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Exercise Therapy Interventions for Lumbago Among Computer Workstation Users: A Review

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Abstract

Lumbago is among the common causes of musculoskeletal disorders It is a neglected health problem responsible for serious sufferings and disabilities Research shows that low back pain affected 619 million people globally and it is expected to increase to 843 million by 2050 Computer workstation users typically spend a significant amount of their time working on a computer. It is estimated that one-third of the disability burden from low back pain is due to prolonged sitting and poor ergonomics This review paper examines the prevalence of lumbago and explores the role of exercise as a therapeutic intervention for the past decade. Desktop review utilized electronic data bases such Google scholar, semantic scholar and PubMed focusing on articles published in the last 10 years. Key words used included low back pain, computer users and exercise therapy. The results showed highest prevalence of Lumbago is among bank computer operators at 72% and lowest at 41.1% among university staff other groups. Predisposure was associated with age, gender, occupation, poor posture and pregnancy. Exercise intervention was utilized as the frontline management strategy using walking, aerobic exercises and stretches or a combination of them However, in most cases exercise was the last option in line of prescription to patients with lumbago. This review recommends exercise therapy programme that can be used as an intervention to manage lumbago.

Keywords: *Low back pain, exercise therapy, computer users*

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1. Introduction

The European Guidelines for preventing low back pain define lumbago (Commonly referred to as low back pain) as pain and discomfort below the costal margin and above the inferior gluteal folds, with or without leg pain (Burton et al., 2004). Around 70%–85% of adults experience at least one lumbago episode, a significant health concern affecting productivity and quality of life and leading to musculoskeletal disability globally (ASM, AB, & N, 2024).

Low-back pain (LBP) has risen globally to 568.4 million cases in 2019, causing 63.7 million people to live with disability. It also affects 619 million people globally, with an estimated 843 million cases by 2050, driven by population growth and ageing. It is the leading cause of disability worldwide, and most people benefit from rehabilitation. Prevalence increases with age up to 80years, with non-specific LBP being the most common presentation (WHO, 2023).

In the US, these disorders have a significant economic impact, with 264 million lost workdays due to back and neck pain in 2015 and $131.8 billion annual earnings lost. By 2040, 78 million adults will have arthritis, and millions will experience arthritis-attributable activity limitations. (Washington (DC) & National Academes press (US), 2020). Healthcare spending on LBP in the US increased by 5.3% annually, ranking 1st among 154 health conditions in 2016. Occupational ergonomic factors (OEF) increase the risk of LBP, accounting for 8.1 and 7.3 million YLD in males and females, respectively (Chen, Tong, Yuen, & Wong, 2023).

Back pain is a prevalent occupational health issue, particularly among Information Technology (IT) professionals. The sedentary nature of IT jobs, prolonged computer usage, poor ergonomic practices, and work-related stress contribute to the incidence of back pain. A systematic review examined the prevalence, risk factors, consequences, and potential interventions to mitigate back pain among IT workers. Results showed a prevalence of 45%-70%, with lower back pain as the most commonly reported type. Factors contributing to back pain include prolonged sitting, poor ergonomic postures, physical inactivity, and psychosocial stress. The findings highlighted the urgent need for targeted workplace interventions, including ergonomic adjustments, regular physical activity, and mental health support (Kale, 2025).

A study in India shows that Psychosocial factors significantly influence low back pain prognosis, with studies showing biopsychosocial treatments are superior to biomedical ones in pain improvement, functional status, and work return (Shete, Suryawanshi & Gandhi, 2015).

A survey of 129 computer users aged 18-65 during the COVID-19 pandemic found that 70.5% experienced neck and back pain, with 42.9% in the neck and upper back, 36.3% in the lower back, and 16.5% in both. The study found that only 32.2% followed ergonomic advice, highlighting the need for increased awareness about proper work ergonomics for young professionals (Manali & Ruchi, 2021).

A study by Gosain, Ahmad, Rizvi and Sharma (2022) established that 121 responses from 53 females and 68 males indicated that females are more prone to musculoskeletal pain, with neck, lower back, and shoulder pain being the most affected body regions. The least affected areas were the elbow, wrist/hand, upper back, hips, knee, and ankle/feet. Risk factors for MSP include lack of workplace during lockdown, stress, eye strain, and work-related mental stress.

The study by Davidson, Zehr, Domineli and Collaghan (2024) shows that prolonged sitting has been linked to low back pain in both epidemiological and laboratory studies. Sustained lumbar flexion and spinal movement are potential mechanisms of sitting-induced low back pain. Sitting positions the spine into flexion, typically between 30% and 80% of the maximum voluntary lumbar flexion angle. Recent popular interventions include whole-body movement or hybrid seating, such as taking standing or walking breaks to reduce sitting time. However, recommendations for appropriately positioning the spine in these hybrid chairs are more recent, and there is little evidence that opening up the trunk-thigh angle in hybrid chairs will elicit less spine flexion than a traditional 90-90-90 sitting posture.

Despite efforts to address this problem, prevalence rates have not decreased over the past three decades. Modifiable risk factors include higher age, female gender, and a previous history of neck pain and low back pain. Workstation postural factors, such as ergonomically poor workstations, have been identified as the predisposing factors. Chairs, VDU, and keyboard

height have been shown to affect neck alignment, with prolonged neck postures associated with neck MSD in computer users.

The purpose of this study was therefore to evaluate the effectiveness of different exercise therapy interventions, based on current evidence, for the preventive and rehabilitative roles of exercise therapy in the management of lumbago.

2. Related Studies

2.1 Global Prevalence of Lumbago

A study among bankers in Port Harcourt Metropolis found a significant relationship between age, chronic low back pain, and time spent in a seated position. Additionally, respondents who did not sit comfortably were 2.60 times more likely to experience chronic low back pain. The study recommends proper break time and ergonomics to prevent twisting the back (Renner & Huldah, 2021).

A study conducted in Gondar found that 55.4% of bank workers experienced low back pain over a 12-month period. Factors such as being female, work-related stress, lack of physical activity, using fixed chairs without armrests, and lifting heavy objects increased the risk of developing the condition. The study recommends establishing a health screening team, providing movable chairs with armrests, focusing on female workers and those with stress, and promoting physical activity to reduce the risk of low back pain among bank workers (Workneh & Mekonen, 2021).

A study of 593 full-time bank employees in Dhaka City found that low back pain (LBP) is a common health issue among employees, resulting in absenteeism. Among the staff who visited their health facility, the prevalence of LBP was 36.6%, with the highest prevalence (64.3%) in the 51- to 59-year-old age group. Factors such as age, length of employment, long working hours, chronic illness, obesity, and physical activity were identified as significant contributors to LBP. The study suggested that addressing these factors can help prevent LBP among bank employees (Ali, Ahsan, & Hossain, 2020).

A study conducted in Rwanda found that 45.8% of bank staff at Equity and I&M banks who visited their health facilities experienced back pain, with the highest proportion among those aged 45 years and older. Risk factors include age, gender, lifestyle, previous pain symptoms, psychosocial factors, socioeconomic variables, poor muscle flexibility, and physical activity. Bank employees in Pakistan are particularly vulnerable to back pain due to prolonged sitting in front of computers with awkward postures and repeated movements. The study also found that lifestyle and chronic diseases associated with back pain were related to back pain among bank workers (Kanyenyeri, Asiimwe, Mochana, Nyiligira & Habtu, 2017).

A systematic review and meta-analysis of 970 English-language articles published between 2010 and 2023 in sub-Saharan Africa found that 55.05% of the working population who visited health facilities reported low back pain in the previous years. Uganda had a higher prevalence (61.48%), while Ghana had a lower prevalence (34.48%). The study recommended that policymakers incorporate and strengthen strategies for the prevention and management of low back pain into each country's health system management guidelines. This is due to the significant global burden of disability-adjusted life years and the impact of low back pain on the quality of life for all population groups (Atalay, Gebeyehu, & Gelaw, 2024).

A study in Nairobi City County examined the impact of socio-demographic characteristics, sedentary lifestyle, and occupation-related factors on low back pain (LBP) among bank staff. A study conducted in 17 sub-counties involving 384 participants from over 10,000 bank employees showed LBP was prevalent among participants, with a duration of treatment of less than two years (Mutua, Waiganjo & Boit, 2023).

2.2 Prevalence of Lumbago among University staff

A study conducted at the University of Gondar Compressive Specialized Hospital in Ethiopia assessed the prevalence and associated factors of low back pain among 423 healthcare professionals. The results showed that over 50% of the participants who visited the facility were suffering from low back pain. Factors such as being female, frequent bending, prolonged standing, being a nurse, and being a physician were significant predictors of low back pain. The study suggests that the hospital should equip its staff with appropriate assistive devices to reduce the frequency of bending and twisting of healthcare workers (Negash, Todele, & Ferede, 2022).

A study in Thailand investigated the prevalence and risk factors of LBP among university staff. Data was collected from 1183 staff using self-administered questionnaires. The study found a 6-month prevalence of self-reported LBP of 22.3%. Habitual physical activity level was an independent factor associated with LBP, with athletic activity exerting a protective effect. This suggests that prevention programs should consider this risk factor to reduce LBP frequency and improve work efficiency among university staff (Khruakhorn, Srittipsakho, Siripakarn, & Vachalathiti, 2010).

The study by Salihu et al. (2021) investigated the prevalence of low back pain (LBP) among office workers in Kano, Nigeria. A cross-sectional study of 300 workers found a 65.3% prevalence of LBP among those who visited their health facility. The majority (54.4%) had a musculoskeletal disorder and hip pain. The majority had a bachelor's degree or above. The study suggests that proper posture and ergonomic chair use are crucial for preventing LBP. More educational programs are needed to equip office workers with knowledge of prevention measures.

A study by Bin et al. (2023) aimed to determine the prevalence of low back pain (LBP) among office workers visiting health facilities in Saudi Arabia. The research involved 604 workers aged 18 years or older, with 51.7% male and 43.5% aged 18-30. The prevalence of work-related LBP was 59.9%. Risk factors for LBP included being overweight, sleep disturbance, previous back trauma, increasing office work, changes to work habits, and frequent work stress. Protective factors included regular physical exercise and job satisfaction. The study concluded that occupational health and safety programs are crucial for ergonomically safe working conditions.

The study by Chaiklieng, Suggaravetsiri and Stewart (2023) found that 83.0% of university-based office workers experienced lower back pain (LBP) during a 12-month follow-up. Risk factors included a body mass index ≤ 25, poor back-pain preventive behavior, and inappropriate workstation width. Most workstations had lighting intensity below the standard requirements. To prevent LBP, ergonomics education, improved workspace design, better lighting, and increased staff physical fitness are necessary.

A study conducted at the University of Nairobi (UoN) found that low back pain (LBP) was prevalent among 136 teaching staff from June 2016 to May 2017. The study identified socio-demographic and work-related risk factors for LBP, including physical inactivity, sitting on lumbar supports, and high workplace stress. The study suggests that addressing these factors, along with regular physical activity, team-building activities, and investment in office infrastructure, can help mitigate the effects of LBP among teaching staff, a trend that is likely to be replicated in other higher learning institutions in Kenya (Diallo, Mweu, Mbuya, & Mwanthi, 2019).

2.3 Predisposing factors for lumbago

The study by Shiri et al. (2019) that aimed to identify risk factors for low back pain (LBP) and lumbar radicular pain in Finns aged 30 and above showed that LBP and lumbar radicular pain were more common in women and slightly declined with age. Obesity and workload factors increased the risk of both LBP and lumbar radicular pain. Walking or cycling to work reduced LBP risk, particularly for >30 days, with the most significant reductions among non-obese individuals and those not exposed to physical workload factors.

A systematic review and meta-analysis of 154 studies by Rizaei, Mousavi, Heshmati and Asadi, (2021) found that the lifetime prevalence of low back pain across various aspects was 54.8%. Factors such as age, gender, BMI, lack of regular physical activity, occupational factors, patient-related factors, body position at work, and stress were identified as the strongest risk factors.

A systematic review of risk factors for LBP or sciatica was conducted, focusing on the last 5 years. Out of 54 risk factors, 38 were significantly associated with increased risk. Adverse risk factors included individual characteristics, poor general health, spinal physical stress, and psychological stress. The study concluded that poor general health, physical and psychological stress, and individual characteristics increase the risk for future episodes of LBP or sciatica (Parreira, Maher, Steffens, Hancock& Ferreira, 2018).

2.4 Management of Lumbago

Various factors, including muscle strain, tight hamstrings, anterior pelvic tilt, weak abdominal muscles, herniated discs, and spinal stenosis can cause lower back pain. Muscle strain is a localized, acute injury characterized by pain that worsens with movement and improves with rest. Tight hamstrings can cause posterior pelvic tilt, which flattens the lumbar spine's natural curve and increases stress on the spinal discs and ligaments. A forward-tilted pelvis can cause lumbar lordosis and misalign spinal loading. Weak abdominal muscles, herniated discs, and spinal stenosis can also contribute to the condition. These conditions can lead to higher disability indices and reduced hip rotational range of motion (Hinge Health, 2024; Kim & Shin, 2023)

According to Zhou, Salman and McGregor (2024), there are diverse recommendations for different stages of lower back pain (LBP). For acute LBP, NSAIDs, therapeutic exercise, and spinal manipulation are recommended. For subacute LBP, NSAIDs, therapeutic exercise, and spinal manipulation were also suggested. For chronic LBP, therapeutic exercise, NSAIDs, spinal manipulation, and acupuncture were recommended.

Lumbago is often treated with NSAIDs, which can reduce inflammation and pain; however, they carry risks, such as gastrointestinal discomfort, dyspepsia, peptic ulceration, and bleeding.

Additionally, NSAIDs can increase blood pressure, heart attack, or stroke, especially in pre-existing conditions, and may cause renal impairment in susceptible individuals (Bally et al., 2017). Muscle relaxants and opioids are used to manage acute lumbago, but they can cause sedation, dizziness, drowsiness, and cognitive impairment. Opioids, while helpful in severe cases, carry risks of constipation, nausea, drowsiness, dependence, and addiction, making them a second- or third-line option. Both drugs can reduce spasm and discomfort, but may limit daily activities (Chou, 2007).

Invasive interventions like percutaneous disc procedures, spinal decompression, or spinal fusion can lead to potential complications like soreness, increased back pain, or temporary neurological symptoms. More extensive surgeries, like fusion, carry risks of infection, nerve injury, blood loss, anesthesia-related complications, failed back surgery syndrome, and hardware failure, which may result in persistent disability (Khalid, 2023).

2.5 Exercise therapy intervention for Lumbago

The Exercise is Medicine (EIM) initiative, launched in 2007 by the American College of Sports Medicine and the American Medical Association, aims to make physical activity assessment and promotion a standard in clinical care and disease prevention. It emphasizes regular physical activity as a vital sign, routinely assessed by healthcare professionals, and integrated into treatment strategies, aiming to bridge the gap between medicine and lifestyle modification (Lobela, Duperly & Frank, 2014). Exercise, therefore, offers therapeutic benefits in managing conditions like depression, arthritis, and chronic obstructive pulmonary disease. As a cost-effective, accessible, and multi-benefit intervention, exercise can complement or substitute pharmacological therapies (Booth, Roberts & Laye, 2012; Pederson & Saltin, 2015).

Studies show that exercise, when combined with education or behavioral components, can reduce pain and improve function for desk workers. Common workplace exercises include lumbar/core strengthening, general trunk endurance training, and flexibility/stretching routines for hip and hamstring musculature. These programs aim to correct muscular imbalances and improve spinal load tolerance, often resulting in improvements in pain and function after 6-12 weeks of supervised or semi-supervised programs (Passos, 2024; Gobbos, 2019).

Supervised exercise programs for office workers show larger effect sizes than unsupervised home programs due to improved exercise quality, progression, and adherence. Systematic reviews and meta-analyses highlight the importance of supervision and individualization in benefit. Digital and web-based delivery, including apps, web portals, and digital therapeutics, has emerged as a scalable model for desk-based populations, showing promising effects on pain, adherence, and self-reported function, mainly when digital programs include reminders, brief supervision/coaching, or biofeedback. Early work on digital lumbar-core exercise modules indicates feasibility and clinically meaningful improvements (Son, 2024).

Active-break interventions, such as regular breaks or guided micro-exercises, can reduce episodes of spinal pain among office workers. Combining exercise with ergonomic adjustments and education can improve outcomes related to pain and disability. However, adherence is challenging, and brief, frequent sessions, integrated into the workday or supported by digital reminders, can improve adherence and outcomes. Providing options like supervised sessions and home practice can increase uptake (Sharat, 2019).

Workplace exercise studies rarely report safety and adverse events, but high-quality trials emphasize screening for red flags and adapting intensity for chronic or severe pain. Recent trials show similar safety profiles but suggest better pain reduction with appropriately dosed strength/endurance training. Evidence gaps remain, making it challenging to define a single "best" protocol for computer workstation users. Practical recommendations include implementing a multimodal program centered on lumbar/core strengthening, short active breaks, and workplace education, with supervised or blended delivery (Oliveira, 2022).

3. Methodology

The review was conducted using a desktop review design approach to analyse relevant studies on the prevalence of Lumbago among computer workstation users. The search strategy included a comprehensive search of electronic databases such as Google Scholar, Semantic Scholar, and PubMed, focusing on articles published in the last 10 years. Keywords used in the search for relevant articles included low back pain, exercise is medicine, and computer users and exercise therapy; studies were included if they reported on the prevalence of Lumbago among computer workstation users across various industries and met specific quality criteria.

4. Results

Globally, the number of lumbago cases is on the rise, with 568.4 million cases in 2019 and an estimated 843 million by 2050 due to population growth and ageing (WHO, 2023; ASM, AB, & N, 2024). The economic impact of lumbago is significant. For instance, in the US, there were 264 million lost workdays due to back and neck pain in 2015 and $131.8 billion in annual earnings lost (Washington, DC, and National Academy Press (US)2020).

Predisposition to lumbago is attributed to the sedentary nature of IT jobs, prolonged computer use, poor ergonomic practices, prolonged sitting, poor ergonomic setups, lack of physical activity, and psychosocial and work-related stress (Kale, 2025; Manali & Ruchi, 2021; Davidson et al., 2024). A systematic review of Lumbago prevalence cases showed that out of all who visited health facilities, Bank and Office Workers indicated a 55.05% average LBP prevalence in sub-Saharan Africa; Ethiopia, 55.4%; Rwanda, 45.8%; Uganda, 61.48%, while Ghana had a lower prevalence of 34.48% (Atalay, Gebeyehu, & Gelaw, 2024); Workneh & Mekonen, 2021; Kanyenyeri, *et. al.,* 2017;Atalay, Gebeyehu, & Gelaw, 2024) compared to Dhaka, Bangladesh, at 36.6% rising to 64.3% in the 51–59 age group (Ali, Ahsan, & Hossain, 2020).

The prevalence of Lumbago varies significantly among university and academic staff globally, ranging from 41.1% to 72% across professions and demographics. For instance, in Ethiopia, over 50% of healthcare professionals reported lumbago (Negash, Todele, & Ferede, 2022); in Thailand, a 6-month prevalence of 22.3% was noted (Khruakhorn *et al.,* 2010); Nigeria exhibited a much higher prevalence at 65.3%, attributed to poor posture and ergonomic practices (Salihu et al., 2021), and Saudi Arabia at 59.9% (Zhang et al., 2013).

Risk factors for lumbago are multifaceted and include demographic, occupational, and lifestyle factors. Shiri *et al*. (2019) highlight obesity, workload, and female gender as key determinants, with physical activities like walking decreasing risk. Meta-analyses indicate that age, gender, body mass index (BMI), physical inactivity, stress, and ergonomics are significant predictors. Management comprises pharmacological options like NSAIDs, muscle relaxants, and opioids,

each with specific risks. NSAIDs are effective but can cause gastrointestinal and cardiovascular side effects, while opioids raise dependence concerns (Bally et al., 2017).

The Exercise is Medicine approach to management of lumbago is cost-effective (Booth, Roberts, & Laye, 2012). Supervised exercise programs outperform home-based ones, and integrated digital interventions are gaining traction. Combined exercise regimens that incorporate multiple exercise modalities result in significant pain reduction and improved quality of life (Tesfaye & Abebe, 2019; Mbada et al., 2014; Mwenda et al., 2013).

5. Discussion

There is evidence of rising rates of lumbago among other occupational hazards across age groups and professions (ASM, AB, & N, 2024). Many studies show varied regional prevalences in cases of lumbago cases. The majority of cases rely on clinical interventions in the management of lumbago (Chou, 2007; Khalid, 2023). The workplace environment is widely characterised by digitization and mechanization, promoting a lifestyle of physical inactivity. This is further aggravated by the nutrition transition, active transport, and increased screen time, which have caused a surge in hypokinetic conditions (Workneh & Mekonen, 2021). However, *the Exercise Is Medicine (EIM) concept initiated by the American College of Sports Medicine to integrate* exercise prescriptions in medical treatments where applicable has demonstrated to be a long-lasting solution to Lumbago. This approach not only manages hypokinetic conditions (with minimum side effects) but also prevents them altogether by increasing fitness levels (Ali, Ahsan, & Hossain, 2020).

EIM guidelines on the accurate diagnosis of lumbago is crucial for its effective management (Lobela, Duperly, & Frank, 2014). While clinical evaluation includes patient history, physical examination, and potential imaging studies that help differentiate between mechanical lumbago and other causes, such as disc herniation, it does not consider psychological factors, which can influence perception and chronicity of pain.

While a structured exercise programme can be designed to prevent various hypokinetic conditions, including lumbago, a tailor-made prescription of exercise can target specific conditions such as lumbago. This design will factor in the specific causes of Lumbago, various ways of presentation, and the activity index or fitness level of the patient. This is achieved by following principles of exercise to meet specific requirements of frequency, intensity, type, and duration of exercise, among others (Lobela, Duperly, & Frank, 2014).

For lumbago in particular, the principle of specificity should be followed to select exercises that target specific muscles that are involved either by addressing disuse (involves strengthening the core muscles and improving lumbar stability) or addressing muscle imbalances in terms of size, strength, and length to restore normality and functionality of all agonists, antagonists, and synergists. muscles. once the imbalance is addressed, the result is neutrality in spine alignment, hence no pain (Passos, 2024; Gobbos, 2019).

Therefore, integrating exercise into routine medical care will significantly enhance patient outcomes by contributing to the broader goal of public health (Booth, Roberts, & Laye, 2012; Pederson & Saltin, 2015). This strategy is appropriate as long as correct exercise dose response patterns are followed. Correlation between the amount of exercise (dose) and the magnitude of the therapeutic effect (response) needs to be carefully determined. Studies on lumbago suggest that regular moderate-intensity exercise (3-5 times per week) yields significant improvements

in pain and function. However optimal dose may vary based on individual entry level factors into the programme, and care must be taken to avoid overloading, which could make symptoms adverse (Sharat, 2019).

6. Recommendations

The review recommends the integration of exercise in the health management system. The programme should include health surveillance, with work environments modified to be ergonomically sound**.** The review also recommends the need to conduct experimental studies to determine exercise dose response patterns for the management of various conditions, and in particular for the management of lumbago.

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