Original Research Article

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A study on the prevalence and risk factors of low back pain among industrial workers in Bangladesh

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Abstract

Introduction: Low back pain (LBP) is one of the prevalent work-related musculoskeletal disorders, leading to reduced productivity and functional impairment among workers, especially in industries where the job is demanding. The purpose of this study is to identify the prevalence of LBP among workers in industries in Bangladesh and the associated risk factors.

Methods: The study was a cross-sectional study that was done among 52 industrial workers in the country of Bangladesh from January 2024 to December 2024. The data collection was based on a pretested structured questionnaire covering socio-demographic variables, occupational characteristics, individual risk factors, and the presence and severity of pain in the lower back. The data were analyzed using the Statistical Package for the Social Sciences version 25.0.

Results: In the study involving 52 industrial workers, the dominant participants were males (78.8%), aged between 31 and 40 years (40.4%), and performed manual/heavy work (55.8%), with 65.4% of them working more than 8 h daily and 69.2% having worked with the company for more than 5 years. Results showed that LBP occurred commonly among 63.5% of the industrial workers. LBP was associated significantly with age over 40 years and work duration ($P < 0.05$), while obesity and smoking were not significant.

Conclusion: Lower back pain was found to be quite prevalent (63.5%) among the industry workforce in Bangladesh and had strong associations with strenuous work activities, increasing age, and increasing service duration. The major contributing factors from the occupational point of view included heavy lifting, frequent bending, prolonged standing, and inadequate rest intervals.

Keywords: Industrial workers, low back pain, occupational exposure

Introduction

Lower back pain (LBP) is among the most prevalent musculoskeletal conditions as well as one of the main causes of disability across the world. Using the Global Burden of Disease study, it is observed that LBP is still the single most important contributor to years lived with disability for all age groups. This puts an important burden on people as well as health care systems as well as countries' economy.[1] The incidence of LBP is most significant among young to middle-aged people who are generally in their prime age group and thus an important concern with respect

to occupation.[2] Occupational exposure is an important contributing factor with respect to LBP. Workers in industries are most frequently subjected to ergonomic risk factors such as heavy lifting, repetitive movements, bad postures, prolonged standing or sitting, whole-body vibration, as well as poor work surroundings.[3] Industrial workers are also most frequently subjected to ergonomic risk factors such as lifting, recurrent movements, bad postures, prolonged standing or sitting, whole-body vibrations, as well as poor work surroundings. These factors lead to cumulative spinal loading or muscle fatigue due to which LBP may develop.[4] Besides these factors, psychosocial factors such as dissatisfaction in work place, work pressure, long working hours, as well as lack of rest also increase LBP among workers.[5] The global incidence of work-related LBP among industrial as well as manual workers is between 40% and over 70%, depending on work as well as work surroundings.[6] In low as well as middle-income countries, due to lack of proper health care as well as poor ergonomics in work surroundings, LBP is underestimated as an important concern with respect to industries as well as health care.[7] Workers in these countries continue their work even in LBP due to which chronic LBP as well as productivity is decreased. Over the past few decades, industries in countries like Bangladesh have grown in leaps as well as bounds in important sectors such as garment industries, manufacturers, construction industries, as well as transport industries employing millions of workers. Despite this growth, important aspects like health care in industries continue to lack in respect to industries employing workers in important sectors due to which workers are subjected to prolonged work as well as poor work surroundings.[8] Studies also carried out in countries like Bangladesh have reported important significant increase in the incidence of important health care conditions like musculoskeletal conditions among which LBP is an important significant complaint among workers due to which important significant concern as well as causes in important sectors.[9] In a cross-sectional study of industrial workers in Dhaka, it was found that over 60% of the workers suffered from LBP, significant associations were found with respect to age, experience, prolonged hours of work, frequent bending, and lifting.[10] To design preventive programs, it is crucial to comprehend the prevalence and contributing factors for LBP in industrial workers. The aim of this study is to find the prevalence of LBP in industrial workers in Bangladesh.

Methods

This cross-sectional study was conducted among 52 industrial workers in Bangladesh, from January 2024 to December 2024, with an objective to establish the prevalence of LBP and its related risk factors. Workers aged ≥18 years who had been employed for at least 6 months were included using a convenient sampling technique, while those with a history of spinal trauma or known spinal pathology were excluded. The data collection was based on a pretested structured questionnaire covering socio-demographic variables, occupational characteristics, individual risk factors, and the presence and severity of pain in the lower back. The anthropometric measurements were used to calculate the body mass index. Data were entered and analyzed using the Statistical Package for the Social Sciences version 25.0. In the data analysis, descriptive statistics have been used to summarize variables, and appropriate inferential tests were used to assess the associations between LBP and potential risk factors, considering $P < 0.05$ as statistically significant. Ethical approval was obtained from the relevant authority, and informed written consent was taken from the participants before data collection.

Results

The majority of participants were aged between 31 and 40 years (40.4%), followed by those aged over 40 years (32.7%). Male workers constituted the predominant proportion of the study population (78.8%). Regarding educational status, 40.4% had attained secondary or higher education, while 23.1% had no formal schooling [Table 1].

More than half of the workers (55.8%) were engaged in manual or heavy labor, while 28.8% performed machine-based tasks. A substantial proportion (65.4%) reported working for more than 8 h per day. In addition, 69.2% of participants had an employment duration exceeding 5 years [Table 2].

LBP was reported by 63.5% of the participants, whereas 36.5% did not report any history of LBP during the study period, indicating a high overall prevalence among industrial workers [Table 3].

LBP was more frequently observed among workers exposed to occupational risk factors such as heavy lifting (78.8%), frequent bending or twisting movements (72.7%), inadequate rest breaks (66.7%), and prolonged standing (63.6%) compared to those without such exposures [Table 4].

LBP was significantly more common among workers aged over 40 years and those with an employment duration exceeding 5 years ($P < 0.05$). Although higher proportions of LBP were observed among overweight workers and smokers, these associations were not statistically significant [Table 5].

Among participants reporting LBP, 45.5% experienced moderate pain, while 12.1% reported

Table 1: Sociodemographic characteristics of the study participants (n=52)

Variable	Frequency	Percentage
Age group (years)		
≤30	14	26.9
31–40	21	40.4
>40	17	32.7
Sex		
Male	41	78.8
Female	11	21.2
Education level		
No formal education	12	23.1
Primary	19	36.5
Secondary or above	21	40.4

Table 2: Occupational characteristics of the participants (n=52)

Variable	Frequency	Percentage
Type of work		
Manual/heavy labor	29	55.8
Machine-based	15	28.8
Mixed duties	8	15.4
Working hours/day		
≤8 h	18	34.6
>8 h	34	65.4
Duration of employment		
≤5 years	16	30.8
>5 years	36	69.2

Table 3: Prevalence of low back pain among industrial workers (n=52)

Low back pain status	Frequency	Percentage
Present	33	63.5
Absent	19	36.5

Table 4: Work-related risk factors associated with low back pain (n=52)

Risk factor	LBP present *n* (%)	LBP absent *n* (%)
Prolonged standing	21 (63.6)	7 (36.8)
Frequent bending/twisting	24 (72.7)	6 (31.6)
Heavy lifting	26 (78.8)	8 (42.1)
Inadequate rest breaks	22 (66.7)	6 (31.6)

LBP: Low back pain

Table 5: Association between individual factors and low back pain among industrial workers (n=52)

Factor	LBP present *n* (%)	LBP absent *n* (%)	*P*-value
Age>40 years	14 (42.4)	3 (15.8)	0.040*
Employment duration >5 years	26 (78.8)	10 (52.6)	0.044*
Overweight (BM I ≥25 kg/m²)	12 (36.4)	4 (21.1)	0.212
Smoking	15 (45.5)	6 (31.6)	0.259

*Statistically significant at P<0.05. BMI: Body mass, LBP: Low back pain

severe pain. More than half of the affected workers (57.6%) indicated some degree of work-related functional limitation due to LBP [Table 6].

Discussion

In the current study, the point prevalence of LBP among industrial workers was found to be 63.5%, reflecting nearly two-thirds of workers suffered from LBP. This very high prevalence is closely supported by the findings of Chowdhury *et al*., from Bangladesh, who estimated an LBP prevalence of 62.0% among low-income industrial workers of Dhaka.[10] While another study conducted among industrial workers from Ethiopia reported a prevalence of 58.9%.[11] The slightly higher prevalence in the current study could be explained by longer working hours and a higher manual worker proportion in our sample, reaffirming that industrial occupation entails a high risk for LBP. With regard to occupational exposure, the current study showed that among workers having LBP, 78.8% were doing heavy lifting, 72.7% reported doing frequent bending or twisting, and 63.6% reported standing for long periods. In comparison, Chowdhury *et al*. reported that 74.6% of workers with LBP were exposed to heavy lifting and 69.3% to frequent bending.[10] Similarly, Wami *et al*. observed that 71.2% of workers exposed to awkward postures reported LBP.[11] These comparable values suggest that biomechanical stressors such as lifting and repetitive spinal movements consistently contribute to LBP across industrial settings. Age was a significant determinant in the present study, where 42.4% of workers aged over 40 years reported LBP, compared to 15.8% among those without LBP ($P = 0.040$). Hartvigsen *et al*. also highlighted that the prevalence of LBP increases progressively with age due to cumulative spinal degeneration and reduced muscular resilience.[2] The close similarity in age-related prevalence supports the role of biological aging combined with occupational exposure in LBP development. Employment duration was another significant factor in our study. Among workers with LBP, 78.8% had been employed for more than 5 years, compared to 52.6% among those without LBP ($P = 0.044$). Chowdhury *et al*. reported that 81.0% of workers with more than 5 years of industrial employment suffered from LBP.[10] Likewise, da Costa and Vieira found that long-term exposure to physical workload significantly increased the risk of chronic musculoskeletal disorders.[3] These findings emphasize the cumulative effect of prolonged occupational exposure on spinal health. In the present study, 36.4% of overweight workers reported LBP compared to 21.1% among non-overweight workers, although this association was not statistically significant. Shiri *et al*., in a meta-analysis, reported that overweight individuals had a 33% higher risk of developing LBP compared to those with normal BMI.[12] The lower magnitude and lack of significance in our study may be related to the small sample size and the dominant effect of occupational factors. Similarly, 45.5% of smokers in our study reported LBP compared to 31.6% of non-smokers, though this association was not statistically significant. Shiri *et al*. reported that smokers had a 1.3-fold increased risk of LBP compared to non-smokers.[12] The weaker association in our study may reflect underreporting or confounding by physical workload.

Table 6: Severity and functional impact of low back pain among affected workers (n=33)

Variable	Frequency	Percentage
Pain severity		
Mild	14	42.4
Moderate	15	45.5
Severe	4	12.1
Work limitation due to LBP		
Yes	19	57.6
No	14	42.4

LBP: Low back pain

Limitations of the study

The study was conducted in a single hospital with a small sample size. Hence, the results may not represent the whole community.

Conclusion

LBP was highly prevalent (63.5%) among industrial workers in Bangladesh and was strongly associated with physically demanding work, older age, and longer employment duration. Occupational factors such as heavy lifting, frequent bending, prolonged standing, and inadequate rest played a major role.

Recommendations

Regular ergonomic assessment of workstations, training on proper lifting techniques, ensuring adequate rest breaks, and implementing workplace health education programs are recommended to reduce the risk of low back pain among industrial workers. Periodic health screening and early intervention, particularly for older and long-serving workers, should also be prioritized to prevent chronic disability.

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