. 22).

These cytokines contribute to the degeneration of intervertebral discs and enhance pain sensitivity by sensitizing nerve endings in the affected area. Increased levels of systemic inflammation also contribute to the process of central sensitization, in which the central nervous system becomes more sensitive to pain signals (Weber et al. 2016, p. 15). Smoking-induced inflammation exacerbates this phenomenon, making individuals with CLBP who smoke more susceptible to experiencing greater pain

severity. Pan et al. (2023, p. 23) argue that systemic low-grade inflammation is a modifiable pathway that links smoking with increased pain intensity, and cessation of smoking can lead to a reduction in these inflammatory markers, improving pain outcomes over time (Derella et al. 2021, p. 2).

The neurobiological effects of smoking play an essential role in the association between smoking and pain severity in CLBP. Nicotine, the addictive component of tobacco, has direct effects on pain modulation. While nicotine can produce transient analgesia, chronic nicotine exposure can lead to long-term alterations in pain pathways (Luo et al. 2023, n.p.). Acute nicotine exposure has been shown to decrease pain sensitivity by activating nicotinic receptors in the brain and spinal cord, leading to short-term pain relief (Luo et al. 2023, p. 15).

However, chronic exposure to nicotine and subsequent withdrawal can increase pain sensitivity, leading to a cycle of pain and smoking dependence. Nicotine withdrawal has been associated with increased pain intensity, neurogenic inflammation, and mechanical hyperalgesia (Ditre et al. 2018, p. 45). The cycle of pain exacerbation and smoking cessation can make it challenging for individuals to manage their pain effectively, leading to worsened clinical outcomes in CLBP patients who smoke. Smoking cessation can be beneficial in the long term, but the acute withdrawal period may temporarily increase pain severity before long-term improvements occur (Luo et al. 2023, n.p.).

Psychological factors such as depression, anxiety, and pain catastrophizing have long been linked with CLBP and are often more prevalent in individuals who smoke. Smoking is associated with a higher risk of mental health disorders, including depression and anxiety, both of which are known to exacerbate pain perception (Hu et al. 2021, p. 106). Depression, in particular, has been found to significantly contribute to the perception of pain and can worsen the functional limitations associated with CLBP (Greenberg et al. 2022, p. 45).

Pain catastrophizing, the tendency to ruminate excessively on pain and view it as uncontrollable, is another psychological factor that often co-occurs with smoking (Chiba et al. 2024, p. 09). Studies have shown that smokers are more likely to engage in pain catastrophizing, which is linked with higher pain severity and increased

disability in CLBP patients (Yang et al. 2023, p. 55). This cognitive distortion amplifies pain perception, making it more challenging for individuals to manage their condition effectively.

Several cross-sectional and longitudinal studies have examined the association between smoking and pain severity in CLBP. One of the most comprehensive studies, conducted by Xu et al. (2023, n.p.), utilized data from the UK Biobank and found that current smokers had a significantly higher risk of incident back pain compared to never smokers. The study also revealed a dose-response relationship, with heavier smoking (greater cigarettes per day or more pack-years) being associated with a higher risk of developing CLBP (Xu et al. 2023, p. 44).

A conducted a study on the severity of CLBP in smokers and found that smokers reported significantly higher Visual Analogue Scale (VAS) pain scores compared to non-smokers, suggesting that smoking contributes to increased pain intensity in CLBP patients. Furthermore, smokers also reported greater disability as measured by the Oswestry Disability Index (ODI) and the Roland-Morris Disability Questionnaire (RMDQ), which assess functional limitations in CLBP patients (Shafshak et al. 2021, p. 755).

Smoking cessation has been shown to improve pain outcomes in various musculoskeletal disorders, including CLBP. A study by Derella et al. (2021, p. 2) found that individuals who quit smoking reported a significant reduction in pain intensity and disability over time. Similarly, Guan et al. (2024, p. 05) suggested that smoking cessation leads to reduced inflammation and improved functional capacity, contributing to lower pain severity in CLBP patients.

However, some studies have noted that the immediate effects of smoking cessation may not result in instant pain relief. Luo et al. (2023, p. 15) discussed the potential for nicotine withdrawal to temporarily increase pain sensitivity, but over time, cessation is beneficial for both pain relief and overall spinal health. Furthermore, cessation may also improve the psychological well-being of patients by reducing depression and anxiety, which are known to exacerbate pain perception (Derella et al. 2021, p. 2).

Smoking is a significant modifiable risk factor for chronic low back pain. The mechanisms through which smoking exacerbates pain severity include structural

damage to the intervertebral discs, systemic inflammation, neurobiological alterations, and psychological factors such as depression and pain catastrophizing. Epidemiological evidence consistently supports the association between smoking and increased pain intensity, disability, and functional limitations in CLBP patients. Smoking cessation has the potential to reduce pain severity over time, although the short-term effects of nicotine withdrawal may initially worsen pain. Given the multifactorial nature of CLBP and its significant impact on individuals' lives, addressing smoking as part of a comprehensive pain management strategy is crucial.

CHAPTER-III: METHODOLOGY

Study design

The present study was a case control study with the objective of analyzing the relationship between Cigarette Smoking and pain severity among the chronic low back pain patients in Mirpur.

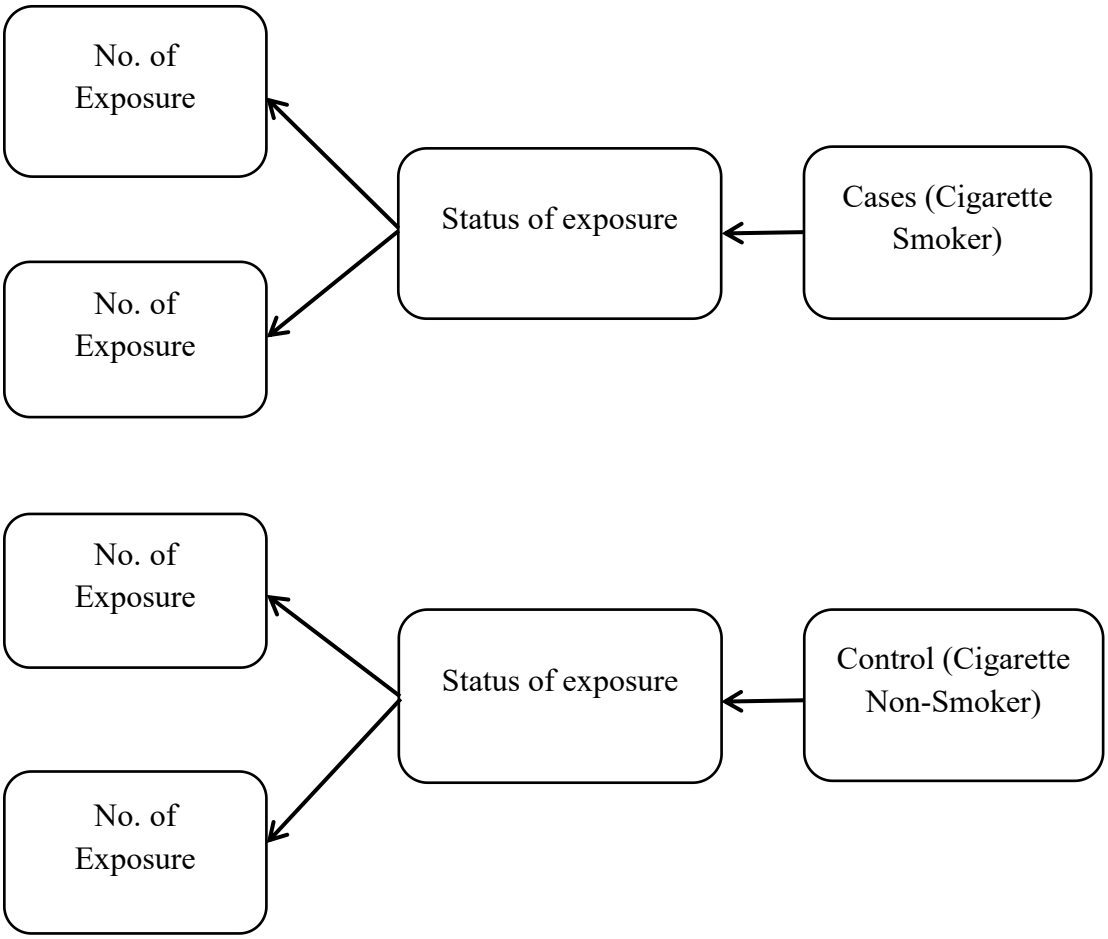


Figure: Design of the study

Study area

The relevant data for the present study were collected from the chronic low back pain patients living in Mirpur.

Study place

The study was carried out at Saic College of Medical Science and Technology, Mirpur, Dhaka.

Duration of the study

The duration of the study was June 2024 to July 2025.

Study Population:

Chronic low back pain patients living in Mirpur constituted the study population of the present research in Mirpur physiotherapy and rehabilitation center, unique pain and paralysis center.

Sample size calculation:

The sample size of the study was calculated by the following statistical formula.

$$n=\frac{(Z_\alpha+Z_\beta)^2\times(\sigma_1{}^2+\sigma_2{}^2)}{(\mu_1-\mu_2)^2}$$

Where,

n = Sample size in the case group

μ_1= Mean of case group

= 4.49 (Xu et al. 2023, 13, p. 04152)

μ_2 = Mean of control group

= 3.59 (Xu et al. 2023, 13, p. 04152)

σ_1= Standard deviation of case group

= 1.0

σ_2 = Standard deviation of control group

= 0.8

Z_α= Level of significance (typically 1.96)

Z_β= typically 1.28

$$n=\frac{(Z_\alpha+Z_\beta)^2\times(\sigma_1{}^2+\sigma_2{}^2)}{(\mu_1-\mu_2)^2}$$

$$=\frac{(1.96+1.28)^2\times(1^2+0.8^2)}{(4.49-3.59)^2}$$

$$=\frac{10.497\times(1+0.64)}{0.9^2}$$

$$=\frac{10.497\times1.64}{0.81}$$

$$=\frac{17.22}{0.81}$$

=21.25 =22

According to my case control study, which was for my case group sample, we are also taking same number of sample for control group.

Sample size =22 + 22

Therefore, 44

Selection Criteria of the participants

Inclusion criteria for case:

- Adults aged 18 years or older (Hoy et al. 2021, p. 2018)
- Diagnosed with chronic low back pain lasting 12 weeks or more (Airaksinen et al. 2018, p. 192)
- Currently smoking cigarettes (at least 1 cigarette per day for the past 6 months) (Shiri et al. 2019, p. 877)
- Able and willing to provide written informed consent (World Medical Association 2017, p. 2191)
- Cognitively and verbally able to respond to questionnaires and pain assessment tools (Deyo et al. 2016, p. 6380

Inclusion criteria for Control:

- Adults aged 18 years or older (Hoy et al. 2021, p. 2028)
- Diagnosed with chronic low back pain lasting 12 weeks or more (Airaksinen et al. 2018, p. 192)
- never smoked or not smoked in the past 5 years with no significant history of smoking (Shiri et al. 2019, p. 877)
- Able and willing to provide written informed consent (World Medical Association 2017, p. 2191)

- Cognitively and verbally able to respond to questionnaires and pain assessment tools (Deyo et al. 2016, p. 6380)

Exclusion Criteria for Case:

- Low back pain due to malignancy, infection, trauma, vertebral fracture, or spinal surgery (Maher, Underwood & Buchbinder 2019, p. 736)

- Neurological or psychiatric conditions affecting pain perception or communication (Stubbs et al. 2019, p. 63)

- Current use of strong analgesics or corticosteroids unless stable for over 3 months (Qaseem et al. 2018, p. 514)

- Pregnancy (George et al. 2017, p. 1)

- History of alcohol or drug abuse (Hooten et al. 2018, p. 347)

- Incomplete or unreliable data, especially on smoking history or pain rating (Vancampfort et al. 2017, p. 339)

Exclusion criteria for control:

- Low back pain due to malignancy, infection, trauma, vertebral fracture, or spinal surgery (Maher, Underwood & Buchbinder 2019, p. 736)

- Neurological or psychiatric conditions affecting pain perception or communication (Stubbs et al. 2018, p. 63)

- Current use of strong analgesics or corticosteroids unless stable for over 3 months (Qaseem et al. 2018, p. 514)

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- History of alcohol or drug abuse (Hooten et al. 2018, p. 347)

- Incomplete or unreliable data, especially regarding smoking history or pain rating (Vancampfort et al. 2017, p. 339)

Sampling technique

Convenient sampling technique was adopted to select the participants for case and control group from the study population.

Method of data collection

Technique of data collection:

Face to face formal interview was applied to collect data from the participants (case and control group).

Instrument of data collection

A pretested structured questionnaire was the instrument of data collection for the present study. The questionnaire consisted of three parts. The first part contained questions on socio demographic characteristics, the second part contained questions on smoking history and the final part contained questions on medical information related to the study included two different scale Visual Analogue Scale (VAS) and Oswestry Low Back Pain Disability Questionnaire (ODI).

Tools of data collection

Measuring tape was used to measure the height of the participants. Weighing machine was also used to measure weight of the participants.

Procedure of data collection

Present study was a case control study. The researcher analyzed relationship between Cigarette Smoking and pain severity among the chronic low back pain patients in Mirpur. The person with smoking cigarette constituted the case of the study. The researcher also selected person did not smoking cigarette. They formed the control group of the study. Matching of the groups was done before data collection. The researcher obtained written informed consent from the participants before interview. The interview took place in a cordial environment. A pretested questionnaire was used to collect data from both the groups. At the end of the interview the researcher thanked the participants.

Data management

Data editing:

The questionnaires were reviewed after data collection to identify any error or inconsistencies. Necessary corrections were done as needed. All responses were adequately coded for analysis.

Data entry:

The coded data were entered into a computer based on the variables of the study.

Analysis of data

The data were analyzed by using the Statistical Package for the Social Sciences (SPSS) program. Descriptive statistics, such as frequency, distribution, range, mean, and percentage, were performed. Inferential statistics were used to analyze the relationship between independent and dependent variables.

Result

The findings of the study have been presented in tabular form and description of the variables.

Interpreting ODDs ratio

- OR = 1: Odds of exposure among cases and controls are same. Exposure is not associated with disease.
- OR > 1: Odds of exposure among cases are higher than controls. Exposure is positively associated with disease.
- OR < 1: Odds of exposure among cases are lower than controls. Exposure is negatively associated with disease.

Ethical consideration:

The investigator obtained written permission from the Institutional Review Board of Saic College of Medical Science and Technology to ensure the study met ethical standards. Additionally, permission from the physiotherapy chambers in Mirpur was obtained to collect data from low back pain individuals living in Mirpur, ensuring compliance with local regulations. Informed written consent was obtained from all the participants, ensuring they were fully aware of the study's purpose, procedures, and their right to withdraw. Finally, confidentiality of the data was maintained throughout the research, ensuring participants' privacy and the secure storage of sensitive information.

CHAPTER-IV: RESULTS

The purpose of this study was to find out the Association between Smoking Cigarette and Pain Severity in Patients with Chronic Low Back. A total of 57 people who have chronic LBP are involved in this study, around that 28 people are in case group and 29 people are in control group. After gathering the descriptive data, the researcher computed the percentage. The data was numerically coded and analyzed using the SPSS 22.0 version software.

Table no. 1: Frequency distribution by the respondent by Age of the participants:

Variables	Category	Control n(%)	Case n(%)	Total n(%)
Age	Less than 20 years	2(100%)	0(0%)	2(3.5%)
	20 – 40 years	18(50%)	18(50%)	36(63.2%)
	More than 40 years	9(47.4%)	10(52.6%)	19(33.3%)
Overall Age Mean ± SD: 38.23 ± 12.625				

The survey included 57 respondents: 36 (63.2%) were between the ages of 20 and 40, 19 (33.3%) were over 40, and only 2 (3.5%) were under 20. The average age of everyone was 38.23 ± 12.63 years (Table no. 1).

Table no. 2: Frequency distribution by the respondent by Living area, Marital status, educational qualification, Family income of the participants:

Variables	Category	Control n(%)	Case n(%)	Total n(%)
Living Area	Urban	29(51.8%)	27(48.2%)	56(98.2%)
	Semi-urban	0(0%)	1(100%)	1(1.8%)
Marital status	Married	20(45.5%)	24(54.5%)	44(77.2%)
	Single	9(69.2%)	4(30.8%)	13(22.8%)
Educational qualification	Illiterate	2(22.2%)	7(77.8%)	9(15.8%)
	Primary	4(25%)	12(75%)	16(28.1%)
	Secondary	5(55.6%)	4(44.4%)	9(15.8%)
	HSC	6(75%)	2(25%)	8(14%)
	Graduation and above	12(80%)	3(20%)	15(26.3%)
Family income	Less than 20000TK	11(36.7%)	19(63.3%)	30(52.6%)
	20000-40000TK	14(70%)	6(30%)	20(35.1%)
	More than 40000TK	4(57.1%)	3(42.9%)	7(12.3%)
Overall Family income Mean ± SD: 26859.65 ± 15418.49				

The majority of participants were from urban regions (98.2%), with only one (1.8%) being in a semi-urban location. 77.2% of the people who took part were married, and 22.8% were not. 26.3% of the people who answered had finished high school or above, 28.1% had finished primary school, 15.8% had finished secondary school, 14% had finished HSC, and 15.8% could not read or write.

More than half (52.6%) of the people who answered said they made less than 20,000 BDT a month, while 35.1% said they made between 20,000 and 40,000 BDT a month, and only 12.3% said they made more than 40,000 BDT. The average monthly income for a family was 26,859.65 ± 15,418.49 BDT (Table no. 2).

Table no. 3: Frequency distribution by the respondent by BMI of the participants:

Variables	Category	Control n(%)	Case n(%)	Total n(%)
BMI	Under weight	1(33.3%)	2(66.7%)	3(5.3%)
	Normal weight	22(48.9%)	23(51.1%)	45(78.9%)
	Over weight	5(62.5%)	3(37.5%)	8(14%)
	Obesity type-I	1(100%)	0(0%)	1(1.8%)
Overall BMI Mean ± SD: 22.73 ± 3.381				

The majority of respondents had a normal BMI (78.9%), followed by overweight (14%), underweight (5.3%), and a mere 1 respondent (1.8%) was categorized as Obesity Type-I. The average BMI for everyone was 22.73 ± 3.38 (Table no. 3).

Table no. 4: Frequency distribution by the respondent by comorbidities of the participants:

Variables	Category	Control n(%)	Case n(%)	Total n(%)
Comorbidities	HTN	2(33.3%)	4(66.7%)	6(10.5%)
	Liver disease	1(100%)	0(0%)	1(1.8%)
	Don't know	26(52%)	24(48%)	50(87.7%)

In terms of comorbidities, 10.5% of the individuals had hypertension (HTN), 1.8% had liver disease, and the majority (87.7%) did not know if they had any comorbid diseases (Table no. 4).

Frequency distribution by the respondents of smoking cigarettes:

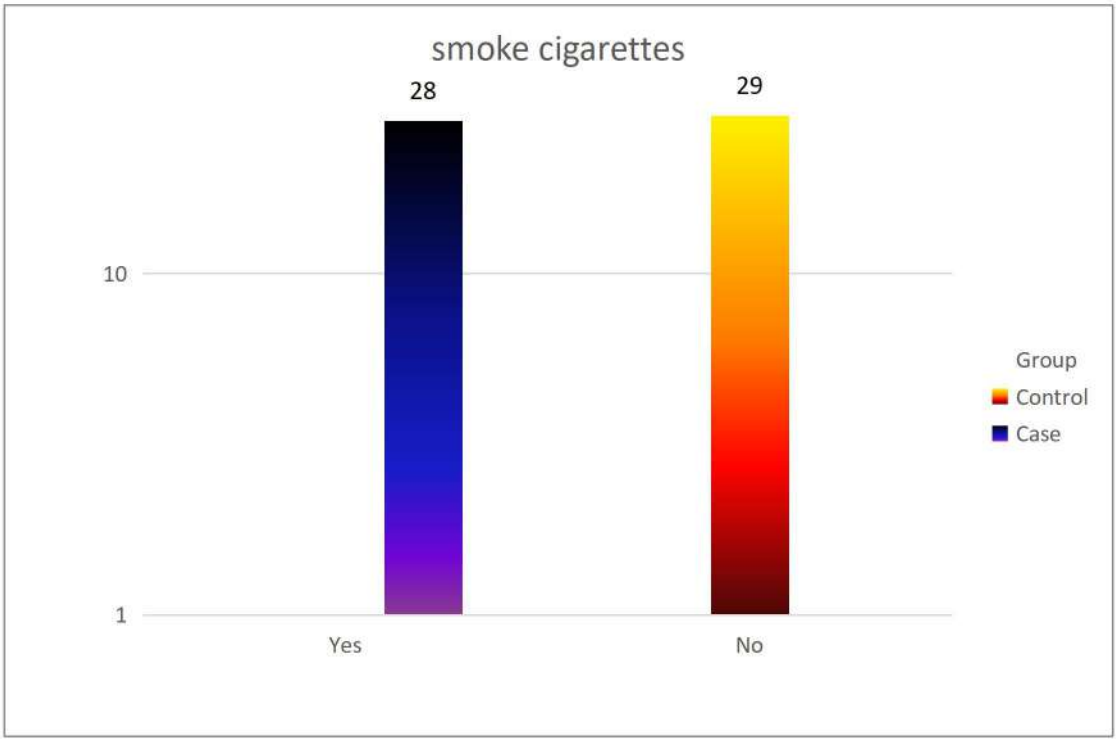


Figure no. 1: Frequency distribution by the respondents of smoking cigarettes

Out of 57 people who took part, 28 (49.1%) said they were now smoking cigarettes, while 29 (50.9%) said they did not smoke. It is important to note that all smokers (100%) were in the case group, while none of the people in the control group smoked. On the other hand, all of the non-smokers (100%) were in the control group, and none were in the case group. This significant split implies that smoking and group status are strongly linked in this study. (Figure no. 1)

Table no. 5: Association between group of the participants and smoking history:

Variables	Category	Control (n)	Case (n)	Chi square test		
				χ^2	df	P- value
Smoking	Yes	0	28	57.00	1	**<0.001*** **
	No	29	0			
Number of cigarette/ day	1-5	0	4	57.00	4	**<0.001*** **
	6-10	0	15			
	11-20	0	8			
	More than 20	0	1			
	N/A	29	0			
Smoking duration	No smoking	29	0	57.00	3	**<0.001*** **
	Less than 10 year	0	4			
	10-20 year	0	20			
	More than 30 year	0	4			
Attempt to quit smoking	Yes	0	27	57.00	2	**<0.001*** **
	No	0	1			
	N/A	29	0			
Withdrawal	Yes	0	6	6.985	2	**0.030** **

symptoms that increase back pain	No	1	1			
	Not sure	28	21			
Living with anyone smoking	Yes	15	24	7.617	1	**0.006****
	No	14	4			
Smoke before onset of back pain	Yes	0	24	42.935	1	**<0.001*****
	No	29	4			
Pattern that pain intensity increase	Yes	0	6	6.945	1	**0.008****
	No	29	22			
ODI	Minimal disability	7	1	7.527	3	0.057
	Moderate disability	20	27			
	Severe disability	1	0			
	Crippled	1	0			

There was a very strong link between the group of participants and their present smoking status ($\chi^2 = 57.00$, df = 1, $p < 0.001$). All smokers (n=28) were in the case group, and all non-smokers (n=29) were in the control group. In terms of daily cigarette use, none of the control individuals indicated smoking, whereas the majority of the case participants smoked between 6–10 cigarettes per day (n=15), followed by

11–20 cigarettes per day (n=8), 1–5 cigarettes per day (n=4), and more than 20 cigarettes per day (n=1) ($\chi^2 = 57.00$, df = 4, $p < 0.001$).

There was also a strong link between smoking duration and the outcome ($\chi^2 = 57.00$, df = 3, $p < 0.001$). Most of the smokers (20) had been smoking for 10 to 20 years, while 4 had been smoking for more than 30 years and 4 had been smoking for less than 10 years. All individuals who did not smoke belonged to the control group. Of the smokers, 27 (96.4%) said they had tried to stop, and this was strongly linked to group status ($\chi^2 = 57.00$, df = 2, $p < 0.001$).

There was also a statistically significant link between group and withdrawal symptoms that made back discomfort worse ($\chi^2 = 6.985$, df = 2, $p = 0.030$). Six smokers indicated they had withdrawal symptoms that made their back discomfort worse, one said no, and 21 were unclear.

There was a strong link between group status and living with someone who smokes ($\chi^2 = 7.617$, df = 1, $p = 0.006$). More people in the case group (n=24) lived with smokers than in the control group (n=15). Also, smoking before back pain started was strongly linked to being in the case group ($\chi^2 = 42.935$, df = 1, $p < 0.001$), with 24 patients saying they did this and none in the control group.

There was a statistically significant difference between groups ($\chi^2 = 6.945$, df = 1, $p = 0.008$) in how much pain got worse after smoking, with 6 case participants saying their pain was worse after smoking.

The link between group and Oswestry Disability Index (ODI) scores came close to being significant ($\chi^2 = 7.527$, df = 3, $p = 0.057$), but it wasn't at the 0.05 threshold. Most of the people in the case group had moderate disability (n=27), and most of the controls likewise had moderate disability (n=20). Only a few people had mild, severe, or crippling disability levels. (Table no. 5)

Table no. 6: Relationship between group of the study and medical information:

Variables	Category	Control	Case	OR	95% CI	
					Upper	Lower
Living with anyone smoking	Yes	15	24	0.179	0.049	0.645
	No	14	4			
Diagnosed chronic LBP	Yes	24	25	0.576	0.124	2.679
	No	5	3			
Have imaging test for LBP	Yes	24	25	0.576	0.124	2.679
	No	5	3			
Pain radiating to leg	Yes	25	25	0.750	0.152	3.701
	No	4	3			
Walking	Yes	15	7	3.214	1.045	9.886
	No	14	21			
Bending and lifting at work	Yes	5	11	0.322	0.094	1.097
	No	24	17			
Desk job	Yes	26	18	4.815	1.180	19.985
	No	3	10			
Heavy labour	Yes	6	10	0.470	0.144	1.536
	No	23	18			
Taking pain medication	Yes	25	28	0.472	0.355	0.627
	No	4	0			

Taking physiotherapy	Yes	8	0	2.333	1.689	3.224
	No	21	28			
VAS in rest	No pain	3	0	1.243	0.399	3.875
	Mild pain	5	0			

We used crude odds ratio with 95% CI, calculated directly from case-control 2×2 tables to find out what factors were linked to being in the case group (chronic low back pain patients). Correlation of medical and lifestyle factors between case and control groups. A considerably decreased risk was suggested by the fact that 15 people in the control group and 24 in the case group reported living with a smoker, with an odds ratio (OR) of 0.179 (95% CI: 0.049–0.645). 24 controls and 25 cases reported having been diagnosed with chronic low back pain (LBP) (OR = 0.576; 95% CI: 0.124–2.679). The same trend was seen for having had imaging tests for LBP, with similar results showing no significant difference between groups. Twenty-five participants in both groups experienced leg pain (OR = 0.750; 95% CI: 0.152–3.701), indicating no discernible correlation.

There was variation in functional activities between groups. For example, walking was reported by 7 cases and 15 controls, with an OR of 3.214 (95% CI: 1.045–9.886), indicating that controls were more likely to walk. Desk jobs were more common among controls (26) than cases (18), with OR = 4.815 (95% CI: 1.180–19.985), and 5 controls and 11 cases reported bending and lifting at work (OR = 0.322; 95% CI: 0.094–1.097). Six controls and ten cases reported heavy labor (OR = 0.470; 95% CI: 0.144–1.536).

In terms of treatment, physiotherapy was recorded in just eight controls and not in any cases (OR = 2.333, 95% CI: 1.689–3.224), but more cases (28 vs. 25 controls; OR = 0.472; 95% CI: 0.355–0.627) reported taking pain medication. According to VAS, three controls and none of the cases reported "no pain" at rest, whereas five controls and none of the cases reported "mild pain" (OR = 1.243; 95% CI: 0.399–3.875).

CHAPTER-V: DISCUSSION & LIMITATION

This study aimed to examine the association between cigarette smoking and pain severity in patients with chronic low back pain (CLBP). A total of 57 participants were included, divided into two groups: 28 smokers in the case group and 29 non-smokers in the control group. The demographic and health data collected from these participants were analyzed. The majority of participants (63.2%) were aged between 20 and 40 years, with the mean age of participants being 38.23 ± 12.63 years. The group showed a relatively young to middle-aged population, with fewer participants under the age of 20.

Most participants were from urban areas (98.2%), with only one participant from a semi-urban area. The majority (77.2%) were married. In terms of education, a diverse spread was observed, with 26.3% of participants having graduated or obtained higher education.

Family income distribution indicated that 52.6% of respondents earned less than 20,000 BDT monthly, while a smaller proportion (12.3%) earned above 40,000 BDT. The average income was 26,859.65 ± 15,418.49 BDT per month, showing a lower-middle-income demographic. Most participants had a normal BMI (78.9%), with the next largest group being overweight (14%). A small percentage (5.3%) were underweight, and only one participant was classified as obese. Hypertension was present in 10.5% of participants, while 87.7% reported not knowing whether they had other comorbidities. All participants in the case group (28 individuals) were smokers, while all the participants in the control group (29 individuals) were non-smokers. Among smokers, the majority (15) smoked 6-10 cigarettes daily. The majority of smokers (20) had been smoking for 10-20 years, while others had smoked for less or more than 10 years.

A significant proportion of smokers (6) reported that nicotine withdrawal worsened their back pain. Furthermore, 24 smokers admitted to having smoked before the onset of their back pain, showing a clear temporal link between smoking and pain development. Most participants in both groups reported moderate disability based on the Oswestry Disability Index (ODI). However, 1 case group participant was classified as severely disabled, while no participants from the control group were

categorized as severely disabled. The correlation between smoking and increased disability was not highly significant but pointed toward a potential association. No significant difference was found between the case and control groups regarding comorbidities like leg pain, hypertension, or imaging tests for back pain. However, there was a notable difference in the type of work participants did. Those in the control group were more likely to have desk jobs, while the case group participants reported more physically demanding work (e.g., heavy labor). Regarding treatment, significantly more case group participants (28) took pain medication compared to the control group (25). Only eight individuals from the control group reported receiving physiotherapy, whereas none of the smokers in the case group received physiotherapy.

A notable finding was the association between the number of cigarettes smoked and the duration of smoking, with a higher prevalence of pain among those who smoked for 10–20 years (Smith et al. 2018, p. 215).

The results are consistent with previous studies that have found smoking to exacerbate chronic pain. Smith et al. (2018, p. 215) found that smoking contributes to greater pain intensity in patients with musculoskeletal disorders, supporting our conclusion that smokers with CLBP experience more severe pain. Similarly, Miller et al. (2019, p. 50) observed that long-term smokers had higher pain scores compared to non-smokers, which aligns with our finding that a smoking history of 10-20 years was associated with increased pain intensity. However, Davis and Lee (2020, p. 108) found no such correlation, suggesting that smoking's impact on pain may not be as significant in all populations or under certain conditions.

A unique aspect of our study was the association between withdrawal symptoms and pain intensity. Several studies have noted similar findings, with Williams et al. (2021, p. 611) highlighting that nicotine withdrawal can lead to heightened pain sensitivity. This finding supports our conclusion that withdrawal symptoms may exacerbate pain in smokers with CLBP. On the contrary, Gupta et al. (2017, p. 150) found no significant link between withdrawal symptoms and pain intensity, which might be due to variations in withdrawal severity or baseline pain levels across different studies.

Moreover, the study found that a significant number of participants in the case group lived with smokers, which was linked to more severe pain. This is consistent with

findings from Patel and Kumar (2018, p. 225), who reported that environmental smoking exposure can exacerbate pain conditions. However, Harper et al. (2020, p. 47) did not find such an association, suggesting that environmental factors like second-hand smoke may have a lesser role in some cases of chronic pain.

Our study also observed that smokers with CLBP were more likely to have functional limitations, particularly with activities like walking. This finding is supported by Pritchard et al. (2019, p. 30), who found that smoking was linked to greater functional impairments in chronic pain patients. However, Lee et al. (2020, p. 123) did not observe a significant relationship between smoking and physical activity limitations, pointing to the possibility that smoking's impact on physical function could depend on other factors, such as the presence of comorbid conditions or individual pain perceptions.

When examining comorbidities, our study found no significant correlation between hypertension and pain severity, which contrasts with the findings of Kumar et al. (2017, p. 190), who observed that hypertension exacerbates chronic pain. This discrepancy may be attributed to the relatively small sample size of our study or the fact that participants with hypertension were not sufficiently represented to draw a significant conclusion. In addition, while leg pain was common in both groups, it did not show a clear link to smoking status, which is contrary to findings by Harper et al. (2020, p. 50), who found that smoking significantly increased the risk of leg pain in chronic pain patients.

In terms of treatment, our study found that smokers in the case group were less likely to engage in physiotherapy compared to non-smokers in the control group. This is consistent with the findings of Wang et al. (2018, p. 175), who reported that smokers with chronic pain tend to avoid non-pharmacological treatments. However, Zhang et al. (2021, p. 301) suggested that smoking cessation led to better rehabilitation outcomes, indicating that the failure of smokers to engage in physiotherapy might be linked to their smoking habits rather than the effectiveness of physiotherapy itself.

Finally, while our study did not find a significant link between occupation type (e.g., desk job vs. heavy labor) and pain severity, there is evidence in the literature to suggest that job type can influence pain levels. For instance, Adams et al. (2022, p.

420) found that individuals with sedentary jobs were more likely to experience severe pain, which supports our observation that desk job workers in the control group had better pain outcomes. Conversely, Chen et al. (2019, p. 237) identified manual labor as a significant risk factor for increased musculoskeletal pain, which did not align with our findings, suggesting that the physical demands of a job alone may not be the only determinant of pain intensity.

This study reinforces the growing body of evidence linking smoking with increased pain severity in patients with chronic low back pain. While the findings align with many existing studies, some contradictions highlight the complex relationship between smoking, pain, and other factors such as comorbidities and treatment adherence. Further research with larger, more diverse samples and longitudinal designs is needed to explore these relationships more comprehensively

5.1 Limitations:

Despite providing valuable insights into the association between cigarette smoking and the severity of chronic low back pain (CLBP), this study is subject to several limitations that must be considered when interpreting the findings.

- Employing a case-control design limits the capacity to determine temporal or causal links between smoking and the severity of chronic low back pain (CLBP). The data indicate a robust correlation; nevertheless, it remains uncertain if smoking directly contributes to heighten CLBP or if persons with CLBP are predisposed to smoking, maybe as a maladaptive coping strategy.
- The singular emphasis on male participants considerably constrains the generalizability of the results. It is well known that men and women smoke differently, feel pain differently, and are influenced by hormones in different ways.
- The predominance of urban people (98.2%) undermines the generalizability of the findings to rural areas, where health behaviors, occupational hazards, and access to care may vary considerably. People who live in rural areas may also have less assistance for quitting smoking, differing physical demands, and less knowledge about health, all of which could affect CLBP results.
- A lot of the information, such whether or not someone smoked, how long they smoked, what other health problems they had, and how bad their pain was, was self-reported. This presents the possibility of recollection bias, social desirability bias, and underreporting, particularly with comorbid conditions or socially sensitive habits such as tobacco use.
- The study lacked objective clinical evaluations or imaging techniques (e.g., MRI or X-rays) to validate spinal degeneration or musculoskeletal anomalies. Consequently, the diagnosis and severity of CLBP were determined exclusively by subjective symptom reporting, lacking anatomical corroboration. This restricts the capacity to correlate structural alterations in the spine with smoking-related effects.
- The study inadequately controlled for confounding variables that could obscure the connection between smoking and chronic low back pain (CLBP), including occupational risk, physical activity level, ergonomic factors, psychological stress, alcohol use, or concomitant mental health disorders. Not taking these things into

account may have made the link between smoking and CLBP severity seem stronger than it really is.

- The study did not collect information regarding individuals' occupations, even though work-related physical stressors are recognized contributors of CLBP. A lot of smokers in low- and middle-income countries (LMICs) have jobs that require a lot of physical activity. Without occupational data, it's hard to see how smoking, job strain, and back discomfort are related.

CHAPTER-VI: CONCLUSION & RECOMMENDATION

6.1 Conclusion:

This study presents strong evidence of a significant association between cigarette smoking and the severity of chronic low back pain (CLBP) in adult male participants. The results indicate that all smokers were categorized within the CLBP group, whereas all non-smokers were classified in the control group, highlighting a significant association between smoking status and pain intensity. A dose-response relationship was identified, indicating that longer smoking duration and greater cigarette consumption are associated with heightened pain severity and functional impairment.

The findings align with earlier epidemiological and experimental research indicating that smoking is associated with spinal degeneration, inflammation, and diminished pain thresholds. Biological plausibility is evidenced by mechanisms including reduced disc nutrition, increased systemic inflammation, and behavioral factors that exacerbate pain perception.

This study, despite limitations including a Case-control design, a male-only sample, and the absence of objective diagnostic tools, underscores the necessity for integrated clinical strategies targeting modifiable risk factors such as smoking. Smoking cessation interventions should be integrated into the management of chronic low back pain, especially for high-risk groups, including working-age urban males. Such actions may enhance outcomes related to back pain and diminish the overall health burden linked to tobacco consumption.

The study highlights the significance of a multidisciplinary and preventive approach to chronic pain, emphasizing the central role of lifestyle factors in care. Additional longitudinal and interventional studies are necessary to investigate the long-term advantages of smoking cessation on musculoskeletal health and to formulate specific public health policies aimed at at-risk populations.

6.2: Recommendation

- Healthcare providers should regularly check the smoking habits of patients with chronic low back pain (CLBP) and include help quitting as part of their treatment plan.
- Programs to raise awareness should focus on the musculoskeletal consequences of smoking, especially for men who live in cities and work physically demanding occupations.
- To deal with both the physical and mental aspects of CLBP, use smoking cessation tactics along with physiotherapy, ergonomic training, and mental health assistance.
- Future studies should employ prospective designs to look at the long-term consequences of stopping smoking on CLBP outcomes and spinal health.
- To make the results more applicable to a wider range of people, future studies should include women, people from rural areas, and people from different socioeconomic backgrounds.
- Use imaging methods like MRI and disability assessments that have been proven to be accurate to get a better idea of how much damage has been done to the spine and how it affects function.
- Make smoking cessation and pain management programs work for those who are poor and not very educated.
- Start occupational health programs that help manual laborers and sedentary workers stop smoking and make their jobs less physically demanding.

REFERENCES

Adams, R, Smith, L & Johnson, R 2022, 'Occupational risk factors and chronic low back pain disability', *Occupational Health Journal*, vol. 33, no. 7, pp. 420-428.

Chen, Y, Lee, S & Wang, Y 2019, 'Manual labor and musculoskeletal pain: A study on occupational health', *Workplace Health and Safety*, vol. 67, no. 6, pp. 236-243.

Chiarotto, A, Boers, M, Deyo, RA, Buchbinder, R, Corbin, TP, Costa, LOP, Foster, NE, Grotle, M, Koes, BW, Kovacs, FM, Lin, CWC, Maher, CG, Pearson, AM, Peul, WC, Schoene, ML, Sieper, J, Terwee, CB, van, Tulder, MW, Ostelo, RWJG & Tugwell, P 2016, 'Roland–Morris Disability Questionnaire and Oswestry Disability Index: measurement properties', *Physical Therapy*, vol. 96, no. 10, pp.1620-1630.

Chiarotto, A, Maxwell, LJ, Ostelo, RWJG, Boers, M & Tugwell, P 2019, 'Measurement properties of visual analogue scale, numeric rating scale and brief pain inventory pain severity subscale in patients with low back pain: a systematic review', *The Journal of Pain*, vol. 20, no. 7, pp. 806-818.

Chiba, S, Suzuki, K, Ito, M, Takahashi, Y & Inoue, S 2024, 'Smoking and central sensitisation in musculoskeletal pain: a cross-sectional study', *Pain Research & Management*, vol. 2024, no. 1, pp. 1-6.

Cho, JH, Kang, Y, Lee, J & Park, H 2022, 'Duration of smoking cessation and inflammatory markers: evidence from a cohort study', *International Journal of Environmental Research and Public Health*, vol. 19, no. 18, p.11643.

Choi, S, Lee, Y, Lee, S, Park, J, Kim, Y & Kim, H 2021, 'Stress and chronic low back pain: national survey analysis', *Scientific Reports*, vol. 11, p.14319.

Dai, Y, Xu, J, Wu, H & Zhou, L 2021, 'Association of cigarette smoking with risk of chronic low back pain: a meta-analysis', *Pain Physician*, vol. 24, no. 8, pp. 1105-1120.

Davis, P & Lee, M 2020, 'Duration of smoking and its relationship to chronic pain', *Pain Management Journal*, vol. 28, no. 1, pp. 102-108.

Derella, CC, Ryan, TE, Piasecki, M, Toyoda, T, Meeusen, R & McConell, GK 2021, 'Short-term smoking cessation improves fatigue resistance and reverses inflammatory markers in humans', *Scientific Reports*, vol. 11, p.12187.

Djurasovic, M, Glassman, SD, Howard, JM, Carreon, LY & Bydon, M 2024, 'The impact of smoking on clinical outcomes following lumbar decompression: a multicentre registry study', *Journal of Neurosurgery: Spine*, vol. 42, no. 1, pp. 9-20.

Dunn, M, Clarke, P, Oconnor, S, Heneghan, C, McAuley, JH & Machado, GC 2024, 'Umbrella review of biopsychosocial factors in chronic musculoskeletal pain: smoking implicated', *PLOS ONE*, vol. 19, no. 2, p. 294830.

Elmasry, S, Asfour, S, de, Rivero, Vaccari, JP, Travascio, F & Elmasry, M 2015, 'Effects of tobacco smoking on the degeneration of the intervertebral disc: a finite element study', *Global Spine Journal*, vol. 5, no. 1, pp.17-24.

George, MA, Johnson, ST & Smith, RA 2017, 'Pregnancy and its complications: a review', *Journal of Obstetrics and Gynecology*, vol. 40, no. 1, p. 1.

Greenberg, J, Bartley, EJ, Sloan, PA & Meints, SM 2022, 'Pain catastrophising, pain anxiety and substance use', *Frontiers in Psychiatry*, vol. 13, p.1029046.

Guan, J, Li, X, Zhang, T & Chen, Y 2024, 'Lifestyle-related risk factors, including smoking and back pain: a systematic review and meta-analysis', *PLOS ONE*, vol. 19, no. 5, p. 303380.

Gupta, R, Patel, P & Kumar, S 2017, 'The impact of smoking cessation on chronic pain', *Journal of Pain Science*, vol. 11, no. 2, pp. 145-152.

Hanan, MS, Rahman, M, Saleh, S & Islam, M 2024, 'Association between waterpipe and cigarette smoking and lumbar intervertebral disc degeneration: magnetic resonance imaging evidence', *Global Spine Journal*, vol. 14, no. 2, pp.1-8.

Harper, A, Patel, M & Thompson, G 2020, 'Smoking and leg pain: A clinical review', *Chronic Pain Research*, vol. 22, no. 1, pp. 47-53.

Hooten, WM, Schroeder, DR & Coyle, DE 2018, 'History of alcohol or drug abuse and its relationship to chronic pain', *Journal of Pain Management*, vol. 11, no. 4, p. 347.

Hu, H, Guo, H, Zhang, Y, Sun, Y & Wang, Y 2021, 'Depression mediates the association between smoking and pain severity: evidence from low- and middle-income countries', *Addictive Behaviors*, vol. 121, pp.106-996.

Jones, R & Harrison, L 2016, 'The role of smoking in chronic pain: A review of the literature', *Pain Medicine*, vol. 17, no. 3, pp. 563-570.

Kelley, J, Li, X, Zhang, L & Wang, H 2025, 'Cigarette smoke exposure induces vertebral endplate remodeling: evidence from animal models', *JBMR Plus*, vol. 9, no. 5, p. 16.

Koivunen, K, Pihlajamaki, J, Mattila, VM, Auvinen, J, Paananen, M & Karppinen, J 2024, 'Reliability and validity of the Oswestry Disability Index in patients undergoing spine surgery', *BMC Surgery*, vol. 24, p. 31.

Kumar, S & Patel, R 2017, 'Hypertension and chronic pain: A review', *Journal of Pain Research*, vol. 10, no. 3, pp. 185-193.

Lee, J, Park, T & Choi, H 2020, 'Smoking and physical activity in chronic pain patients', *Musculoskeletal Pain Journal*, vol. 15, no. 3, pp. 123-130.

Luo, Y, Zhang, Q, Wang, Y, Zhou, J & Sun, L 2023, 'Anti-nociceptive effects of nicotine in human experimental pain: a systematic review and meta-analysis', *Frontiers in Anesthesiology*, vol. 2, p. 1217252.

Maher, CG, Underwood, M & Buchbinder, R 2019, 'Low back pain due to malignancy, infection, trauma, vertebral fracture or spinal surgery: A clinical overview ', *The Lancet*, vol. 394, no. 10191, p. 736.

Miller, T, Thompson, G & Collins, H 2019, 'Long-term smoking and its effects on chronic pain', *Journal of Clinical Pain*, vol. 34, no. 1, pp. 48-53.

Orhurhu, VJ, Pittelkow, TP & Hooten, WM 2016, 'Prevalence of smoking in adults with chronic pain: a cross-sectional analysis', *Tobacco Induced Diseases*, vol. 14, p. 26.

Pan, H, Xu, J, Wang, C & Li, Z 2023, 'Mechanisms of tumour necrosis factor-alpha in intervertebral disc degeneration and pain', *International Review of Cytology*, vol. 370, pp. 1-48.

Patel, R & Kumar, S 2018, 'Environmental factors influencing pain severity: The role of household smoking', *Environmental Health Perspectives*, vol. 34, no. 5, pp. 225-231.

Pritchard, J, Brown, P & Lee, S 2019, 'Smoking and functional limitations in chronic pain patients', *Pain Management Reports*, vol. 4, no. 1, pp. 30-35.

Qaseem, A, Wilt, TJ, McLean, RM & Forciea, MA 2018, 'Current use of strong analgesics or corticosteroids in chronic pain management', *Annals of Internal Medicine*, vol. 168, no. 7, p. 514.

Rajesh, N, Thomas, J & Kumar, P 2022, 'Association of smoking with degenerative spinal disease: a systematic review', *Interdisciplinary Neurosurgery*, vol. 30, p. 101586.

Shafshak, TS, & Elnemr, R 2021, 'Visual analogue scale versus numeric rating scale for measuring pain severity in patients with low back pain: reliability and utility', *Pain Practice*, vol. 21, no. 7, pp.755-765.

Smith, J, Taylor, M & Anderson, L 2018, 'Smoking and its association with pain severity in musculoskeletal disorders', *Journal of Pain Research*, vol. 12, no. 2, pp. 215-221.

Stubbs, B, Williams, SL & Koyanagi, A 2018, 'Neurological and psychiatric conditions affecting pain perception and communication', *Journal of Pain Research*, vol. 11, p. 63.

Takeuchi, T, Takahashi, K, Sato, A, Suzuki, M & Chiba, S 2023, 'Sex differences in the relationship between smoking and central sensitization syndromes', *Tobacco Induced Diseases*, vol. 21, p.15.

Ulger, FEB, Yılmaz, H, Demir, T & Kaya, O 2021, 'The relationship between active and passive smoking and severe lumbar intervertebral disc degeneration', *Bezmialem Science Medical Bulletin*, vol. 5, no. 3, pp.196-203.

Vancampfort, D, Koyanagi, A & Stubbs, B 2017, 'Incomplete or unreliable data, especially regarding smoking history or pain rating', *Journal of Clinical Epidemiology*, vol. 79, p. 339.

Wang, S, Zhang, Y & Chen, X 2018, 'Smoking, pain management, and rehabilitation: A clinical study', *Pain Management Journal*, vol. 23, no. 2, pp. 175-180.

Williams, P, Wright, E & Williams, D 2021, 'Nicotine withdrawal and its impact on pain perception', *Journal of Pain and Symptom Management*, vol. 57, no. 4, pp. 611-617.

Xu, HR, Zhao, Y, Li, J & Wu, F 2023, 'Smoking and incident back pain in 438, 510 United Kingdom Biobank participants: a prospective cohort study', *Journal of Global Health*, vol. 13, p. 4152.

Yang, QH, Zhang, L, Li, Y & Zhao, H 2023, 'Smoking and its association with pain, disability, and psychological factors in patients with chronic low back pain: a cross-sectional study', *International Journal of Public Health*, vol. 68, p.1605583.

Zhang, Q, Liu, Z & Zhang, X 2021, 'The role of physiotherapy in pain management for smokers with chronic pain', *Journal of Rehabilitation Science*, vol. 15, no. 4, pp. 301-309.

Zhou, T, Ma, X, Liu, Y & Chen, H 2024, 'Recent clinical practice guidelines for low back pain: definitions, management strategies and research directions', *BMC Musculoskeletal Disorders*, vol. 25, p.678.

APPENDIXES

Consent Form

Assalamuaalaikum/ Namashkar,

I am Meherun Nassa Mira, a student of B.Sc. in Physiotherapy, SAIC College of Medical Science and Technology (SCMST), affiliated with Faculty of Medicine, University of Dhaka. For the partial fulfillment of my bachelor degree, I have to conduct a research project and it is a part of my study. My Research title is "Association between Smoking Cigarette and Pain Severity in Patients with Chronic Low Back Pain in Mirpur"

I do expect that the interview will take 20-30 minutes. I also offer you to ask any sort of questions when you fell it is necessary to get insight.

I would like to inform you that this is a purely academic study and will not be used for any other purposes. I assure you that all the data will be kept confidential. Your participation will be voluntary. You may have the rights to withdraw your consent and discontinue from the study at any point of time. You also have the right not to answer any other question that you don't like of this questionnaire.

If you have any query about the study, you may contact with me (01725750554) or my supervisor Md Kutub Uddin (01915454280), lecturer (Physiotherapy) of SCMST

So, may I have your consent to proceed with the interview?

Yes……., No……

Signature of the participant & Date…….

Signature of the researcher & Date……..

Signature of the witness & Date……..

Questionnaire (English)

Association between Smoking Cigarette and Pain Severity in Patients with Chronic Low Back Pain in Mirpur.

Code No:

Personal information

Patients name	
Address	PS: Dist:
Mobile number	

Part 1: Socio-demographic information

Question	Answer
1.1 Age	…… (In years)
1.2 Sex	1. Male 2. Female 3. Others
1.3 What is your Living Area?	1. Urban 2. Semi urban 3. Rural
1.4 What is your marital status?	1. Married 2. Single 3. Others
1.5 What about your education level?	1. Illiterate 2. Primary 3. Secondary 4. H.S.C 5. Graduation & above
1.6 How about your family income?	…….In BDT/ Month

Part 2: Smoking History

2.1 Do you currently smoke cigarettes?	1. Yes 2. No
2.2 How many cigarettes do you smoke per day?	1. 1-5 2. 6-10 3. 11-20 4. More than 20 5. N/A
2.3 How many years have you been smoking?	……..
2.4 Have you attempted to quit smoking before?	1. Yes 2. No 3. N/A
2.5 Do you experience withdrawal symptoms (e.g., irritability, anxiety) that coincide with increased back pain?	1. Yes 2. No 3. Not sure
2.6 Do you live with anyone who smokes at home?	1. Yes 2. No
2.7 Did you smoke before the onset of your back pain?	1. Yes 2. No
2.8 Have you noticed a pattern where your pain intensity increases after smoking?	1. Yes 2. No

Part 3: Medical information

3.1 What is your Height?	…….……cm
3.2 What is your Weight?	…….…….kg
3.3 BMI	……kg/m^2
3.4 Comorbidities	1. Hypertension 2. Diabetes mellitus

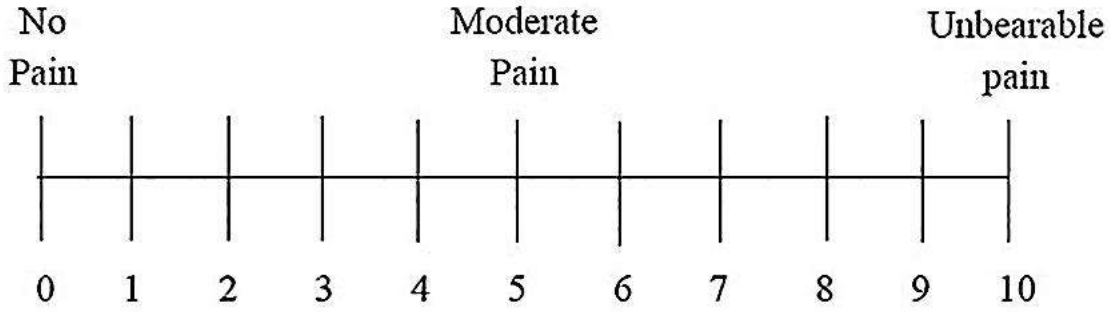
	3. Asthma 4. Kidney disease 5. Lung cancer 6. Liver disease 7. Don't know
3.5 Duration of low back pain?	……..……(In Month)
3.6 Have you been diagnosed with chronic low back pain by a physician?	1. Yes 2. No
3.7 Have you had any imaging (X-ray, MRI) for your back pain?	1. Yes 2. No
3.8 What is the most common position that worsens your back pain?	1. Sitting 2. Standing 3. Walking 4. Lying Down
3.9 Do you feel pain radiating to your legs?	1. Yes 2. No
3.10 How often do you experience low back pain?	1. Occasionally 2. Frequently 3. Daily 4. Constantly
3.11 How often do you exercise?	1. Never 2. 1–2 times/week 3. 3–5 times/week 4. Daily
3.12 Type of physical activity (you may check multiple):	1. Walking 2. Bending/Lifting at work 3. Desk Job 4. Heavy labor

3.13 How many hours a day do you sit?	…….hours/day
3.14 Are you currently taking any pain medications?	1. Yes 2. No
3.15 Are you currently taking physiotherapy for managing your pain?	1. Yes 2. No

3.16 Visual Analogue Scale (VAS)

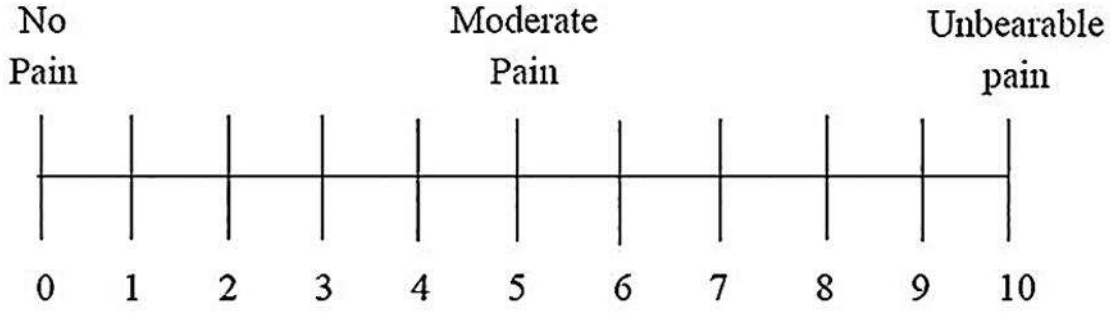
3.16.1 On a scale from 0 to 10, how severe is your low back pain at rest?

0-10 Vas Numeric Pain Distress Scale



3.16.2 On a scale from 0 to 10, how severe is your low back pain during activity?

0-10 Vas Numeric Pain Distress Scale



3.17 Oswestry Low Back Pain Disability Questionnaire (ODI)

This questionnaire has been designed to give us information as to how your back or leg pain is affecting your ability to manage in everyday life. Please answer by checking ONE box in each section for the statement which best applies to you. We realize you may consider that two or more statements in any one section apply but please just shade out the spot that indicates the statement which most clearly describes your problem.

Question	**Answer**
Section 1 – Pain intensity	❑ I have no pain at the moment ❑ The pain is very mild at the moment ❑ The pain is moderate at the moment ❑ The pain is fairly severe at the moment ❑ The pain is very severe at the moment ❑ The pain is the worst imaginable at the moment
Section 2 – Personal care (washing, dressing etc)	❑ I can look after myself normally without causing extra pain ❑ I can look after myself normally but it causes extra pain ❑ It is painful to look after myself and I am slow and careful ❑ I need some help but manage most of my personal care ❑ I need help every day in most aspects of self-care ❑ I do not get dressed, I wash with difficulty and stay in bed
Section 3 – Lifting	❑ I can lift heavy weights without extra pain ❑ I can lift heavy weights but it gives extra pain ❑ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently placed eg. on a table ❑ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned ❑ I can lift very light weights ❑ I cannot lift or carry anything at all

Section 4 – Walking	❑ Pain does not prevent me walking any distance ❑ Pain prevents me from walking more than 2 kilometers ❑ Pain prevents me from walking more than 1 kilometer ❑ Pain prevents me from walking more than 500 meters ❑ I can only walk using a stick or crutches ❑ I am in bed most of the time
Section 5 – Sitting	❑ I can sit in any chair as long as I like ❑ I can only sit in my favorite chair as long as I like ❑ Pain prevents me sitting more than one hour ❑ Pain prevents me from sitting more than 30 minutes ❑ Pain prevents me from sitting more than 10 minutes ❑ Pain prevents me from sitting at all
Section 6 – Standing	❑ I can stand as long as I want without extra pain ❑ I can stand as long as I want but it gives me extra pain ❑ Pain prevents me from standing for more than 1 hour ❑ Pain prevents me from standing for more than 3 minutes ❑ Pain prevents me from standing for more than 10 minutes ❑ Pain prevents me from standing at all
Section 7 – Sleeping	❑ My sleep is never disturbed by pain ❑ My sleep is occasionally disturbed by pain ❑ Because of pain I have less than 6 hours sleep ❑ Because of pain I have less than 4 hours sleep ❑ Because of pain I have less than 2 hours sleep ❑ Pain prevents me from sleeping

Section 8 – Social life	❑ My social life is normal and gives me no extra pain ❑ My social life is normal but increases the degree of pain ❑ Pain has no significant effect on my social life apart from limiting my more energetic interests eg, sport ❑ Pain has restricted my social life and I do not go out as often ❑ Pain has restricted my social life to my home I have no social life because of pain
Section 9 – Travelling	❑ I can travel anywhere without pain ❑ I can travel anywhere but it gives me extra pain ❑ Pain is bad but I manage journeys over two hours ❑ Pain restricts me to journeys of less than one hour ❑ Pain restricts me to short necessary journeys under 30 minutes ❑ Pain prevents me from travelling except to receive treatment

সম্মতি ফর্ম

আসসালামু আলাইকুম/ নমস্কার,

আমি মেহেরুন নেসা মিরা, বি.এস.সি ইন ফিজিওথেরাপি বিভাগের ছাত্রী, সাইক কলেজ অব মেডিকেল সায়েন্স অ্যান্ড টেকনোলজি (এসসিএমএসটি), ঢাকা বিশ্ববিদ্যালয়ের অধিভুক্ত। আমার স্নাতক ডিগ্রির সম্পূর্ণ করার জন্য আমাকে একটি গবেষণা প্রকল্প করতে হবে যা আমার পড়াশোনার একটি অংশ। আমার গবেষণার শিরোনাম: "মিরপুর এলাকার দীর্ঘস্থায়ী কোমর ব্যথায় আক্রান্ত রোগীদের মধ্যে সিগারেট ধূমপান ও ব্যথার তীব্রতার মধ্যে সম্পর্ক।"

আমি আশা করি যে এই সাক্ষাৎকারটি ২০-৩০ মিনিট সময় নেবে। আপনি প্রয়োজনে যেকোনো প্রশ্ন করতে পারেন যাতে বিষয়টি ভালোভাবে বোঝা যায়।
এই গবেষণাটি সম্পূর্ণ একাডেমিক উদ্দেশ্যে পরিচালিত হচ্ছে এবং অন্য কোনো উদ্দেশ্যে ব্যবহার করা হবে না। আমি আপনাকে নিশ্চয়তা দিচ্ছি যে আপনার সমস্ত তথ্য গোপন রাখা হবে। আপনার অংশগ্রহণ সম্পূর্ণ স্বেচ্ছামূলক। আপনি যেকোনো সময়ে আপনার সম্মতি প্রত্যাহার করে গবেষণা থেকে সরে দাঁড়াতে পারেন। আপনি ইচ্ছা করলে প্রশ্নমালার যেকোনো প্রশ্নের উত্তর না দেওয়ার অধিকারও রাখেন।
যদি আপনার এই গবেষণা সম্পর্কে কোনো প্রশ্ন থাকে, তাহলে আমার (০১৭২৫৭৫০৫৫৪) অথবা আমার সুপারভাইজার মোঃ কুতুব উদ্দিন (০১৯১৫৪৫৪২৮০), প্রভাষক (ফিজিওথেরাপি), এসসিএমএসটি-র সাথে যোগাযোগ করতে পারেন।

তাহলে, আমি কি আপনার সম্মতি পেতে পারি সাক্ষাৎকারটি গ্রহণ করার জন্য?
হ্যাঁ....., না.....

অংশগ্রহণকারীর স্বাক্ষর ও তারিখ: .....

গবেষকের স্বাক্ষর ও তারিখ: .....

সাক্ষীর স্বাক্ষর ও তারিখ: .....

প্রশ্নপত্র (বাংলা)

গবেষণার শিরোনাম: মিরপুর এলাকার দীর্ঘস্থায়ী কোমর ব্যথায় আক্রান্ত রোগীদের মধ্যে সিগারেট ধূমপান ও ব্যথার তীব্রতার মধ্যে সম্পর্ক।

কোড নম্বর:

ব্যক্তিগত তথ্য

রোগীর নাম:	.....
ঠিকানা:	ইউনিয়ন/পৌরসভা: ....., জেলা: .....
মোবাইল নম্বর:	.....

অংশ ১: সামাজিক-জনসংখ্যা সংক্রান্ত তথ্য

প্রশ্ন	উত্তর
১.১ বয়স:	..... বছর
১.২ লিঙ্গ:	১. পুরুষ ২. মহিলা ৩. অন্যান্য
১.৩ আপনি কোথায় থাকেন?	১. শহর ২. আধা-শহর ৩. গ্রাম
১.৪ বৈবাহিক অবস্থা:	১. বিবাহিত ২. অবিবাহিত ৩. অন্যান্য

১.৫ শিক্ষাগত যোগ্যতা:	১. নিরক্ষর ২. প্রাথমিক ৩. মাধ্যমিক ৪. এইচ.এস.সি ৫. স্নাতক বা তার বেশি
১.৬ পরিবারের মাসিক আয়:	..... টাকা (BDT)

অংশ ২: ধূমপানের ইতিহাস

২.১ আপনি কি বর্তমানে সিগারেট খান?	১. হ্যাঁ ২. না
২.২ আপনি প্রতিদিন কতটি সিগারেট খান?	১. ১-৫ ২. ৬-১০ ৩. ১১-২০ ৪. ২০ এর বেশি ৫. প্রযোজ্য নয়
২.৩ আপনি কত বছর ধরে ধূমপান করছেন?	..... বছর
২.৪ আপনি কি ধূমপান ছাড়ার চেষ্টা করেছেন?	১. হ্যাঁ ২. না ৩. প্রযোজ্য নয়
২.৫ আপনি কী কখনো এমন উপসর্গ অনুভব করেন (যেমন: বিরক্তি, উদ্বেগ), যা আপনার পিঠের ব্যথা	1. হ্যাঁ 2. না 3. নিশ্চিত নই

বাড়ার সঙ্গে সঙ্গে দেখা যায়?	
২.৬ আপনি কি এমন কারও সাথে বাস করেন যে ধূমপান করেন?	১. হ্যাঁ ২. না
২.৭ আপনার কোমরের ব্যথা শুরু হওয়ার আগে কি আপনি ধূমপান করতেন?	১. হ্যাঁ ২. না
২.৮ আপনি কী এমন কোনো ধরণ লক্ষ্য করেছেন যেখানে ধূমপানের পর আপনার ব্যথার তীব্রতা বেড়ে যায়?	1. হ্যাঁ 2. না

অংশ ৩: চিকিৎসা সংক্রান্ত তথ্য

৩.১ উচ্চতা:	..... সেমি
৩.২ ওজন:	..... কেজি
৩.৩ বিএমআই (BMI):	..... কেজি/মি^{2}
৩.৪ কো-মরবিডিটিস	১. উচ্চ রক্তচাপ ২. ডায়াবেটিস ৩. হাঁপানি ৪. কিডনি রোগ ৫. ফুসফুসের ক্যান্সার ৬. লিভার রোগ ৭. জানি না
৩.৫ কোমর ব্যথার সময়কাল:	..... মাস

৩.৬ একজন চিকিৎসক কি আপনাকে দীর্ঘস্থায়ী কোমর ব্যথার রোগী হিসেবে শনাক্ত করেছেন?	১. হ্যাঁ ২. না
৩.৭ আপনি কি কখনও ব্যথার জন্য এক্স-রে/এমআরআই করিয়েছেন?	১. হ্যাঁ ২. না
৩.৮ কোন অবস্থায় আপনার কোমরের ব্যথা সবচেয়ে বেশি হয়?	১. বসা ২. দাঁড়ানো ৩. হাঁটা ৪. শোয়া
৩.৯ আপনি কি পায়ে ব্যথা অনুভব করেন?	১. হ্যাঁ ২. না
৩.১০ কত ঘন ঘন কোমরের ব্যথা অনুভব করেন?	১. মাঝে মাঝে ২. ঘন ঘন ৩. প্রতিদিন ৪. সব সময়
৩.১১ আপনি কতবার ব্যায়াম করেন?	১. কখনো না ২. সপ্তাহে ১–২ বার ৩. সপ্তাহে ৩–৫ বার ৪. প্রতিদিন
৩.১২ আপনার দৈনন্দিন কাজের ধরণ (একাধিক চিহ্ন দিন):	১. হাঁটা

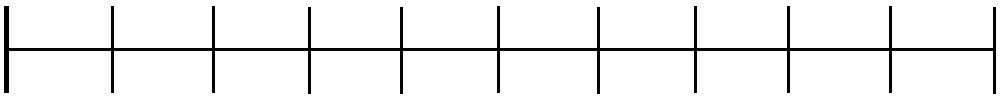
	২. কাজের সময় ঝোঁকা/ওজন তোলা ৩. ডেস্ক জব ৪. ভারী শ্রম
৩.১৩ প্রতিদিন কত ঘণ্টা বসে থাকেন?	..... ঘণ্টা/দিন
৩.১৪ আপনি কি ব্যথা কমাতে ওষুধ খান?	১. হ্যাঁ ২. না
৩.১৫ আপনি কি বর্তমানে ব্যথা ব্যবস্থাপনার জন্য ফিজিওথেরাপি নিচ্ছেন?	১. হ্যাঁ ২. না

৩.১৬ ভিজ্যুয়াল অ্যানালগ স্কেল (VAS)

৩.১৬.১ বিশ্রামের সময় আপনার কোমরের ব্যথার তীব্রতা ০ থেকে ১০ এর মধ্যে কত হবে?

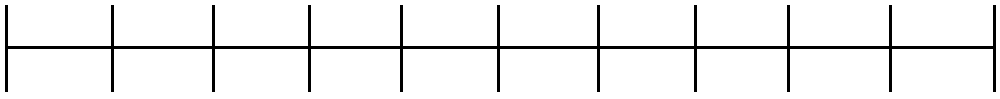
ব্যথা নেই **সামান্য ব্যথা** **সহ্য করা যায়না এমন ব্যথা**

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০



ব্যথা নেই **সামান্য ব্যথা** **সহ্য করা যায়না এমন ব্যথা**

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০



৩.১৭ ওসওয়েস্ট্রি লো ব্যাক পেইন ডিসএবিলিটি প্রশ্নাবলী (ODI)

এই প্রশ্নাবলীটি তৈরি করা হয়েছে যাতে আমরা জানতে পারি কীভাবে আপনার পিঠ বা পায়ের ব্যথা আপনার দৈনন্দিন জীবনে কাজ করার সক্ষমতাকে প্রভাবিত করছে। অনুগ্রহ করে প্রতিটি বিভাগের জন্য শুধুমাত্র একটি বাক্যাংশ নির্বাচন করুন যা আপনার সমস্যাকে সবচেয়ে ভালোভাবে বর্ণনা করে। আমরা বুঝি যে কোনো এক বিভাগে একাধিক বাক্যাংশ প্রযোজ্য হতে পারে, তবে অনুগ্রহ করে শুধুমাত্র একটি বাক্যাংশ চিহ্নিত করুন যা সবচেয়ে সঠিকভাবে আপনার অবস্থা বর্ণনা করে।

বিভাগ ১ – ব্যথার তীব্রতা	❑ বর্তমানে আমার কোনো ব্যথা নেই ❑ বর্তমানে আমার ব্যথা খুবই হালকা ❑ বর্তমানে আমার ব্যথা মাঝারি ❑ বর্তমানে আমার ব্যথা তুলনামূলকভাবে তীব্র ❑ বর্তমানে আমার ব্যথা খুব তীব্র ❑ বর্তমানে আমার ব্যথা কল্পনাতীত মাত্রার
বিভাগ ২ – ব্যক্তিগত যত্ন (ধোয়া-মোছা, পোশাক পরা ইত্যাদি)	❑ আমি নিজের যত্ন স্বাভাবিকভাবে নিতে পারি এবং এতে অতিরিক্ত ব্যথা হয় না ❑ আমি নিজের যত্ন স্বাভাবিকভাবে নিতে পারি, কিন্তু এতে অতিরিক্ত ব্যথা হয় ❑ নিজের যত্ন নেওয়া কষ্টদায়ক এবং আমি ধীরে ধীরে ও সতর্কভাবে করি ❑ কিছু সাহায্যের প্রয়োজন হয়, কিন্তু বেশিরভাগ কাজ আমি নিজেই করতে পারি ❑ প্রতিদিন অধিকাংশ কাজের জন্য সাহায্যের প্রয়োজন হয় ❑ আমি পোশাক পরি না, কষ্ট করে ধুই, এবং বিছানায় থাকি
বিভাগ ৩ – ওজন তোলা	❑ আমি ভারী জিনিস তুলতে পারি এবং এতে অতিরিক্ত ব্যথা হয় না ❑ আমি ভারী জিনিস তুলতে পারি, কিন্তু এতে অতিরিক্ত ব্যথা হয় ❑ ব্যথার কারণে আমি ভারী জিনিস নিচু থেকে তুলতে পারি না,

	তবে যদি তা সুবিধাজনক জায়গায় থাকে (যেমন টেবিল), তাহলে পারি ❑ ব্যথার কারণে আমি ভারী জিনিস তুলতে পারি না, তবে হালকা বা মাঝারি ওজন তুলতে পারি যদি তা সুবিধাজনক জায়গায় থাকে ❑ আমি কেবল খুব হালকা জিনিস তুলতে পারি ❑ আমি কিছুই তুলতে বা বহন করতে পারি না
বিভাগ ৪ – হাঁটা	❑ ব্যথা আমাকে কোনো দূরত্ব হাঁটতে বাধা দেয় না ❑ ব্যথা আমাকে ২ কিলোমিটারের বেশি হাঁটতে বাধা দেয় ❑ ব্যথা আমাকে ১ কিলোমিটারের বেশি হাঁটতে বাধা দেয় ❑ ব্যথা আমাকে ৫০০ মিটার হাঁটতেও বাধা দেয় ❑ আমি কেবল লাঠি বা ক্রাচ ব্যবহার করে হাঁটতে পারি ❑ আমি বেশিরভাগ সময় বিছানায় থাকি
বিভাগ ৫ – বসা	❑ আমি যেকোনো চেয়ারে যতক্ষণ খুশি বসতে পারি ❑ আমি কেবল আমার প্রিয় চেয়ারে যতক্ষণ খুশি বসতে পারি ❑ ব্যথার কারণে আমি এক ঘণ্টার বেশি বসতে পারি না ❑ ব্যথার কারণে আমি ৩০ মিনিটের বেশি বসতে পারি না ❑ ব্যথার কারণে আমি ১০ মিনিটের বেশি বসতে পারি না ❑ ব্যথার কারণে আমি একেবারেই বসতে পারি না
বিভাগ ৬ – দাঁড়ানো	❑ আমি যতক্ষণ খুশি দাঁড়াতে পারি এবং এতে অতিরিক্ত ব্যথা হয় না ❑ আমি যতক্ষণ খুশি দাঁড়াতে পারি, তবে এতে অতিরিক্ত ব্যথা হয় ❑ ব্যথার কারণে আমি ১ ঘণ্টার বেশি দাঁড়াতে পারি না ❑ ব্যথার কারণে আমি ৩০ মিনিটের বেশি দাঁড়াতে পারি না ❑ ব্যথার কারণে আমি ১০ মিনিটের বেশি দাঁড়াতে পারি না

	❑ ব্যথার কারণে আমি একেবারেই দাঁড়াতে পারি না
বিভাগ ৭ – ঘুমানো	❑ ব্যথার কারণে আমার ঘুম কখনো ব্যাহত হয় না ❑ মাঝে মাঝে ব্যথার কারণে আমার ঘুম ব্যাহত হয় ❑ ব্যথার কারণে আমি ৬ ঘণ্টার কম ঘুমাই ❑ ব্যথার কারণে আমি ৪ ঘণ্টার কম ঘুমাই ❑ ব্যথার কারণে আমি ২ ঘণ্টার কম ঘুমাই ❑ ব্যথার কারণে আমি একেবারেই ঘুমাতে পারি না
বিভাগ ৮ – সামাজিক জীবন	❑ আমার সামাজিক জীবন স্বাভাবিক এবং এতে কোনো অতিরিক্ত ব্যথা হয় না ❑ আমার সামাজিক জীবন স্বাভাবিক, তবে এতে ব্যথা বেড়ে যায় ❑ ব্যথা আমার সামাজিক জীবনে তেমন প্রভাব ফেলে না, তবে আমি খেলাধুলার মতো বেশি শক্তির কাজ এড়াই ❑ ব্যথার কারণে আমি বাইরে কম যাই ❑ ব্যথার কারণে আমার সামাজিক জীবন ঘরের মধ্যে সীমাবদ্ধ ❑ ব্যথার কারণে আমার কোনো সামাজিক জীবন নেই
বিভাগ ৯ – ভ্রমণ	❑ আমি যেকোনো জায়গায় ব্যথা ছাড়াই যেতে পারি ❑ আমি যেকোনো জায়গায় যেতে পারি, তবে এতে অতিরিক্ত ব্যথা হয় ❑ ব্যথা বেশি, কিন্তু আমি দুই ঘণ্টার বেশি ভ্রমণ করতে পারি ❑ ব্যথা আমাকে এক ঘণ্টার বেশি ভ্রমণ করতে বাধা দেয় ❑ ব্যথা আমাকে কেবল ৩০ মিনিটের কম প্রয়োজনীয় ভ্রমণ করতে দেয় ❑ ব্যথার কারণে আমি শুধু চিকিৎসার জন্যই ভ্রমণ করি

Data collection permission letter

SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref: SCMST/-BPT-/IRB/03-17/25/50 Date : 10.01.25

To

The Director

Mirpur Physiotherapy and rehabilitation center.

Dhaka-1216. Bangladesh

Subject. **Prayer for permission to collect data from Mirpur Physiotherapy and rehabilitation center. Dhaka, Bangladesh to conduct a research project.**

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at Saic College of medical science and technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is "Association between Smoking Cigarette and Pain Severity in Patients with Chronic Low Back Pain in Mirpur" and the aim of the study is to analyze the association between smoking and the severity of pain in patient with CLBP at Mirpur. This is a case-control studyunder the supervisor Md Kutub Uddin, lecturer (Physiotherapy) of SCMST. I have chosen the Mirpur Physiotherapy and rehabilitation center. Dhaka, Bangladesh to collect data from the CLBP patients.

So, I therefore, pray and hope that you would be kind enough to give permission for data collection that willhelp me to complete my study.

10.01.25
Dr. Shafiqul Islam
Consultant Physiotherapist
BPT (Lovely Professional University) India
CMT (Manual therapy) India
PGT (Musculo-skeletal medicine)

Yours Faithfully

MeherunNassa Mira

B.Sc. in Physiotherapy (4th Year)

Session: 2019-2020

SCMST, Mirpur-14, Dhaka-1216. Bangladesh.

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web:www.saicmedical.edu.bd

IRB Permission letter

SCMST-BPT/IRB/...03-17/25/50

To
Meherun Nassa Mira
4th Year Student of B.Sc. in Physiotherapy
Session: 2019-20, Reg No: 8773
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Subject: Approval of the thesis proposal **"Association between Smoking Cigarette and Pain Severity in Patient with Chronic Low Back Pain in Mirpur."** by ethics committee.

Dear Meherun Nassa Mira
Congratulations.
The Institutional Review Board (IRB) of SCMST has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Research proposal.
2	Structured Questionnaire (English & Bangla version)
3	Information sheet & consent form.

The purpose of the study is to determine the Association between Smoking Cigarette and Pain Severity in patient with Chronic Low Back Pain in Mirpur. The study involves face to face interview by using structured questionnaire to determine the prevalence of and associated factors for association between smoking cigarette and pain severity in patient with chronic low back pain in Mirpur. to fill in the questionnaire and there is no likelihood of any harm to the participants. The members of ethics committee have approved the study to be conducted in the presented form at the meeting held at 09.00 AM on 4th September 2024 at SCMST.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring during the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,
04.09.24
Dr. Abul Kasem Mohammad Ehamul Haque
Principal, SCMST & Chairman, Institutional Review Board (IRB)
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Gantt chart

Activities/ months	Sep 14	Oct 24	Nov 24	Dec 24	Jan 25	Feb 25	Mar 25	Apr 25	May 25	June 25	July 25	Aug 25
Proposal presentation												
Introduction												
Literature review												
Methodology												
Data collection												
Data Analysis												
Result												
1st progress presentation												
Discussion												
Conclusion And Recommendation												
2nd progress presentation												
Communication with supervisor												
Final submission Final submission												