

## Effect of physical and psychosocial factors on occupational low back pain

Emel Yilmaz<sup>1</sup>, Ozden Dedeli<sup>2</sup>

1. Assistant Professor, Department of Surgical Disease, Celal Bayar University School of Health, Manisa, Turkey

2. Assistant Professor Department of Internal Medicine, Celal Bayar University School of Health, Manisa, Turkey

### ABSTRACT

**Background:** Musculoskeletal pain, in particular low back pain, is one of the most common occupational health problems and accounts for a large number of workers' compensational days and disability in modern industrialised societies. It is believed that occupational musculoskeletal pain is caused by multiple factors, generally categorised into physical, psychosocial and lifestyle ones.

**Aims:** The aim of this review was to evaluate role of psychosocial and physical risk factors in work-related low back pain in the light of current literature.

**Methods and material:** The method of this review evaluated both research and review studies in national and international literature which about role of psychosocial and physical risk factors in work-related low back pain.

**Results:** Various physical factors mechanical impacts have been found to be associated with pain in different body regions. Heavy physical work, heavy or frequent manuel operations, repeated rotation of the trunk, whole body vibration and prolonged sitting were positively associated with low back pain. Psychosocial factors at work have also been shown to play important roles in the development of low back pain. Factors such as work demands, decision latitude, symptoms of stress and social support have been reported as important psychosocial factors at work. However, the causal and independent contribution of the work enviroment on the incidence of low back pain is stil debated, especially with regard to psychosocial factors.

**Conclusion:** A number of researchers have been examined the evidence for psychosocial factors at work as risk factors for back pain in recent years. It is recommended to be addressed psychosocial factors as physical factors as for management of work related low back pain.

**Key words:** Low back pain, psychological factors, social factors.

### CORRESPONDING AUTHOR

*Ozden Dedeli,*

*Celal Bayar,*

*University School of Health Istasyon Mevkii,*

*45020 Manisa-Turkey,*

*Tel: +902362391318*

*Email: ozdendedeli@yahoo.co.uk*

### INTRODUCTION

**B**ack disorders encompass a spectrum of condition, from those of acute onset and short duration of lifelong disorders, and include osteoarthritis, disc degeneration, osteoporosis, and common low back pain. Neck pain is an entity in and of itself. The prevalence of many of these disorders increases markedly with age, and many of the disorders are affected by lifestyle factors, such as obesity and certain types of physical activity. Although the economic and public health effects of back disorders and especially low back pain are enormous, epidemiologic research into the problem is in a formative stage, is the increasing number of older people throughout the world, the burden on the individual and society as a whole is expected to increase dramatically. While not a disease, back pain is a major cause of disability, especially in areas where compensation systems take it into cognizance.<sup>1,2</sup>

Low back pain (LBP) is usually defined as pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal folds, with or without leg pain (sciatica).<sup>1</sup> LBP is a major health problem around the world which accounts for considerable socioeconomic and health care burden.<sup>2</sup> The life time incidence of LBP has been

reported between 60-80 %, <sup>3,4</sup> and out of these incidents in about 80-90% cases pain subsides within first 2-3 months rest of the patients (around 10-20%) develop chronic pain syndromes.<sup>5</sup> Chronic low back pain patients comprises 73-77% of all the patients with lower back pain disorders.<sup>6,7</sup> Approximately 90% of cases of back pain have no identifiable cause and are designated as nonspecific. Many doctors order elaborate studies when nonspecific back pain is presented, including radiographs and magnetic resonance imaging. The results are little guidance to treatment decisions. Inconsistencies remain in the literature over the relative contributions of physical and psychological risk factors to the occurrence of back disorders and back pain. Relatively little is known about risk factors for the transition from acute to chronic LBP can be classified as individual, psychosocial, or occupational factors (Table 1).<sup>1</sup>

The presence and severity of LBP is associated with several socio-demographic factors, among them sex, age, education level, smoking, and occupation.<sup>8-10</sup> Studies on the association between occupational risk factors and low back pain are hampered by the difficulties of measuring specific exposures. Many studies are limited by

the absence of more quantitative measurements of manual material handling task parameters, and risk of low back injury may be entirely a result of the design of the workplace as opposed to individual differences among the workers.<sup>11</sup> Occupational factors be able to defined as workplace factors and others. Workplace factors including physical and psychosocial factors and their interaction, are strong determinants of back pain. Other factors such as heavy physical work, night shifts, lifting, bending, twisting, pulling, and pushing have often been associated with low back pain.<sup>10,12</sup> Psychological variables associated with low back include stress, distress, mood and emotions, cognitive functioning, pain behavior, and depressive disorder.<sup>13</sup> Numerous studies have explored and have identified associations between psychological factors or social factors or social factors and low back pain. These associations occur before the fact, i.e. in subjects who have yet to develop back pain, and after the fact, i.e. in patients who have developed back pain.<sup>14</sup> The many publications occupational LBP and have examined risk factors, it is the most expensive source of compensated work related injury in modern industrialised countries. Moreover, both the rate and the degree of disability accruing from

LBP are increasing worldwide.<sup>15</sup> Epidemiologic studies provide some support that psychosocial factors in the work environment are in fact related to LBP. The aim of this paper was to provide and review of the impact of physical, psychosocial factors, and psychological stress on occupational LBP.

### **Occupational risk factors for low back pain**

Musculoskeletal pain, in particular LBP, is one of the most common occupational health problems and accounts for a large number of workers' compensation days and disability in modern industrialised societies. LBP has been found to affect more workers and result in higher costs to industry than any other musculoskeletal disorders. Traditionally, the most widely investigated occupational risk factors for LBP have been biomechanical demands of the job. In more recent years, psychosocial characteristics of work have been investigated as potential risk factors for LBP. Each of these approaches has provided some evidence about the complex relationship among work tasks, work place environment, and LBP. A conceptual model of the potential relationships among psychosocial work characteristics, biomedical work demands, and LBP is presented in Fig 1.

Psychosocial factors (see pathway a) and biomechanical factors (see pathway b) may independently contribute to the etiology and progression of LBP. Psychosocial factors may also influence the relationship between biomechanical factors and LBP (see pathway c), such that biomechanical demands have a greater effect on LBP under poor psychosocial work conditions. Additionally, poor psychosocial work characteristics and high biomechanical demands may covary (e.g., tend to concentrate in similar jobs and occupations). This covariation (see pathway a) raises the possibility of confounding if both types of risk factors are not accounted for in risk models. Until fairly recently, biomechanical demands and psychosocial work characteristics were rarely investigated as risk factors for LBP within the same study.<sup>16</sup>

## **The association of physical and nonphysical factors with occupational low back pain**

The association of nonphysical factors with LBP has been one of the more robust findings in the literature reporting factors associated with LBP. Two factors, psychological state and aspects of work satisfaction, have been the main focus of

research. LBP has been consistently associated with neurotic signs such as depression, anxiety, and heightened somatic awareness in LBP sufferers drawn from patient populations. While several studies have suggested similar associations between psychological factors and LBP in nonpatient populations, the findings have not been consistent. Aspects of the work environment and work satisfaction have also been found to be associated with LBP in industrial and general population studies. Several studies have reported that sufferers of LBP and back injury claimants are more likely to be dissatisfied with their jobs, attract poor appraisal from supervisors, and be more likely to experience a poor psychosocial work environment, but contradictory findings have also been reported.<sup>15</sup> It is believed that occupational LBP is caused by multiple factors, generally categorised into biomechanical and psychosocial approaches.

The biomechanical approach has been based on the premise that physical aspects of the job contribute to LBP. Biomechanical factors have been hypothesized to cause LBP through two mechanisms: excessive load and repetitive loading on the spinal structures. Excessive loads can result

from lifting heavy loads, awkward postures, and high trunk velocities while repetitive loading results from an elevated number of lifting cycles over long period time. Biomechanical factors such as lifting, awkward postures, static postures, repetitive trunk motions, whole-body vibration, and heavy loads have been found to be risk factors for LBP. Loads on the spine that accompany the above risk factors have also been found to be moderately associated with LBP.<sup>16</sup> Psychosocial factors at work have also been shown to play important roles in the development of LBP. Important psychosocial factors included work demands and decision latitude, symptoms of stress, social support, type A behaviour, and psychological distress. After reviewing 59 relevant studies, Bonger et al.,<sup>17</sup> concluded that monotonous work, high perceived workload, time pressure, low control on the job, lack of social support from colleagues, and stress symptoms were related to musculoskeletal problems. Carayon et al.,<sup>18</sup> reviewed work organisation, job stress, and work related musculoskeletal disorders, and concluded that work organisation and psychosocial factors at work could contribute to upper extremity disorders. They further indicated that work organisation and ergonomic factors

might interact to affect the musculoskeletal system. Chen et al.,<sup>19</sup> explored the relation between psychosocial factors and musculoskeletal pain in Chinese offshore oil installation workers. According to results of this study, the prevalence of musculoskeletal pain over the previous 12 months varied between 7.5 % for elbow pain and 32 % for LBP; 56 % workers had at least one complaint significant associations were found between various psychosocial factors and musculoskeletal pain in different body regions after adjusting for potential confounding factors. Occupational stressors, in particular stress from safety, physical environment, and ergonomics, were important predictors of musculoskeletal pain, as was coping by eating behaviour. Eating behaviour coping styles as eating, drinking alcohol/tea/coffee, and smoking. Other coping styles, escaping/abreaction, external/social, and internal were also found to have an impact on pain in different body regions. Psychosocial factors at work have also been shown to play important roles in the development of LBP. Gaffari et al.,<sup>20</sup> tested the hypothesis that workplace psychosocial factors such as demand, control, support, job satisfaction and job appreciation can predict the future onset of disabling LBP in Iranian

industrial workers. A total of 744 subjects reported current LBP, a total of 52 new episodes of disabling LBP were observed during the 1-year follow-up. Male employers reported higher demands, lower control and lower support than female employers.

There are many studies have evaluate prevalence, etiology and the association of sociodemographic variables with occupational low back pain in Turkey but there are limited number of studies have tested the relationship between psychosocial factors and occupational LBP. In a study examined the level of depression and quality of life and their relationship with severity of pain in chronic low back pain patients. According to researchers the depression level and the pain severity are closely related in patients with chronic low back pain. Pain severity and the level of depression negatively affected the life quality and functional capacity of the patients.,<sup>21</sup> Demet et al.,<sup>22</sup> investigated low back pain of housewives and determined relationships between psychological status, education and physical health in housewives. The results of this study were the housewives with chronic back pain and do not exercise regularly limit activities of daily living and, the housewives' the level of

depression were high. In another study determined if there was a relationship between smoking and low back pain. Researchers concluded that smoking is not a risk factor for low back pain.<sup>23</sup> In view of the risky physical demands and psychosocial features of police work, policemen are at risk for low back pain. Beyaz & Ketenci<sup>24</sup> investigated occupational low back pain and therapeutic approaches in policemen. Policemen reported causes of LBP; non-ergonomic and worn-out seats, poor physical integration, previous low back pain, the time spent in the vehicle, personal occupational heavy equipment such as duty belt, stress and occupation years. Low back pain is a common problem in textile industry workers. In another study investigated the prevalence and risk factors of self reported low back pain among textile workers. The study population consisted of 1153 factory workers of which 84.7% were males. Twenty eight percent of the workers experienced at least once low back pain during the last six months. The prevalence of mechanical low back pain was 7%. Being female, working more than ten years in textile industry, smoking and working in the office were the risk factors for self-reported low back pain, and making exercise regularly

was a preventive factor. Workers who exercise regularly routine reported of low back pain.<sup>25-27</sup> Ozcan et al.<sup>28</sup> investigated the risk factors and the prevalence of occupational musculoskeletal pain in workers who working at metal work. The prevalence of musculoskeletal pain 83.0% in the last 12-months. The prevalence of complaints of pain in the last 12-months, 64.8% low back, 52.9% back, neck 48.0%. The risk factors of occupational musculoskeletal pain have been found that 20 kg load lifting, load-pulling, load-carrying. Occupational LBP is a very common complaint in the health care professionals. In a study determined the prevalence of occupational LBP, the association of personal and work related factors with occupational LBP in health care workers at the university hospitals. The results of this study were yearly back pain prevalence was 34.3% and chronic low back pain prevalence was 16%. Positive family history and smoking were found to be related to an increased risk of low back pain. Sex, weight, race, social status, history of pregnancy or sports activities and daily living activities were not found to be related to low back pain.<sup>29</sup> Yilmaz & Ozkan<sup>30</sup> determined the prevalence of LBP in nurses who working at the public hospitals. Researchers found that 39.9%

of the nurses had experienced an episode of LBP and statistical correlation between LBP and working period, sleep regime and income level. In another study described musculoskeletal problems resulting from work setting and occupation in medical doctors who work in a hospital. Researchers established that 41 of 123 subjects had at least one musculoskeletal problem resulting from work setting and working so long time with the same position and repeating the same activities during work day lead to a risk factor about musculoskeletal problems in medical doctor.<sup>31</sup>

### **Conclusion**

Although there are enough studies related to effect of psychosocial factors on occupational LBP in our country, psychosocial factors play an important role in low back pain is now well documented and generally accepted. A person' ability to recover may be determined by such things as motivation, ambitions, social support, attitude at work and family dynamics. The development of occupational LBP are effective physical factors as well as psychosocial factors. According to findings of review studies may be suggested that occupational LBP may be improved by management of

psychological distress, provide of social support, develop of positive coping styles, evaluate of depression, burnout, job satisfaction.

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## ANNEX

**Table 1. Risk factors for occurrence of non-specific back pain and chronicity**

	<b>Occurence</b>	<b>Chronicity</b>
<b>Individual</b>	Age	Obesity
	Gender	Educational level
	Smoking	High levels of pain/disability
	General health	Health care provider attitudes
	High birth weight (males)	Unemployment
<b>Psychosocial factors</b>	Stress	Distress
	Pain behavior	Depressive mood
	Depressive mood	Somatization
	Cognitive functioning	Baseline long duration of pain Fear-avoidance behavior
<b>Occupational factors</b>	Manual handling of materials	Job dissatisfaction
	Monotonous tasks	Unavailability of light duty
	Control at work	Lifting for more than three fourths of the day
	Job dissatisfaction	
	Social support/work relations	
	Night shifts	
	Bending and twisting	
	Whole-body vibration	

**Fig. 1. Conceptual model of the relationship between psychosocial and biomechanical risk factors and LBP (Davids & Heaney, 2000).**

