

The Determinants of Prevalence of Low Back Pain; A Systematic Review

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Abstract: *Low back pain (LBP) is one of the most prevalent musculoskeletal disorders worldwide and a leading cause of disability, imposing a significant burden on individuals and healthcare systems. This study aimed to systematically review the determinants influencing the prevalence of LBP across diverse populations. A systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A comprehensive search was performed across PubMed, Scopus, Web of Science, and Google Scholar to identify relevant studies published up to 2025. Studies reporting the prevalence and/or determinants of LBP among adult populations or specific occupational groups were included, and the findings were synthesized qualitatively. A total of 20 studies met the inclusion criteria. The results demonstrated that the prevalence of LBP varies widely depending on population characteristics and occupational exposure, with higher rates consistently reported among healthcare workers and other high-risk occupational groups. Occupational factors such as prolonged sitting, heavy lifting, and repetitive movements were the most frequently identified determinants. Psychological factors, including stress and job dissatisfaction, were also strongly associated with LBP. In addition, demographic factors such as age and gender, lifestyle factors such as physical inactivity and smoking, and clinical conditions including degenerative spinal disorders and obesity were identified as significant contributors. Overall, LBP is a multifactorial condition influenced by a complex interaction of physical, behavioral, and psychosocial factors. These findings highlight the need for comprehensive and multidisciplinary approaches to prevention and management, with particular emphasis on workplace interventions, lifestyle modification, and psychological support to reduce the global burden of LBP.*

Keywords: Low back pain; prevalence; risk factors; determinants; systematic review.

1. Introduction

Low back pain (LBP) is one of the most prevalent musculoskeletal disorders worldwide and constitutes a major public health concern due to its high frequency and disabling nature. It affects individuals across all age groups and occupational categories, often leading to significant limitations in daily activities and reduced quality of life. Globally, LBP has been consistently ranked among the leading causes of years lived with disability, reflecting its substantial impact on both individuals and healthcare systems (Safiri et al., 2023). The burden is particularly pronounced in low- and middle-

income countries, where access to preventive and therapeutic healthcare services may be limited. The prevalence of LBP varies widely across regions and populations, influenced by differences in occupational exposures, lifestyle patterns, and socioeconomic conditions. In the Middle East and North Africa region, LBP has shown a significant association with socio-demographic variables such as age, gender, and employment status (Safiri et al., 2023). Similarly, systematic reviews conducted in African countries have reported considerable prevalence rates, especially among working populations exposed to physical strain and poor ergonomic conditions (Jegnie & Afework, 2021; Fay & Black, 2024). Among healthcare workers, who represent a high-risk occupational group, the prevalence of LBP has been reported to be particularly high due to prolonged standing, patient handling, and repetitive movements (Rezaei et al., 2021; Ibrahim et al., 2025; Islam et al., 2020).

A growing body of literature has identified multiple determinants contributing to the occurrence and persistence of LBP. Demographic factors such as increasing age and female gender have been frequently associated with higher prevalence rates (Daud et al., 2023; Amayri et al., 2023). Occupational factors, including prolonged sitting, heavy lifting, awkward postures, and repetitive tasks, are among the most consistently reported risk factors across different professions (Hilmi et al., 2024; Jia et al., 2024; Xing et al., 2024). In addition, lifestyle-related determinants such as physical inactivity and smoking have been shown to significantly increase the risk of developing LBP, potentially through mechanisms involving reduced muscle strength and impaired tissue healing (Saciloto et al., 2024; Teferi, 2020). Psychosocial factors have also emerged as important contributors to LBP, with evidence indicating that stress, anxiety, and job dissatisfaction may exacerbate pain perception and chronicity (Alammari et al., 2025). Furthermore, clinical conditions such as obesity and degenerative spinal disorders play a critical role in the development and progression of LBP (Singh & Singh, 2020; Al Mulhim et al., 2023). These findings highlight the multifactorial nature of LBP, where biological, behavioral, and environmental factors interact to influence its prevalence.

Despite the extensive research on LBP, much of the existing literature focuses on specific populations or isolated risk factors, limiting the ability to draw comprehensive conclusions. For example, several studies have concentrated on occupational groups such as drivers, military personnel, and equestrians, each demonstrating unique exposure-related risks (Jia et al., 2024; Xing et al., 2024; Duarte et al., 2024). While these studies provide valuable insights, there remains a need for an integrative synthesis that consolidates evidence across diverse populations and settings. Therefore, this systematic review aims to comprehensively examine the determinants associated with the prevalence of low back pain. By synthesizing findings from a wide range of studies, this review seeks to provide a clearer understanding of the key factors influencing LBP and to support the development of effective prevention and management strategies.

2. Methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure methodological rigor, transparency, and reproducibility (Rezaei et al., 2021; Fay & Black, 2024). A comprehensive literature search was performed across four major electronic databases, including PubMed, Scopus, Web of Science, and Google Scholar, to identify relevant studies published up to January 2025. The search strategy combined both controlled vocabulary and free-text keywords using Boolean operators, including “low back pain” OR “lumbar pain” AND “prevalence” OR “epidemiology” AND “risk factors” OR “determinants,” consistent with previous systematic reviews in this field (Jegnie & Afework, 2021; Xing et al., 2024). These search terms were adapted for each database to maximize

sensitivity and specificity. In addition, the reference lists of included studies were manually screened to identify further relevant articles (Daud et al., 2023). Studies were included if they reported on the prevalence and/or determinants of low back pain, involved adult populations or specific occupational groups, and were published in English. Studies such as case reports, conference abstracts, editorials, and those lacking sufficient data on prevalence or associated risk factors were excluded, in line with prior review methodologies (Alammari et al., 2025). All retrieved records were screened in two stages: initially through title and abstract screening, followed by full-text assessment based on predefined eligibility criteria. Any discrepancies in study selection were resolved through discussion and consensus.

Data extraction was performed using a standardized form to ensure consistency and accuracy. Extracted variables included author name, year of publication, country, study design, sample size, population characteristics, prevalence of low back pain, and identified risk factors. The methodological quality of included studies was assessed using validated appraisal tools depending on study design. Observational studies were evaluated using the Newcastle-Ottawa Scale, while systematic reviews were assessed using established critical appraisal tools, as recommended in similar studies (Hilmi et al., 2024; Jia et al., 2024). Studies were subsequently categorized as high, moderate, or low methodological quality. Due to substantial heterogeneity across included studies in terms of design, populations, and outcome measures, a meta-analysis was not performed. Instead, a narrative synthesis approach was adopted to systematically summarize the findings and identify consistent determinants of low back pain, following approaches used in previous systematic reviews (Fay & Black, 2024; Rezaei et al., 2021). The study selection process is summarized in Figure 1.

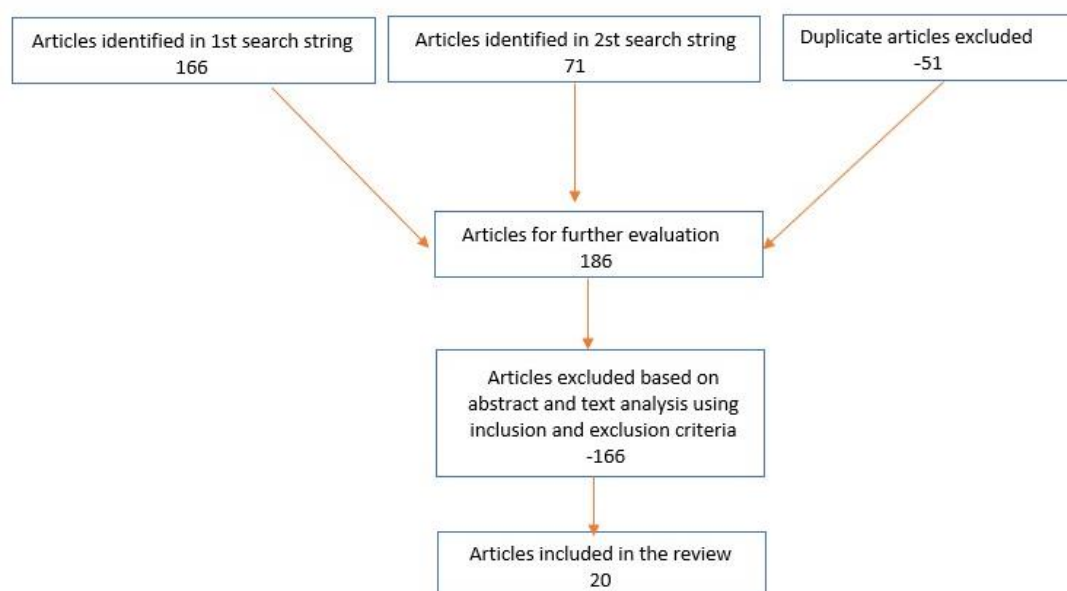


Figure 1: The Systematic Review Process

2.1 3.Results

2.2 Study Characteristics

A total of 237 records were initially identified through database searching, including 166 articles from the first search string and 71 from the second search string. After the removal of 51 duplicate records, 186 articles remained for further evaluation. Following title and abstract screening, 166 articles were excluded based on predefined inclusion and exclusion criteria. Ultimately, 20 studies were included

in this systematic review. The included studies were conducted across a wide range of geographical regions, including Asia, Africa, the Middle East, and Europe, reflecting diverse socio-demographic and occupational contexts (Fay & Black, 2024; Safiri et al., 2023). In terms of study design, the majority of the included studies were cross-sectional, alongside cohort studies, case-control studies, and systematic reviews (Rezaei et al., 2021; Jegnie & Afework, 2021). The sample sizes varied considerably, and the populations studied included healthcare workers, professional drivers, military personnel, pregnant women, and general adult populations (Ibrahim et al., 2025; Jia et al., 2024; Amayri et al., 2023; Xing et al., 2024). The detailed characteristics and distribution of determinants across the included studies are presented in Table 1.

Table 1: Literature Review Matrix

No	Author(s) and Year	Demographic	Occupational	Lifestyle	Psychological	Clinical
1	Rezaei et al. (2021)	✓	✓		✓	
2	Ibrahim et al. (2025)	✓	✓		✓	
3	Islam et al. (2020)	✓	✓		✓	
4	Fay & Black (2024)	✓	✓	✓	✓	
5	Singh & Singh (2020)	✓				✓
6	Amayri et al. (2023)	✓			✓	✓
7	Saciloto et al. (2024)			✓		✓
8	Jegnie & Afework (2021)	✓	✓		✓	
9	Daud et al. (2023)	✓	✓	✓	✓	
10	Xing et al. (2024)	✓	✓		✓	✓
11	Al Mulhim et al. (2023)	✓				✓
12	Teferi (2020)			✓		✓
13	Alammari et al. (2025)	✓	✓		✓	
14	Duarte et al. (2024)	✓	✓	✓		
15	Hilmi et al. (2024)	✓	✓	✓	✓	
16	Jia et al. (2024)	✓	✓		✓	
17	Safiri et al. (2023)	✓	✓	✓	✓	✓
18	Salman et al. (2024)	✓	✓		✓	✓
19	Wu et al. (2020)	✓	✓	✓		✓
20	Cieza et al. (2020)	✓		✓		✓

2.3 Prevalence of Low Back Pain

The prevalence of low back pain (LBP) demonstrated considerable variation across the included studies, reflecting differences in population characteristics, occupational exposures, and geographical settings. Globally, LBP remains one of the most prevalent musculoskeletal conditions and a leading cause of disability. According to global estimates from the Global Burden of Disease (GBD) study, LBP affects a substantial proportion of the population and is consistently ranked among the top contributors to years lived with disability worldwide (Wu et al., 2020). Furthermore, the growing need for rehabilitation services associated with LBP highlights its significant impact on healthcare systems and population health (Cieza et al., 2020). Among occupational groups, particularly healthcare workers, the prevalence of LBP was reported to be notably high. Studies conducted in hospital settings indicated prevalence rates ranging from moderate to high levels, largely attributed to physically demanding tasks such as patient handling, prolonged standing, and repetitive movements (Rezaei et al., 2021; Ibrahim et al., 2025; Islam et al., 2020). Similarly, other high-risk occupational groups, including professional drivers and military personnel, exhibited elevated prevalence rates due to prolonged sitting, exposure to vibration, and physically strenuous activities (Jia et al., 2024; Xing et al., 2024).

In general adult populations, the prevalence of LBP varied depending on socio-demographic and environmental factors. Systematic and scoping reviews conducted in regions such as Africa and Southeast Asia reported variable prevalence rates, often influenced by lifestyle behaviors, occupational patterns, and access to healthcare services (Fay & Black, 2024; Daud et al., 2023). Regional epidemiological studies further emphasized the widespread nature of LBP, particularly in developing countries where risk factors such as manual labor and limited ergonomic awareness are prevalent (Safiri et al., 2023). Specific population groups also demonstrated distinct prevalence patterns. For instance, pregnant women were found to have a high prevalence of LBP, likely due to physiological and biomechanical changes during pregnancy (Amayri et al., 2023). Additionally, clinical populations, including patients with degenerative spinal conditions or those undergoing surgical interventions, showed increased prevalence and severity of LBP (Singh & Singh, 2020; Al Mulhim et al., 2023). The findings indicate that LBP is a highly prevalent condition across diverse populations and settings. The variation in reported prevalence underscores the influence of multiple interacting factors, including occupation, lifestyle, and underlying health conditions. These results highlight the importance of targeted preventive strategies and the need for context-specific interventions to reduce the burden of LBP globally.

2.4 Determinants of Low Back Pain

The findings of this systematic review indicate that the determinants of low back pain (LBP) are multifactorial and consistently reported across diverse populations and study settings. The included studies highlight a complex interaction between demographic, occupational, lifestyle, psychological, and clinical factors, all of which contribute to the prevalence and severity of LBP. Demographic factors were among the most commonly reported determinants. Increasing age was frequently associated with a higher prevalence of LBP, likely due to cumulative mechanical stress and degenerative changes over time. Gender differences were also observed, with several studies indicating a higher prevalence among females, particularly in specific populations such as pregnant women (Amayri et al., 2023; Daud et al., 2023). These findings suggest that biological and physiological factors play a significant role in the development of LBP.

Occupational factors emerged as one of the strongest and most consistent determinants across the included studies. Work-related exposures such as prolonged sitting, heavy lifting, repetitive movements, and awkward postures were strongly associated with increased risk of LBP (Hilmi et al., 2024; Jia et al., 2024; Xing et al., 2024). Healthcare workers, drivers, and military personnel were particularly affected due to the physical and ergonomic demands of their professions (Rezaei et al., 2021; Ibrahim et al., 2025). These findings emphasize the importance of workplace ergonomics and occupational health interventions. Lifestyle factors also played a significant role in the occurrence of LBP. Physical inactivity was identified as a major risk factor, as it contributes to reduced muscle strength and spinal support (Teferi, 2020). In addition, smoking was associated with an increased risk of LBP, potentially due to its negative effects on blood flow and tissue healing (Saciloto et al., 2024). These results highlight the importance of promoting healthy lifestyle behaviors in preventing LBP.

Psychological factors were increasingly recognized as important contributors to LBP. Stress, anxiety, and job dissatisfaction were frequently associated with both the onset and persistence of LBP (Alammari et al., 2025). These factors may influence pain perception and coping mechanisms, thereby exacerbating the condition. The interaction between psychological and physical factors further underscores the biopsychosocial nature of LBP. Clinical factors, including obesity and degenerative spinal conditions, were also identified as key determinants. Degenerative changes in the lumbar spine were strongly associated with LBP, particularly in older populations (Singh & Singh, 2020). Additionally, clinical conditions following surgical interventions were linked to persistent or recurrent LBP (Al Mulhim et al., 2023). These findings highlight the role of underlying health conditions in the progression and chronicity of LBP. The evidence demonstrates that LBP is influenced by a wide range of interrelated factors. Among these, occupational and psychological determinants were the most consistently reported, followed by demographic, lifestyle, and clinical factors. This multifactorial nature emphasizes the need for comprehensive and multidisciplinary approaches to prevention and management.

3. Discussion

This systematic review aimed to comprehensively examine the determinants influencing the prevalence of low back pain (LBP) across diverse populations and settings. The findings of this review confirm that LBP is a highly prevalent and multifactorial condition, influenced by a complex interplay of occupational, psychological, demographic, lifestyle, and clinical factors. Among these, occupational and psychological determinants emerged as the most consistently reported and influential contributors across the included studies. The high prevalence of LBP identified in this review is consistent with global epidemiological evidence. Data from the Global Burden of Disease (GBD) studies demonstrate that LBP remains one of the leading causes of years lived with disability worldwide, affecting millions of individuals and placing a substantial burden on healthcare systems (Wu et al., 2020). Furthermore, the increasing global demand for rehabilitation services related to musculoskeletal disorders, particularly LBP, underscores its significant public health impact (Cieza et al., 2020). These findings reinforce the notion that LBP is not only a clinical concern but also a major socioeconomic issue requiring coordinated public health interventions.

Occupational factors were identified as the most prominent determinants of LBP in this review. Individuals engaged in physically demanding occupations, such as healthcare workers, drivers, and military personnel, exhibited higher prevalence rates due to prolonged exposure to biomechanical stressors. Activities such as heavy lifting, repetitive movements, prolonged sitting, and maintaining awkward postures were consistently associated with increased risk of LBP (Rezaei et al., 2021; Jia et

al., 2024; Xing et al., 2024). These findings are supported by ergonomic research, which highlights the cumulative effect of mechanical strain on spinal structures. Importantly, this suggests that workplace interventions, including ergonomic adjustments, task modification, and employee education, could play a critical role in reducing the burden of LBP. Psychological factors also emerged as significant contributors to both the onset and persistence of LBP. Variables such as stress, anxiety, and job dissatisfaction were frequently associated with increased pain perception and chronicity (Alammari et al., 2025). This aligns with the biopsychosocial model of pain, which posits that psychological and social factors interact with physical conditions to influence the experience and progression of pain. The recognition of psychological determinants highlights the need for a more holistic approach to LBP management, incorporating mental health support alongside physical treatment.

Demographic factors, particularly age and gender, were also found to influence the prevalence of LBP. Increasing age was consistently associated with higher prevalence, likely due to cumulative wear and tear on spinal structures and the progression of degenerative changes (Daud et al., 2023). Gender differences were also observed, with females showing higher prevalence rates in certain populations, including pregnant women, where hormonal and biomechanical changes contribute to LBP (Amayri et al., 2023). These findings suggest that demographic characteristics should be considered when designing targeted prevention strategies. Lifestyle factors, including physical inactivity and smoking, were identified as modifiable determinants of LBP. Physical inactivity contributes to reduced muscle strength and spinal stability, thereby increasing susceptibility to LBP (Teferi, 2020). Similarly, smoking has been associated with impaired blood flow and delayed tissue healing, which may exacerbate musculoskeletal conditions (Saciloto et al., 2024). These findings emphasize the importance of lifestyle modification as a key component of LBP prevention and management. Clinical factors, such as obesity and degenerative spinal conditions, were also significantly associated with LBP. Degenerative changes in the lumbar spine were particularly prevalent among older individuals and were strongly linked to chronic LBP (Singh & Singh, 2020). Additionally, patients undergoing surgical interventions, such as lumbar discectomy, often continued to experience LBP postoperatively, indicating the complexity of managing chronic pain conditions (Al Mulhim et al., 2023). These findings highlight the need for early diagnosis and comprehensive clinical management.

This review has several strengths. It integrates evidence from a wide range of study designs and populations, enhancing the robustness and generalizability of the findings. The inclusion of both global and regional studies provides a comprehensive understanding of LBP across different contexts. However, some limitations should be acknowledged. The heterogeneity of the included studies, particularly in terms of methodology and population characteristics, may limit comparability. Additionally, the restriction to English-language publications may introduce language bias. This review demonstrates that LBP is a multifactorial condition influenced by a wide range of determinants. Addressing these factors requires a multidisciplinary approach that integrates occupational health strategies, lifestyle interventions, psychological support, and clinical management. Future research should focus on developing targeted and context-specific interventions to effectively reduce the global burden of LBP.

4. Conclusion

This systematic review provides a comprehensive synthesis of the determinants influencing the prevalence of low back pain (LBP) across diverse populations and settings. The findings confirm that

LBP is a highly prevalent and multifactorial condition, driven by the interaction of occupational, psychological, demographic, lifestyle, and clinical factors. Among these, occupational and psychological determinants were identified as the most consistent and influential contributors. The review highlights that individuals exposed to physically demanding work environments, prolonged sitting, repetitive movements, and poor ergonomic conditions are at significantly higher risk of developing LBP. In addition, psychological factors such as stress and job dissatisfaction play a crucial role in both the onset and persistence of pain, emphasizing the importance of adopting a biopsychosocial approach to understanding and managing LBP.

Modifiable lifestyle factors, including physical inactivity and smoking, further contribute to the burden of LBP, suggesting that preventive strategies should incorporate health promotion and behavioral interventions. Moreover, clinical conditions such as degenerative spinal disorders and obesity were found to exacerbate the severity and chronicity of LBP, highlighting the need for early diagnosis and appropriate clinical management. The findings underscore the necessity of a multidisciplinary approach to reducing the burden of LBP. Effective strategies should integrate workplace interventions, lifestyle modifications, psychological support, and clinical care. Future research should focus on developing targeted, population-specific interventions to address the most significant determinants and improve health outcomes globally.

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