

# Low Back Pain Among Healthcare Personnel in Saudi Arabia: A Systematic Review

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## Abstract

**Background:** Low back pain (LBP) is a complex condition with several determinants contributing to its occurrence. LBP is defined as pain that persists for 12 weeks or longer. The prevalence of work-related LBP among health-care personnel in Saudi Arabia affects both the healthcare personnel and the quality of patient care. **Aim:** The aim of this study was to review the epidemiology of LBP among the healthcare personnel in Saudi Arabia and wellness programs aimed at decreasing the rate of LBP. **Methods:** A systematic literature search was conducted using relevant keywords to search for studies conducted in Saudi Arabia regarding LBP among healthcare personnel. After selecting the inclusion criteria and epidemiological measures of LBP for the current research as well as obtaining full texts for the study, a total of 13 articles were used. **Results:** Thirteen studies were included in the current systematic review. Nurses and dentists were among the most vulnerable groups, constantly experiencing LBP due to long working hours, standing, as well as stress. Physical and occupational therapists and surgeons were experiencing LBP and generalized myalgia due to the work stress caused by the overcommitment at work and a high number of treated patients. Emergency medical services personnel reported a very high prevalence of musculoskeletal disorders. Based on the results of the reviewed studies, most of the participants experienced the prevalence of the LBP within the last 12 months. **Conclusion:** LBP has multifactorial risks, etiology, and increased evidence and prevalence among healthcare personnel in Saudi Arabia. The results show that there is good reason to conduct an in-depth study of available best practice interventions aimed at preventing LBP among healthcare personnel. Future studies in Saudi Arabia should focus on creating workplace wellness programs and on assessing risk factors as well as preventing LBP.

**Keywords:** Epidemiology, healthcare personnel, incidence, interventions, low back pain, prevalence, productivity rate, risk, Saudi Arabia, workplace wellness

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## INTRODUCTION

### Background

Low back pain (LBP) is a complex condition with several determinants contributing to its occurrence.<sup>[1-3]</sup> Chronic LBP is defined as pain that persists for 12 weeks or longer.<sup>[4]</sup> This could develop after an initial injury or even if the underlying cause of acute LBP has been treated.<sup>[4]</sup> LBP is a frequent public health concern that continues to increase and spread among many populations in developed and developing nations.<sup>[5]</sup>

Evidence in research indicates that there are three different groups of potential risk factors leading to LBP: (1) individual factors, such as body weight and age, (2) biomechanical factors, such as heavy physical load, lifting, twisted postures, and vibration, and (3) psychosocial factors, such as job control (i.e., self-sufficiency or autonomy at work) and job satisfaction.<sup>[1-3]</sup>

In the current literature, several studies have reported that LBP is considered as a work-related, constant, and repetitious complication. Many employees must remain at or return to work with the persistent painful symptoms of the problem.<sup>[6]</sup> Additional epidemiological and clinical studies do show that, although in pain, returning to work with persistent symptoms does not necessarily increase the risk of “reinjury.” LBP often improves during the first month, and patients are advised to stay active during this period and share their feelings about the pain. However, if the patients do not recover after self-care, it is recommended that physicians should perform non-pharmacological and non-surgical procedures. These include spinal manipulation, intensive interdisciplinary rehabilitation, exercise, acupuncture, massage therapy, yoga, cognitive behavioral therapy, and/or progressive relaxation.<sup>[4,7,8]</sup>

Job strain is accepted as a psychosocial workplace factor since it represents the combination of high psychological stresses and low decision autonomy.<sup>[9]</sup> Psychosocial factors relate not only to the medical expenses of healthcare, but also it can alter the opportunity to obtain medical care. At the same time, an environment without job

strain lowers the risk of cardiovascular disease, allowing employees more flexibility to have time for medical appointments.<sup>[9]</sup> Statistically, data has named ten of the most expensive physical health conditions, affecting employee productivity and business losses among Americans. They are angina pectoris, essential hypertension, diabetes mellitus, mechanical LBP, and acute myocardial infarction. Included in that list are chronic obstructive pulmonary disease, back disorders not specified as LBP, trauma to the spine and spinal cord, sinusitis, and diseases of the ear, nose, and throat or mastoid process. Accordingly, productivity losses among employees suffering from back pain may result in enormous expenditures for an employer due to absenteeism or low efficiency.<sup>[7]</sup>

### Prevalence and epidemiology

LBP is reported as a self-limited issue, a cause of disability, and incapability or reduced ability to work. Statistical data indicate that since the first signs of LBP, more than 50% of affected patients feel positive progress in 4–8 weeks. Still, the risk of recurrence of LBP symptoms is about 85% higher due to the complexity of the bony, muscular, ligamentous, and neural elements and the lack of specificity and high rates of early, spontaneous remission.<sup>[4,7-9]</sup> The frequency of LBP has reached epidemic numbers worldwide, affecting a huge 60%–80% of people during their life span.<sup>[10]</sup> It is believed that over 80% of the entire adult population will experience the symptoms of LBP during one’s lifetime. The condition of LBP often occurs in the workplace, and most employees experience symptoms during their careers.<sup>[1,3]</sup> The lifetime prevalence of LBP has been estimated to be approximately 60%–90% and is commonly considered a biopsychosocial phenomenon.<sup>[11-13]</sup> On the other hand, Krismer and van Tulder indicated that approximately 90% of workers return to work within 2 months of LBP episode.<sup>[12]</sup> Preventing new episodes or recurrences of LBP and also predicting workers who develop chronic LBP seems to be a logical approach to potentially reducing the impact of long-term disability.<sup>[1,3,11-13]</sup>

Medical history of recent trauma, red flags, chronic development, and the underlining conditions of

constant LBP should be considered while examining the patient.<sup>[11-13]</sup> Furthermore, workplace and workload that involve heavy lifting, bending, long sitting hours, heavy work, and long-distance driving may cause LBP. Other diseases and health conditions that may relate to LBP are obesity, pregnancy, and smoking that often increase the incidence of LBP. Further, LBP can be caused by tumors, either primary or secondary infections or fractures, which are either traumatic or spontaneous.<sup>[14]</sup>

Research has shown that LBP is not a disease but a group of symptoms and patients' medical history remain primarily unidentified.<sup>[1-4]</sup> Despite that finding, in most cases, the risk factors can be identified. Most treatments, initially, are focused on reducing the pain rather than finding a remedy. Furthermore, LBP causes challenges for medical and surgical professionals. The study reinforced the fact that at the same time, it results in a high socioeconomic burden in the budgets of many countries. The problem affects not only the elderly but also the adults of working age from 25 to 60 years of age. Furthermore, studies have found that the control and care of patients with LBP involve several influences. They are an accurate primary diagnosis, providing the intensive care needed to avoid potentially permanent difficulties and the proper therapy given by experienced professionals.<sup>[1-4,11-16]</sup> Simultaneously, when possible, patients should try to remain physically active. For those patients with complex comorbid conditions and depression, appropriate therapy should be prescribed. This should include exercises, multidisciplinary interventions, as well as any interventions used to treat employees with LBP. Summaries and outcomes of LBP prevention interventions and their effectiveness based on the existing evidence in literature are shown in Table 1.<sup>[1,3,11-16]</sup>

Several studies have been published with focused on the prevalence and risk factors for LBP among medical staff, especially among nurses, dentists, and physiotherapists. In addition, the healthcare organizations (i.e., hospitals) have categories of employees exposed to muscle tension, stress during work, and LBP.<sup>[17-20]</sup> LBP represents the primary type of occupational injury, especially in the healthcare

field, as it is found to be about twice more than other specialties. Data show that 18.7% of healthcare personnel with chronic LBP were using pain relief drugs and/or analgesics. In Saudi Arabia, the rate of LBP is not different from that in other parts of the world. Several studies addressed the prevalence of LBP among health-care personnel in different regions of Saudi Arabia. As such, in Riyadh, the lifetime prevalence of back pain among all healthcare personnel was 83.9%, in the eastern region of Saudi Arabia, 79%, and southwestern Saudi Arabia, the prevalence of LBP among healthcare workers in the past 12 months was 73.9%.<sup>[20-29]</sup>

Considering evidence set out in this section, this systematic review was aimed at reviewing the epidemiology of LBP among medical personnel in several occupations in Saudi Arabia and wellness programs aimed at lowering LBP's level.

## METHODS

A systematic literature search was conducted using relevant keywords to retrieve studies conducted in Saudi Arabia relating to LBP among healthcare personnel. Data were collected from journals indexed in PubMed and Scopus. Selection criteria depended on keywords of the reviewed article: LBP, Saudi Arabia, epidemiology, prevalence, healthcare personnel, incidence, rate, workplace wellness, interventions, and risk. The period of published studies' search was 2008–2019. The searches yielded 215 articles.

Additional sources included 10 articles, sourced from reference lists of review articles identified through the original database search strategy. After duplicates were removed, records were screened by title and abstract by the selection criteria before full-text articles were identified. In the last phase, the full text of recruited papers were critically analyzed to select only relevant studies.

Studies were included if they met the following inclusion criteria: heavy physical work, lifting, and forceful movements, bending and twisting, static work postures, long working hours, and interventions aimed at reducing LBP rates. Initial screening based on the title and abstracts to exclude

**Table 1: Summaries and outcomes of low back pain prevention interventions and their effectiveness based on the existing evidence in literature**

	Sick leave	Costs	Episodes of LBP	Pain	Other outcomes
Education	No evidence of effect	No evidence of effect	Limited evidence of no effect	No evidence of effect	Yes
Exercise	Limited evidence of effect	Limited evidence of effect	Limited evidence of effect	No evidence of effect	Yes
Back belts	No evidence of effect	No evidence of effect	Limited evidence of no effect	No evidence of effect	Yes
Multidisciplinary interventions	Limited evidence of no effect	No evidence of effect	No evidence of effect	Limited evidence of effect	Yes
Pamphlet	No evidence of effect	-	-	-	Yes
Treatment	Moderate evidence of effect	No evidence of effect	Limited evidence of effect	No evidence of effect	Yes

LBP: Low back pain

duplicates, articles without full text or out of the study's scope, resulted in 50 articles. The number of full-text articles extracted for a more detailed assessment was 15. The total number of studies included for a systematic review is 13. Study identification, screening, and eligibility based on the inclusion and exclusion criteria of the current systematic review are shown in Figure 1.

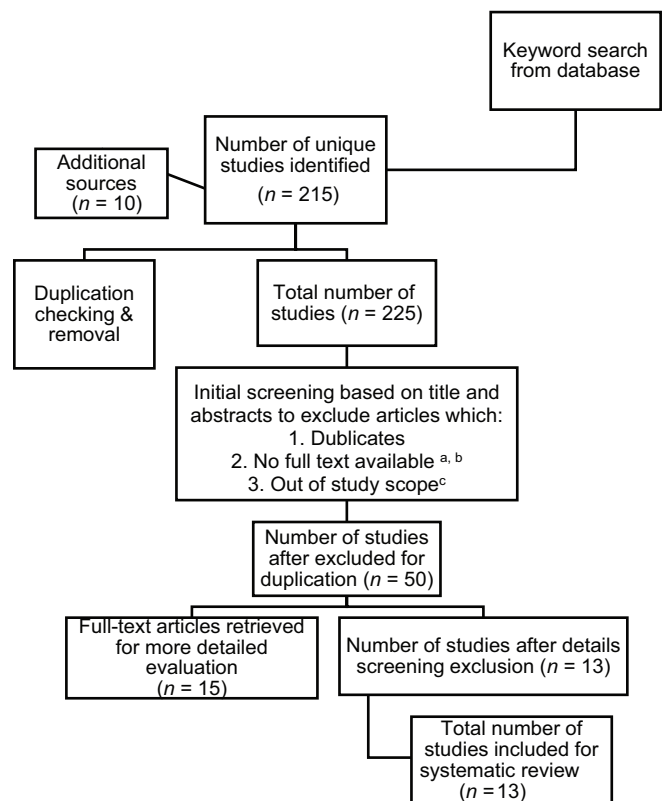
## RESULTS

A summary of the results is shown in Table 2.

A total of 13 studies were included in this systematic review aimed at reviewing the epidemiology of LBP among medical personnel in several healthcare occupations in Saudi Arabia and wellness programs aimed at addressing LBP. The results indicate that nurses and dentists were among the most vulnerable groups, constantly experiencing LBP complications due to long working hours, standing, as well as work-related stress.

### Nurses

Low back pain was particularly prevalent in nurses who were in direct contact with patients' care. LBP prevalence was 61% among those who complained of moderate and mild LBP for a week or more in Riyadh (Central region). Almost half of the participants from Taif (Western region) hospital ( $n = 61$ , 48.41%) were complaining of LBP. Female participants complaining of LBP were significantly more than male participants ( $P = 0.002$ ). LBP was the most commonly reported as work-related musculoskeletal disorders (WMSDs), with a frequency of 65.7% (95% confidence interval [CI]: 58.7%–72.1%) in Jeddah (Western region).<sup>[19-21]</sup>



**Figure 1:** Study identification, screening, and eligibility based on the inclusion and exclusion criteria of the current systematic review. <sup>a</sup>Excluded for review articles, conference proceedings, reports, abstracts, and fact sheets. <sup>b</sup>Accepted cross-sectional study, randomized controlled trials, case-control, modeling studies, and cohort/longitudinal study. <sup>c</sup>Studies excluded due to regional inconvenience

### Dentists

Musculoskeletal disorders represent a significant occupational health hazard for dentists that can have a potentially negative impact in terms of reduced work efficiency and productivity. It was found that increasing the length of working time without a 10-min break for more than 3 h is usually associated with increased pain and discomfort (86.4%) with the prevalence of LBP (81.8%) and neck



**Table 2: Characteristics and categorization of the included reviews relating to low back pain and risk factors among healthcare personnel in the KSA (2008-2020)**

#	Study (author, years)	Aims of the study	Setting/ population	Results	Discussion
1	Abduljabbar, T. A. (2008). MSDs among dentists in Saudi Arabia	To find out the prevalence and distribution of MSK symptoms among dentists in Dammam and Riyadh	<i>n</i> =140 dentists from the public dental service clinics in Dammam and Riyadh	It was found that increasing the length of working time without a 10-min break for more than 3 hours is usually associated with increased pain and discomfort (86.4%) with the prevalence of LBP (81.8%) and neck pain (77.3%). The prevalence of LBP within the last 12 months was 52.1%	The appearance of MSK symptoms among dental students, even after a relatively short clinical training period, suggests that ergonomics should be covered in the educational system to reduce risks to dental practitioners <sup>[17]</sup>
2	Devreux, I. C., Al-Awa, B., Mamdouh, K., and Elsayed, E. (2012). Relation of WMSDs and overcommitment of rehabilitation staff in Saudi Arabia	To identify the MSDs reported by physical and occupational therapists in the region of Jeddah and the relation to the level of overcommitment and work factors	<i>n</i> =166 physical and occupational therapists from Jeddah	LBP was the most commonly expressed symptom (13.9%), of which 50% was reported among the occupational therapists, and 57.7% among the physiotherapists. No indication of the prevalence of LBP within the last 12 months	Preventive strategies to adopt compensatory mechanisms by modifying body mechanics, monitoring the workload, but also analyzing the factors contributing to the overcommitment could be encouraged <sup>[18]</sup>
3	Dajah, S., and Al Daghdi, A. (2013). Prevalence and risk factors of LBP among nurses in Suydar region	To study the prevalence and risks of work-related LBP among nurses in the Suydar region, Riyadh	<i>n</i> =300 nurses at the Suydar region (Riyadh)	LBP was particularly prevalent in nurses who were in direct contact with patients' care in wards. LBP prevalence among the study group was 61% who complained of moderate and mild LBP for a week or more. No indication of the prevalence of LBP within the last 12 months	The main route for the prevention of LBP among nurses is likely to lie in improved ergonomics and psychological health in their workplace. Proper posture and correct transferring techniques in ward situations should be reinforced <sup>[19]</sup>
4	Keriri, H. (2013). Prevalence and risk factors of LBP among nurses in operating rooms, Taif, Saudi Arabia	To estimate the prevalence and to identify risk factors, pattern, and course of illness of LBP among nurses in operating rooms in Taif	<i>n</i> =126 nurses in operating rooms, Taif, KSA	Almost half of the participants, 48.41%, in the current study were complaining of LBP. Female participants complaining of LBP were significantly more than male participants ( <i>P</i> =0.002). No indication of the prevalence of LBP within the last 12 months	Different psychosocial risk factors should be examined in further study to test groups of healthcare workers regarding job satisfaction, work stress, and anger during the last days in association with LBP <sup>[20]</sup>
5	Attar, S. M. (2014). Frequency and risk factors of MSP in nurses at a tertiary centre in Jeddah, Saudi Arabia: A cross sectional study	To determine the frequency and risk factors of WMSDs among nursing personnel at a tertiary center in Jeddah	<i>n</i> =200 nurses from the tertiary center at King Abdulaziz University Hospital	LBP was the most commonly reported WMSD, with a frequency of 65.7% (95% CI: 58.7-72.1%). No indication of the prevalence of LBP within the last 12 months.	WMSDs are common among the nurses, and back pain is the most common symptom. Further studies are required to examine the best modality for decreasing the occurrence of WMSDs <sup>[21]</sup>
6	Aljanakh, M., Shaikh, S., Siddiqui, A. A., Al-Mansour, M., and Hassan, S. S. (2015). Prevalence of MSDs among dentists in the Ha'il region of Saudi Arabia	To investigate the prevalence of MSDs among dentists in the Ha'il region	<i>n</i> =68 dentists from the Ha'il region	The prevalence of MSDs among respondents was 77.9%, with the most commonly affected areas the lower back (73.5%), followed by the neck (66%), and the shoulders (43.3%). The prevalence of LBP and neck pain within the last 12 months was 45.2%	MSDs represent a significant occupational health hazard for dentists that can have a potentially negative impact in terms of reduced working efficiency and productivity. It is necessary to identify the causes of the MSDs and subsequently focus on appropriate preventive interventions that can help to reduce the prevalence of these problems <sup>[22]</sup>

Contd...

Table 2: Contd...

#	Study (author, years)	Aims of the study	Setting/ population	Results	Discussion
7	Al-Mohrej, O. A., AlShaalan, N. S., Al-Bani, W. M., Masuadi, E. M., and Almodaimegh, H. S. (2016). Prevalence of MSP of the neck, upper extremities and lower back among dental practitioners working in Riyadh, Saudi Arabia: A cross-sectional study	To estimate the prevalence of work-related MSK pain and investigate its associated risk factors among dentists in Saudi Arabia	<i>n</i> =224 dentists from Riyadh	LBP had the highest prevalence and was experienced by 68.1% of all dentists. Participants working for more than 2 h without a break are more likely to have neck and LBP. The prevalence of LBP within the last 12 months was 68.1%.	There is a high prevalence of MSK pain, in particular, LBP among Saudi dentists in Riyadh. Training courses covering occupational health, ergonomics, workplace organization, and psychosocial coping skills should be offered to dentists <sup>[23]</sup>
8	Alghadir, A., Zafar, H., Iqbal, Z. A., and Al-Eisa, E. (2017). Work-related LBP among physical therapists in Riyadh, Saudi Arabia	To determine the prevalence of work-related LBP and factors associated with and consequences of work-related LBP among physical therapists in Riyadh	<i>n</i> =600 members of the Saudi Physical Therapist Association in Riyadh	This study reported a prevalence of 89% for work-related LBP among PTs in the Riyadh. Among these, 39% were suffering from pain at the time of this survey. Of these, the majority, 26% females and 6% males, reported mild LBP. Only 3% of females reported severe LBP before practicing PT. No indication on the prevalence of LBP within the last 12 months	Clinicians should devise primary as well as secondary prevention strategies to treat therapists so that they can adequately care for patients. Work-related stress reduction and teamwork could decrease the risk of WMSD <sup>[24]</sup>
9	Algarni, A. D., Al-Saran, Y., Al-Moawi, A., Bin Dous, A., Al-Ahaideb, A., and Kachanathu, S. J. (2017). The prevalence of and factors associated with neck, shoulder, and low-back pains among medical students at university hospitals in Central Saudi Arabia	To determine the prevalence of neck, shoulder, and low-back pains and to explore the factors associated with MSP among medical students at university hospitals in central Saudi Arabia	<i>n</i> =469 medical students from university hospitals in Central Saudi Arabia	The prevalence of back pain was 40.5% in the past week and 67.0% in the past year. Seventy participants (14.9%) claimed to have sustained some form of trauma to the back; 24.7% claimed that back pain affected their life, and 13.4% consulted a physician, physiotherapist, or other health professionals because of back pain. The prevalence of LBP within the last 12 months was 67.0%	The present study also showed that 13.2%, 24.7%, and 11.3% of the participants claimed that neck, low back, and shoulder pains, respectively, affected their student's quality of life in the form of frequent absences from school and difficulties in performing their usual activities. Medical school authorities should be aware of this health issue and formulate corrective measures to control MSP related to medical students <sup>[25]</sup>
10	Aljerian, N., Alshehri, S., Masudi, E., Albawardi, A. M., Alzahrani, F., and Alanazi, R. (2018). The prevalence of MSDs among EMS personnel in Saudi Arabia, Riyadh	To determine how common is the MSD among the EMS personnel and its associated factors such as smoking, BMI, and place of work (field workers and hospital workers) in Saudi Arabia, Riyadh	<i>n</i> =360 EMS personnel in Riyadh	The result of the study showed a very high prevalence of MSDs. The highest was the low back (60.3%). This study found 37.2% suffered from LBP in their duty. A study reported about 47% suffering back pain while performing the job. The prevalence of LBP within the last 12 months was 60.3%	Most of the EMS personnel complain of LBP, and they are at higher risk of WRMSDs. The BMI is high, which escalates the MSDs, and they must be engaged in exercise programs. Smoke cessation program should be accessible for them. Manual handling techniques must be explained to reduce the risk of WRMSDs. Further researches are in need to assess their awareness about MSDs and WRMSDs <sup>[26]</sup>
11	Alsultan, A., Alahmed, S., Alzahrani, A., Alzahrani, F., and Masuadi, E. (2018). Comparison of MSP prevalence between medical and surgical specialty residents in a major hospital in Riyadh, Saudi Arabia	To compare surgical and nonsurgical specialties MSP prevalence, as well as assess whether certain factors contribute to their pain	<i>n</i> =140 surgical and nonsurgical physicians at King Abdulaziz Medical City, Riyadh	The majority of physicians suffered from either LBP (53%) or neck pain (39%). When asked to characterize exactly what they felt, 64% reported feeling general pain, and 18% felt stiffness in the affected areas. Only 26% had symptoms in the last 12 months and 24% had symptoms 7 days before the study	Occupational MSK comorbidities were prevalent issues and the cause of chronic pains, loss of working days, and care seeking. Therefore, attention must be paid to the work environment. The surgical staff were encouraged to be more aware of MSP's potential risk over time and should be trained in how to avoid or deal with muscle pain caused by work <sup>[27]</sup>

Contd...

Table 2: Contd...

#	Study (author, years)	Aims of the study	Setting/ population	Results	Discussion
12	Al-Ruwaili B., and Khalil T. (2019) Prevalence and associated factors of LBP among physicians working at King Salman Armed Forces Hospital, Tabuk, Saudi Arabia	To identify the magnitude, determinants, and sequence of the problem of LBP among physicians working at the King Salman Armed Forces Hospital, Tabuk, Saudi Arabia	n=254 physicians at the King Salman Armed Forces Hospital, Tabuk	Most physicians (76.4%) have experienced LBP. The prevalence of LBP within the last 12 months was 70.5%. All ophthalmologists and most emergency and anesthesia/intensive care physicians (88.9%) compared with only 14.3% of nephrologists and neurologists have expressed LBP in the last 12 months	Absence from work because of LBP in the last 3 months was mentioned by 15% of physicians, where bed rest and pain medications were the most commonly reported treatment modalities for LBP. Most affected physicians did not seek medical help and only used simple analgesics and heat/cold fomentations as mostly LBP is a mechanical procedure <sup>[28]</sup>
13	Al-Mohrej, O. A., Elshaer, A. K., Al-Dakhil, S. S., Sayed, A. I., Aljohar, S., AlFattani, A. A., and Alhussainan, T. S. (2020). WMSDs among Saudi orthopedic surgeons: A cross-sectional study	To approximate the prevalence and predictors of MSK pain among Saudi orthopedic surgeons working in Riyadh, Saudi Arabia.	n=179 of Saudi orthopedic surgeons in Riyadh	The prevalence of MSK pain was 67.0%. Among those who reported any MSK pain, the highest pain responses were those of LBP (74.0%). The second highest reported prevalence was neck pain, making up 58.2% of the reports. The prevalence of LBP within the last 12 months was 28.7%	MSK pain among practicing orthopedic surgeons in Saudi Arabia is a prevalent problem. Lower back and neck pain are the most pervasive sites involved. Orthopedic surgeons face many difficulties at work: from long hours in the operating rooms to an awkward body position during the patient's examination. The authors of the current study concluded that to further analyze and interpret the MSK pain among orthopedic surgeons, proper prospective studies should be carried out. Future studies should aim to reveal the physical and psychosocial predictors of pain initiation <sup>[29]</sup>

Main results and conclusions of the systematic review. LBP: Low back pain, WMSD: Work-related musculoskeletal disorder, CI: Confidence interval, MSD: Musculoskeletal disorder, MSK: Musculoskeletal, PT: Physical therapy, MSP: Musculoskeletal pain, BMI: Body mass index, EMS: Emergency medical services

pain (77.3%).<sup>[17]</sup> In the study by Aljanakh *et al.*, the prevalence of MSDs among respondents was 77.9%, with the most commonly affected areas the lower back (73.5%), followed by the neck (66%), and the shoulders (43.3%). Participants working for more than 2 h without a break are more likely to have neck and LBP.<sup>[17,21,22]</sup>

### Physical and occupational therapists

Studies conducted among the physical therapists (PT) and occupational therapists reported a prevalence of 89% for work-related LBP among PTs in Riyadh.<sup>[24]</sup> A study among physical and occupational therapists in Jeddah showed that LBP was the most reported symptom (13.9%), of which 50% were reported among occupational therapists, and 57.7% among physical therapists.<sup>[18,23,24]</sup>

### Surgical and nonsurgical specialties

Occupational musculoskeletal (MSK) comorbidities were prevalent issues and the cause of chronic pains, loss of working days, and treatment seeking.<sup>[24-26]</sup> The majority of physicians suffered from either LBP (53%)

or neck pain (39%). When asked to characterize what exactly they felt, 64% reported feeling general pain, and 18% felt stiffness in the affected areas.<sup>[27]</sup>

Musculoskeletal disorder pain among practicing orthopedic surgeons in Saudi Arabia is a prevalent problem. LBP and neck pain are the most pervasive sites involved. Among those who reported any MSK pain, the highest pain responses were those with LBP (74.0%). The second highest reported prevalence was neck pain, making up 58.2% of the reports.<sup>[28,29]</sup> Of the participants, 28.7% reported lower back pain more than five times during the previous year, as did the 22.6% of the sample population who reported neck pain. The literature further indicates, that orthopedic surgeons face many difficulties at work: from long hours in the operating rooms to an uncomfortable body position during the patient's examination. Absence from work because of LBP in the last 3 months was mentioned by 15% of physicians, where on bed rest and pain medications were the most commonly reported treatment modalities for LBP.<sup>[28,29]</sup>

Of thirteen articles, which are included in this study, only 8 studies indicated the incidence of LBP within the past 12 months (i.e., the study period of the reviewed articles). Of five articles, three studies were conducted among nurses from Riyadh, Taif, and Jeddah. Two studies, with no indication of LBP's prevalence within the last 12 months, were conducted among physical and occupational therapists. Two articles reported less than half of LBP within the last 12 months among orthopedic surgeons (28.7%) as well as surgical and nonsurgical physicians (26%). Among dentists, the prevalence of LBP within the last 12 months was 52.1% (Riyadh and Dammam), 45.1% (Ha'il), and 68.1% (Riyadh). A study conducted among medical students from university hospitals in Central Saudi Arabia reported that the prevalence of LBP within the last 12 months was 67.0%. More than half of the emergency medical services personnel respondents (60.3%) and physicians from Tabuk (70.5%) reported the prevalence of LBP within the last 12 months.<sup>[17-29]</sup>

## DISCUSSION

Low back pain is a multifactorial and debilitating disorder with high prevalence among healthcare personnel globally and in Saudi Arabia. LBP is exerting a substantial socioeconomic burden on healthcare systems, employers, employees, and individuals. In the present systematic review, the epidemiology of LBP among the healthcare personnel in Saudi Arabia and wellness programs aimed at decreasing the rate of LBP.<sup>[17-20]</sup> Studies were included after the systematic literature search and based on the inclusion and exclusion criteria; including healthcare personnel and their professional hazards, such as heavy physical work, lifting, and forceful movements, bending and twisting, long working hours, and static work postures. Work-related MSK problem is a prevalent health concern among healthcare personnel in Saudi Arabia, where the LBP and neck pain are the most pervasive sites involved.<sup>[1-5,17-27]</sup>

The comparison of the included studies confirmed previous evidence that work environment factors are closely related to the health, well-being, and professional activities of healthcare personnel.<sup>[17-27]</sup>

Moreover, there was some consistency in results, showing that workplace interventions, such as exercise, training, educational programs, and ergonomic desks and chairs, can reduce pain and symptoms for healthcare personnel staff experiencing LBP.<sup>[1,13,24]</sup>

This systematic review has identified high rates of MSDs among physicians, nurses, and dentists.<sup>[17-27]</sup> When asked whether the LBP complaints were related to their profession's nature, most healthcare personnel attributed their occupation as a foremost cause for their MSK complaints. Several risk factors contributed to the development of LBP in this review were identified, namely working more than 3 h without a break for 10 min, job-related stress, and workloads, specifically among nurses and dentists.<sup>[17-27]</sup> As such, LBP was the most commonly reported WMSDs among nurses from the tertiary center at King Abdulaziz University Hospital, with a frequency of 65.7% (95% CI: 58.7%–72.1%).<sup>[21]</sup> Furthermore, a study by Keriri reported that almost half of the nurses in operating rooms in Taif ( $n = 61$ , 48.41%) were complaining of LBP. Female participants complaining of LBP were significantly more than male counterparts ( $P = 0.002$ ).<sup>[20]</sup> LBP prevalence among nurses from the Suydar region (Riyadh) was 61%. The pain was either moderate or mild for a week or more.<sup>[19]</sup>

Studies conducted among dentists showed high rates of constant LBP due to long working hours, time spent standing, and back strain. It was found that increasing the length of working time without a 10-min break for more than 3 h is usually associated with increased pain and discomfort (86.4%) with the prevalence of LBP (81.8%) and neck pain (77.3%).<sup>[17]</sup> A study among dentists from the Ha'il region aimed to investigate the prevalence of MSDs reported that the prevalence of MSDs among respondents was 77.9% ( $n = 53$ ) with the most commonly affected area – lower back (73.5%).<sup>[22]</sup>

On the other hand, the higher prevalence of work-related LBP among physical therapists has been identified due to either extreme workloads or wrong MSK techniques used in treating patients (i.e., overloading muscles and joints during



treatment sessions, which increases the risk of developing disorders). Bent or twisted postures during patient transfers and positioning and mobilization of joints are considered additional factors reported to precipitate pain.<sup>[24]</sup> Thus, Alghadir *et al.* reported a prevalence of 89% for work-related LBP among physical therapists in Riyadh, and 39% were suffering from pain at the time of the study.<sup>[24]</sup> Study findings were similar to other international surveys from New Delhi, Great Britain, Kuwait, Canada, the United States, and Turkey.<sup>[24]</sup>

This systematic review (2008–2020) revealed the dire need for further and more thorough studies of workplace interventions for healthcare personnel experiencing regular LBP in Saudi Arabia. Further, the authors indicated that multifactorial intervention programs are necessary for the successful application and implementation of a wellness program that can increase productivity and reduce absenteeism.<sup>[17-29]</sup> In addition, they noted that ergonomic interventions, such as ergonomics of participation and adaptation at the workplace, an adaptation of work tasks, and adaptation of working hours, were effective in returning affected healthcare personnel to work. However, studies in this systematic review lack specific recommendations that could be adapted and implemented among the healthcare personnel in Saudi Arabia.

In summary, based on the results of studies included in this research and evidence from the previous international studies, LBP can be linked to occupational hazards common among healthcare personnel of Saudi Arabia in all regions and of various specialties.<sup>[1-5,17-29]</sup> This, of course, may vary due to workload and type. Nevertheless, the connection between the physical loads of work and LBP is multifactorial and can vary in different situations.<sup>[30]</sup> Thus, findings of the current systematic review indicate that high-quality interventions, including the systematic evaluation and ongoing monitoring procedures of LBP among Saudi healthcare personnel, will lead to increased efficiency in designing practical guidelines aimed at reducing the occupational hazards, MSDs, and particularly LBP.<sup>[1,9,17-29]</sup>

## CONCLUSIONS

There is an immediate need of scientific literature to recommend a specific intervention or program. Available data indicate that most representatives of healthcare personnel in Saudi Arabia do not perform specific exercises or physical activities and do not have proper rest hours for rehabilitation. One of the most common solutions for participants in studies reviewed was sick leaves. One of the main factors of a hospital's staff productivity is employee health and well-being; a healthy staff often results in successful and productive work.

Consequently, an appropriate assessment framework and research methods are needed that can reflect the complexity of interventions aimed at addressing LBP among Saudi healthcare providers and increasing their productivity, health status, and presentism. Improving the understanding of multi-factors that influence the decrease of LBP among healthcare personnel, and studying these factors will improve the performance of Saudi healthcare organizations (i.e., hospitals) and policymakers. This, in turn, will ensure an appropriate return to the work of healthcare personnel affected by LBP.

## Strengths and limitations

In the present systematic review, an attempt was made to draw a synopsis on the work-related LBP among healthcare personnel in Saudi Arabia and programs aimed at reducing the existing LBP numbers. However, the later was not clear. For example, reviewed studies indicated several intervention tools that might be useful (e.g., ergonomics and psychological health in the workplace). There was no indication of the specific programs and/or training that might be adapted among healthcare personnel. Furthermore, the conclusion was limited due to the small number of included studies in this review. Further research and comparison with international studies on LBP prevention and intervention programs could overcome these limitations.

## Authors' contributions

A.W. contributed to the literature search and manuscript writing; M.A. contributed to study design and critical review; A.N. - expert contribution and critical review; L.J. contributed to critical review;

M.H.- expert contribution and critical review; M.S. contributed to study design and critical review and overall supervision and correspondence.

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There are no conflicts of interest.

#### Compliance with ethical principles

Review was written as per institutional and national and international ethical guidelines.

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