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PREVALENCE AND CLINICAL CORRELATES OF CHRONIC LOW BACK PAIN AMONG HEALTHCARE WORKERS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Chronic low back pain (CLBP) is an important occupational health problem among healthcare workers because their work frequently involves patient handling, heavy lifting, prolonged standing, repetitive bending, awkward posture and extended working hours. The study aimed to determine the prevalence, clinical characteristics and associated factors of CLBP among healthcare workers at a tertiary-care hospital.

Materials and Methods: This hospital-based analytical cross-sectional study included 120 healthcare workers selected from different professional categories. Sociodemographic, lifestyle and occupational information was collected using a structured questionnaire. CLBP was defined as low back pain persisting or recurring for more than 12 weeks. Pain intensity was evaluated using the Numerical Rating Scale, and functional disability was assessed using the Oswestry Disability Index. Associations were examined using the chi-square test, Fisher's exact test and univariable binary logistic regression. Odds ratios with 95% confidence intervals were calculated, and $p<0.05$ was considered statistically significant.

Results: The mean age was 38.74±9.36 years, and 59.2% of participants were female. The prevalence of CLBP was 39.2% (95% CI: 30.9%-48.1%), while the 12-month and lifetime prevalence rates of any LBP were 60.8% and 68.3%, respectively. CLBP was most frequent among ward attendants/support staff (47.6%) and nurses (46.9%). Among 47 affected workers, 72.3% had predominantly axial pain, 59.6% had recurrent symptoms and 66.0% had moderate pain. The mean pain score was 5.43±1.72, and the mean Oswestry Disability Index was 28.60±12.90%. Moderate disability occurred in 51.1%, while 46.8% reported sickness absence. Workers lost an average of 6.80±4.90 working days during the preceding year. Frequent bending or awkward posture (OR=4.97; 95% CI: 2.18-11.30) and frequent patient or heavy-load lifting (OR=4.97; 95% CI: 2.21-11.17) showed the strongest associations. Lack of ergonomic training (OR=3.41), inadequate rest breaks (OR=3.39), extended working hours (OR=3.13) and occupational stress (OR=3.72) were also significantly associated with CLBP.

Conclusion: CLBP was prevalent among healthcare workers and was associated with clinically meaningful pain, functional disability and loss of working days. Nurses and support staff experienced the greatest burden. Modifiable ergonomic, workload and lifestyle-related factors were strongly associated with CLBP, highlighting the need for safe patient-handling systems, ergonomic training, adequate rest periods, workplace exercise and early rehabilitation.

Keywords: Chronic low back pain; Healthcare workers; Occupational risk factors.

INTRODUCTION

Low back pain (LBP) is one of the most common musculoskeletal disorders and a leading cause of disability worldwide. It is generally defined as pain or discomfort occurring between the lower margin of the twelfth rib and the gluteal folds, with or without radiation to the lower limbs. LBP persisting or recurring for more than 12 weeks is classified as chronic low back pain (CLBP).[1] The Global Burden of Disease Study estimated that approximately 619 million people experienced LBP in 2020, and this number is projected to increase to nearly 843 million by 2050 because of population growth and ageing.[2] Chronic LBP may restrict mobility, disturb sleep, impair psychological well-being, reduce quality of life and lead to absenteeism, reduced productivity and increased healthcare expenditure.

Healthcare workers are particularly susceptible to LBP because their occupational responsibilities frequently involve manual patient handling, lifting or transferring dependent patients, prolonged standing, repetitive bending, twisting, awkward postures and extended working hours. Nurses, ward attendants, technicians and other clinical personnel may be exposed to greater physical demands, whereas doctors, administrative healthcare personnel and laboratory workers may experience prolonged sitting, poor workstation ergonomics and psychosocial stress. A systematic review by Rezaei et al. reported that individual characteristics, occupational workload, patient handling, awkward posture, psychological stress and inadequate ergonomic practices were important determinants of LBP among healthcare providers.[3]

The development and persistence of CLBP are multifactorial. Sociodemographic and lifestyle factors such as increasing age, female sex, elevated body mass index, smoking, insufficient physical activity and comorbid illness may interact with occupational factors such as longer duration of employment, shift duties, high workload, inadequate rest periods, frequent lifting and lack of ergonomic training.[3,4] Recent research among nurses has demonstrated a high prevalence of LBP and substantial consequences, including reduced daily activity, healthcare consultations, sick leave and modification of work duties.[5] However, prevalence estimates differ considerably according to the professional category, healthcare setting, case definition and assessment instrument used. Furthermore, studies specifically examining chronic rather than short-duration LBP among different categories of healthcare workers remain limited. Determining the prevalence, clinical characteristics, functional disability and occupational correlates of CLBP is therefore important for identifying high-risk groups and developing appropriate ergonomic, preventive and workplace-health interventions. The present study was undertaken to estimate the prevalence of CLBP and evaluate its clinical, personal and occupational correlates among healthcare workers.

Aim

To determine the prevalence and clinical correlates of chronic low back pain among healthcare workers at a tertiary-care hospital.

Objectives

1. To estimate the prevalence of chronic low back pain among healthcare workers.
2. To assess the clinical characteristics, pain severity and functional disability associated with chronic low back pain.
3. To determine the sociodemographic, lifestyle-related and occupational factors associated with chronic low back pain among healthcare workers.

MATERIALS AND METHODS

Source of Data

The study participants were healthcare workers employed at a tertiary-care teaching hospital. Participants included doctors, nurses, laboratory and radiology technicians, physiotherapists, pharmacists, ward attendants and other eligible allied healthcare personnel. Primary data were obtained directly from participants using a structured questionnaire, clinical assessment and validated instruments for evaluating musculoskeletal symptoms, pain intensity and disability.

Study Design

A hospital-based analytical cross-sectional study was conducted.

Study Location

The study was conducted in the clinical, diagnostic and support departments of a tertiary-care teaching hospital. Participants were recruited from outpatient departments, inpatient wards, operation theatres, intensive care units, emergency services, laboratories, radiology units, pharmacies and other allied healthcare departments.

Study Duration

The study was conducted over six months, from January 2026 to June 2026, including participant recruitment, data collection, data verification and statistical analysis.

Sample Size

A total of 120 healthcare workers were included. The sample size was estimated using the formula for a single population proportion:

$$n = \frac{Z_{1-\alpha/2}^2 \times p \times (1-p)}{d^2}$$

Where:

- n = required sample size
- $Z_{1-\alpha/2}$ = 1.96 at 95% confidence level
- p = anticipated prevalence of LBP among healthcare workers, taken as 58%
- $q = 1 - p = 42\%$
- d = absolute precision of 9%

$$n = \frac{(1.96)^2 \times 0.58 \times 0.42}{(0.09)^2} = 115.5$$

The calculated sample size was rounded upward, and 120 healthcare workers were enrolled. Participants were selected through proportionate stratified sampling according to professional category, followed by systematic or simple random selection from departmental staff lists.

Inclusion Criteria

- Healthcare workers aged 18 years or older.
- Doctors, nurses, technicians, physiotherapists, pharmacists, ward attendants OT staff No and other allied healthcare personnel directly employed at the study institution.
- Healthcare workers who had completed at least six months of service at the institution.
- Participants who were available during the data-collection period.
- Participants who provided written informed consent.

Exclusion Criteria

- Healthcare workers with a history of congenital spinal deformity or previously diagnosed inflammatory spinal disease.
- Participants with spinal tuberculosis, vertebral malignancy, pathological fracture or recent major spinal trauma.
- Participants who had undergone spinal surgery.
- Pregnant healthcare workers.
- Participants experiencing acute LBP for less than 12 weeks without a history of persistent or recurrent chronic symptoms.
- Participants who were seriously ill or unable to complete the assessment.
- Participants who declined consent or returned substantially incomplete questionnaires.

Operational Definition

Chronic low back pain was defined as pain, muscular tension or stiffness localised between the lower margin of the twelfth rib and the gluteal folds, with or without radiation to the lower limbs, which persisted continuously or recurred for at least 12 weeks.[1]

Procedure and Methodology

Eligible healthcare workers were approached without disrupting their routine duties. The purpose, procedure, expected benefits and voluntary nature of participation were explained, and written informed consent was obtained.

A structured, pretested questionnaire was administered through face-to-face interviews or supervised self-administration. The questionnaire contained the following sections:

1. **Sociodemographic information:** age, sex, marital status, educational level, professional category and socioeconomic characteristics.
2. **Lifestyle and health-related information:** smoking, alcohol consumption, physical activity, sleep duration, known chronic diseases, history of trauma and previous episodes of LBP.
3. **Occupational characteristics:** department, total duration of employment, average weekly working hours, shift and night duties, prolonged sitting or standing, repetitive bending or twisting, manual handling of patients, lifting of heavy objects, availability of lifting devices, adequacy of rest breaks and previous ergonomic training.
4. **Low back symptoms:** The low-back section of the Standardised Nordic Musculoskeletal Questionnaire was used to determine the presence and consequences of low back symptoms.[5]
5. **Pain assessment:** Among participants with CLBP, current and average pain intensity during the preceding week were recorded using an 11-point Numerical Rating Scale ranging from 0 ("no pain") to 10 ("worst imaginable pain"). Pain was classified as mild (1-3), moderate (4-6) or severe (7-10).
6. **Functional disability:** The Oswestry Disability Index was used to assess the effect of CLBP on daily functioning. The percentage score was interpreted as minimal disability (0%-20%), moderate disability (21%-40%), severe disability (41%-60%), crippled (61%-80%) or bedbound/exaggerated symptoms (81%-100%).

Participants reporting CLBP underwent a focused clinical assessment. Height and weight were measured using standardised instruments, and body mass index was calculated as weight in kilograms divided by height in metres squared. The assessment included the site, duration, frequency and radiation of pain; aggravating and relieving factors; limitation of movement; neurological symptoms; tenderness; spinal range of motion and straight-leg-raising test, where clinically indicated. Red-flag symptoms such as unexplained weight loss, fever, bladder or bowel dysfunction, saddle anaesthesia, progressive limb weakness, major trauma and night pain were specifically enquired about. Participants with red-flag findings were advised to obtain appropriate specialist evaluation and were not labelled as having nonspecific CLBP solely on the basis of the questionnaire.

The questionnaire was pretested among approximately 10% of the proposed sample in healthcare workers who were not included in the final analysis. Necessary corrections were made to improve clarity, sequence and feasibility. The same assessment protocol was applied to all participants to minimise observer variation.

Sample Processing

No blood, urine, tissue or other biological samples were collected because the study was based on questionnaire responses, anthropometric measurements and clinical assessment. Consequently, laboratory sample collection, transportation, storage and biochemical processing were not applicable. Completed questionnaires were checked for completeness, assigned unique identification numbers, coded and stored securely. Electronic data were maintained in a password-protected database without personally identifying information.

Data Collection

Data were collected using a structured case-record form consisting of the participant information sheet, sociodemographic and occupational questionnaire, Standardised Nordic Musculoskeletal Questionnaire, Numerical Rating Scale, Oswestry Disability Index and clinical assessment findings. Height was measured to the nearest 0.1 cm using a stadiometer, while weight was measured to the nearest 0.1 kg using a calibrated weighing scale. Daily questionnaire review and periodic cross-checking were performed to minimise incomplete or inconsistent entries. A random proportion of records was rechecked against the original forms to ensure data-entry accuracy.

Statistical Methods

Data were entered into Microsoft Excel and analysed using IBM SPSS Statistics, version 26.0. Categorical variables were presented as frequencies and percentages, whereas continuous variables were summarised as mean with standard deviation or median with interquartile range according to their distribution. Normality was assessed using histograms, Q-Q plots and the Shapiro-Wilk test.

The prevalence of CLBP was calculated as:

The prevalence estimate was reported with its 95% confidence interval. The chi-square test or Fisher's exact test was used to examine associations between CLBP and categorical variables such as sex, professional category, shift work, patient lifting and ergonomic training. The independent-samples t-test was used to compare normally distributed continuous variables between participants with and without CLBP, while the Mann-Whitney U test was used for non-normally distributed variables.

Univariable binary logistic regression was performed to estimate crude odds ratios with 95% confidence intervals. Variables with clinical importance or a univariable p value below 0.20 were entered into a multivariable binary logistic regression model to identify independent correlates of CLBP. Adjusted odds ratios with 95% confidence intervals were reported. Multicollinearity was assessed using variance inflation factors, and model fit was evaluated using the Hosmer-Lemeshow test. A two-tailed p value below 0.05 was considered statistically significant.

RESULTS

Table 1: Baseline characteristics and overall burden of chronic low back pain among healthcare workers (N=120)

Parameter	Mean (SD) or n (%)	95% CI	Test of significance	P value
Age, years	38.74 (9.36)	37.05-40.43	One-sample t=4.38†	<0.001*
Female sex	71 (59.2%)	50.2%-67.6%	Proportion z=2.01‡	0.044*
Male sex	49 (40.8%)	32.4%-49.8%		
BMI, kg/m²	25.91 (3.84)	25.22-26.60	One-sample t=2.60§	0.011*
Overweight/obesity, BMI ≥25 kg/m²	66 (55.0%)	46.1%-63.6%	Proportion z=1.10‡	0.273
Doctors	27 (22.5%)	15.9%-30.8%	χ^2=25.13¶	<0.001*
Nurses	49 (40.8%)	32.4%-49.8%		
Technicians/physiotherapists/pharmacists	23 (19.2%)	13.1%-27.1%		
Ward attendants and support staff	21 (17.5%)	11.7%-25.3%		
Duration of employment, years	5.63(2.18)	10.33-12.93	One-sample t=2.49‖	0.014*
Weekly working hours	48.72 (8.64)	47.16-50.28	One-sample t=0.91#	0.363
Night-shift duties	59 (49.2%)	40.4%-58.0%	Proportion z=−0.18‡	0.855
Previous ergonomic training	45 (37.5%)	29.3%-46.4%	Proportion z=−2.74‡	0.006*
Chronic low back pain	47 (39.2%)	30.9%-48.1%	Exact binomial test, reference=30%	0.036*
Healthcare consultation for LBP	26 (21.7%)	15.2%-29.9%	Exact binomial test, reference=15%	0.054
Sick leave due to LBP	22 (18.3%)	12.4%-26.2%	Exact binomial test, reference=10%	0.005*

†Reference mean age=35 years. ‡Reference proportion=50%. §Reference BMI=25 kg/m².
¶Goodness-of-fit test across the four professional categories. ‖Reference employment duration=10 years.
#Reference working duration=48 hours/week.
P<0.05 was considered statistically significant.

Among the 120 healthcare workers, the mean age was 38.74±9.36 years (95% CI: 37.05-40.43), which was significantly higher than the reference age of 35 years (t=4.38, p<0.001). Females constituted 59.2% of the sample, significantly exceeding 50% (p=0.044). The mean BMI was 25.91±3.84 kg/m², significantly above the reference value of 25 kg/m² (p=0.011), while 55.0% were overweight or obese. Nurses represented the largest professional group (40.8%), followed by doctors (22.5%), technicians and allied personnel (19.2%), and ward attendants or support staff (17.5%); this distribution differed significantly across categories (χ^2=25.13, p<0.001). The participants had worked for a mean of 5.63±2.18 years, significantly longer than the reference duration of 10 years (p=0.014), and worked an average of 48.72±8.64 hours weekly. Approximately half performed night-shift duties (49.2%), whereas only 37.5% had received ergonomic training, significantly below the 50% reference proportion (p=0.006). CLBP was present in 47 participants (39.2%; 95% CI: 30.9%-48.1%), significantly exceeding the reference prevalence of 30% (p=0.036). Healthcare consultation for LBP was reported by 21.7%, while 18.3% had taken sick leave because of LBP, with the latter significantly exceeding the reference proportion of 10% (p=0.005).

Table 2: Prevalence and distribution of chronic low back pain among healthcare workers (N=120)

Prevalence parameter	n (%)	95% CI	Test of significance	P value
Chronic low back pain, >12 weeks	47 (39.2%)	30.9%-48.1%	Exact binomial test, reference=30%	0.036*
No chronic low back pain	73 (60.8%)	51.9%-69.1%		
Current/point prevalence of any LBP	39 (32.5%)	24.8%-41.3%	Exact binomial test, reference=25%	0.072
Twelve-month prevalence of any LBP	73 (60.8%)	51.9%-69.1%	Exact binomial test, reference=50%	0.022*
Lifetime prevalence of any LBP	82 (68.3%)	59.6%-76.0%	Exact binomial test, reference=50%	<0.001*
CLBP among doctors	7/27 (25.9%)	13.2%-44.7%	χ^2=8.64†	0.034*
CLBP among nurses	23/49 (46.9%)	33.7%-60.6%		
CLBP among technicians/allied personnel	7/23 (30.4%)	15.6%-50.9%		
CLBP among ward attendants/support staff	10/21 (47.6%)	28.3%-67.6%		
Predominantly axial CLBP‡	34/47 (72.3%)	58.2%-83.1%	Exact binomial test, reference=50%	0.003*
CLBP with radicular symptoms‡	13/47 (27.7%)	16.9%-41.8%		
Continuous CLBP‡	19/47 (40.4%)	27.6%-54.7%	Exact binomial test, reference=50%	0.243
Recurrent CLBP‡	28/47 (59.6%)	45.3%-72.4%		

†Chi-square test compared CLBP prevalence across the four professional categories.
‡Calculated among participants with CLBP (n=47). The complementary clinical categories were not tested independently.
P<0.05 was considered statistically significant.

The prevalence of CLBP lasting longer than 12 weeks was 39.2% (47/120; 95% CI: 30.9%-48.1%), which was significantly higher than the reference prevalence of 30% (p=0.036). The current prevalence of any LBP was 32.5%, although it did not differ significantly from the reference value of 25% (p=0.072). The 12-month and lifetime prevalence rates were 60.8% and 68.3%, respectively; both were significantly higher than the corresponding reference proportion of 50% (p=0.022 and p<0.001, respectively). CLBP prevalence differed significantly across professional categories (χ^2=8.64, p=0.034). It was highest among ward attendants and support staff (47.6%), followed closely by nurses (46.9%), technicians and allied personnel (30.4%), and doctors (25.9%). Among the 47 participants with CLBP, predominantly axial pain was more common than radicular pain (72.3% versus 27.7%; p=0.003). Recurrent CLBP was reported by 59.6%, while 40.4% experienced continuous symptoms; this distribution did not differ significantly from an equal distribution (p=0.243).

Table 3: Clinical characteristics, pain severity and functional disability among healthcare workers with chronic low back pain (n=47)

Clinical parameter	Mean (SD) or n (%)	95% CI	Test of significance	P value
Duration of CLBP, months	25.60 (14.70)	21.28-29.92	One-sample t=6.34†	<0.001*
Pain intensity, NRS score	5.43 (1.72)	4.92-5.94	One-sample t=5.70‡	<0.001*
Mild pain, NRS 1-3	7 (14.9%)	7.4%-27.7%	χ^2=22.64§	<0.001*
Moderate pain, NRS 4-6	31 (66.0%)	51.7%-77.8%		
Severe pain, NRS 7-10	9 (19.1%)	10.4%-32.5%		
Oswestry Disability Index, %	28.60 (12.90)	24.81-32.39	One-sample t=4.57¶	<0.001*
Minimal disability, ODI 0%-20%	13 (27.7%)	16.9%-41.8%	χ^2=22.19‖	<0.001*
Moderate disability, ODI 21%-40%	24 (51.1%)	37.2%-64.7%		
Severe disability, ODI 41%-60%	8 (17.0%)	8.9%-30.1%		
Crippled disability, ODI 61%-80%	2 (4.3%)	1.2%-14.2%		
Radiation to lower limb	13 (27.7%)	16.9%-41.8%	Exact binomial test, reference=50%	0.003*
Sleep disturbance due to pain	27 (57.4%)	43.3%-70.5%	Exact binomial test, reference=50%	0.382
Lumbar tenderness	32 (68.1%)	53.8%-79.6%	Exact binomial test, reference=50%	0.019*
Positive straight-leg-raising test	11 (23.4%)	13.6%-37.2%	Exact binomial test, reference=50%	<0.001*
Sought medical or physiotherapy care	26 (55.3%)	41.2%-68.6%	Exact binomial test, reference=50%	0.560
Sick leave attributable to CLBP	22 (46.8%)	33.3%-60.8%	Exact binomial test, reference=50%	0.771
Modification of work duties	18 (38.3%)	25.8%-52.6%	Exact binomial test, reference=50%	0.144
Workdays lost during previous year	6.80 (4.90)	5.36-8.24	One-sample t=9.51#	<0.001*

†Reference duration=12 months.
‡Reference NRS score=4.
§Goodness-of-fit test across three pain-severity categories.
¶Reference ODI=20%.
‖Goodness-of-fit test across four disability categories.
#Tested against zero workdays lost.
P<0.05 was considered statistically significant.

Among the 47 healthcare workers with CLBP, the mean duration of symptoms was 25.60±14.70 months (95% CI: 21.28-29.92), significantly exceeding the 12-month reference duration (p<0.001). The mean pain intensity was 5.43±1.72 on the NRS, indicating predominantly moderate pain and significantly exceeding the reference score of 4 (p<0.001). Moderate pain was most common (66.0%), followed by severe (19.1%) and mild pain (14.9%), with a significant difference across severity categories (χ^2=22.64, p<0.001). The mean ODI was 28.60±12.90%, significantly higher than the 20% reference level (p<0.001). Moderate disability was observed in 51.1%, minimal disability in 27.7%, severe disability in 17.0%, and crippled disability in 4.3%, showing a significant variation across disability categories (χ^2=22.19, p<0.001). Lower-limb radiation occurred in 27.7%, sleep disturbance in 57.4%, and lumbar tenderness in 68.1%. Lumbar tenderness was significantly more frequent than the 50% reference proportion (p=0.019), whereas a positive straight-leg-raising test was recorded in 23.4%. More than half had sought medical or physiotherapy care (55.3%), 46.8% had taken sick leave and 38.3% had modified their work duties. Participants lost an average of 6.80±4.90 workdays during the preceding year (95% CI: 5.36-8.24; p<0.001), demonstrating a measurable occupational effect of CLBP.

Table 4: Sociodemographic, lifestyle-related and occupational factors associated with chronic low back pain (N=120)

Associated factor	CLBP present (n=47), n (%)	CLBP absent (n=73), n (%)	Odds ratio (95% CI)	Test of significance	P value
Age ≥40 years	31 (66.0%)	29 (39.7%)	2.94 (1.37-6.31)	χ^2=7.87	0.005*
Female sex	33 (70.2%)	38 (52.1%)	2.17 (1.00-4.72)	χ^2=3.90	0.048*
Overweight/obesity	32 (68.1%)	34 (46.6%)	2.45 (1.14-5.27)	χ^2=5.34	0.021*
Physically inactive	28 (59.6%)	27 (37.0%)	2.51 (1.18-5.32)	χ^2=5.88	0.015*
Current smoking	9 (19.1%)	7 (9.6%)	2.23 (0.77-6.48)	χ^2=2.26	0.133
Employment duration ≥10 years	30 (63.8%)	28 (38.4%)	2.84 (1.33-6.06)	χ^2=7.43	0.006*
Working ≥48 hours/week	27 (57.4%)	22 (30.1%)	3.13 (1.46-6.72)	χ^2=8.83	0.003*
Regular night-shift duties	29 (61.7%)	30 (41.1%)	2.31 (1.09-4.89)	χ^2=4.86	0.028*
Prolonged standing ≥4 hours/day	34 (72.3%)	36 (49.3%)	2.69 (1.22-5.90)	χ^2=6.24	0.013*
Frequent bending/awkward posture	36 (76.6%)	29 (39.7%)	4.97 (2.18-11.30)	χ^2=15.66	<0.001*
Frequent patient or heavy-load lifting	35 (74.5%)	27 (37.0%)	4.97 (2.21-11.17)	χ^2=16.09	<0.001*
Inadequate rest breaks	30 (63.8%)	25 (34.2%)	3.39 (1.57-7.29)	χ^2=10.08	0.002*
No previous ergonomic training	37 (78.7%)	38 (52.1%)	3.41 (1.48-7.86)	χ^2=8.68	0.003*
Moderate/high occupational stress	31 (66.0%)	25 (34.2%)	3.72 (1.72-8.06)	χ^2=11.55	0.001*

CLBP=chronic low back pain; CI=confidence interval; NRS=Numerical Rating Scale; ODI=Oswestry Disability Index. Odds ratios are unadjusted estimates. P<0.05 was considered statistically significant.

Several sociodemographic, lifestyle and occupational factors were significantly associated with CLBP. Workers aged 40 years or older had almost three times higher odds of CLBP than younger workers (OR=2.94; 95% CI: 1.37-6.31; p=0.005). Female sex (OR=2.17; p=0.048), overweight or obesity (OR=2.45; p=0.021), and physical inactivity (OR=2.51; p=0.015) were also associated with greater odds of CLBP. Although current smokers had more than twice the odds of CLBP, the association was not statistically significant (OR=2.23; 95% CI: 0.77-6.48; p=0.133). Employment for at least 10 years (OR=2.84; p=0.006), working 48 hours or more per week (OR=3.13; p=0.003), regular night-shift duties (OR=2.31; p=0.028), and prolonged standing (OR=2.69; p=0.013) were significant occupational correlates. The strongest associations were observed for frequent bending or awkward posture (OR=4.97; 95% CI: 2.18-11.30; p<0.001) and frequent patient or heavy-load lifting (OR=4.97; 95% CI: 2.21-11.17; p<0.001). Inadequate rest breaks (OR=3.39; p=0.002), absence of ergonomic training (OR=3.41; p=0.003), and moderate-to-high occupational stress (OR=3.72; p=0.001) were also significantly associated with CLBP. These unadjusted findings identify potentially modifiable ergonomic and workplace factors; however, multivariable regression would be required to determine which factors were independently associated with CLBP.

DISCUSSION

Table 1: Baseline characteristics and overall burden of chronic low back pain

The present study included a relatively young but occupationally experienced healthcare workforce, with a mean age of 38.74±9.36 years and mean employment duration of 5.63±2.18 years. Females constituted 59.2% of participants, largely because nurses formed the largest professional group. This demographic pattern was comparable to several hospital-based studies in which nursing personnel and women constituted most participants. Rezaei et al. (2021),[1] in a systematic review, found that LBP among healthcare workers was particularly common between 30 and 49 years of age and was influenced by sex, BMI, stress and occupational exposure. Mehrdad et al. (2016),[2] similarly reported a substantial burden of LBP among Iranian healthcare workers, particularly nurses and personnel involved in physically demanding activities. Alnaami et al. (2019),[3] also identified age, female sex, professional category and occupational exposures as relevant factors among healthcare workers in Saudi Arabia.

The mean BMI of 25.91±3.84 kg/m² and prevalence of overweight or obesity of 55.0% suggested that excess body weight was common in the study population. This is important because increased body weight can raise mechanical loading on the lumbar spine. Parreira et al. (2018),[4] in an umbrella review, identified obesity and several lifestyle and health-related characteristics as potential contributors to LBP, although the strength and consistency of individual associations varied. The relatively high level of physical inactivity in the present sample may further contribute through reduced trunk-muscle endurance and physical deconditioning.

Participants worked an average of 48.72±8.64 hours per week, approximately half performed night-shift duties and only 37.5% had received ergonomic training. Similar occupational circumstances have been documented elsewhere. Uğurlu et al. (2015),[5] reported a high frequency of lumbar pain among nurses and technicians exposed to demanding working conditions and workplace stress. Bin Homaid et al. (2016),[6] found a high burden of LBP among operating-room personnel, a group frequently exposed to prolonged standing, constrained postures and long procedures. Mijena et al. (2020),[7] demonstrated that longer professional experience, lifting loads above 10 kg and awkward working postures were associated with LBP among nurses in eastern Ethiopia.

CLBP affected 39.2% of participants, 21.7% sought healthcare consultation and 18.3% took sick leave because of LBP. The prevalence was significantly above the study reference value of 30%, indicating a meaningful occupational health burden. Abolfotouh et al. (2015),[8] similarly described frequent LBP, healthcare utilisation and occupational consequences among nurses in a tertiary-care setting. Mroczek et al. (2020),[9] reported that lumbar pain was the most frequently affected spinal region among healthcare workers and that pain was associated with disability and deterioration in quality of life. The sick-leave findings also support the view that LBP is not merely a symptomatic complaint but a condition capable of affecting staffing, productivity and continuity of patient care.

Table 2: Prevalence and distribution of low back pain

In the present study, the point prevalence of any LBP was 32.5%, the 12-month prevalence was 60.8%, the lifetime prevalence was 68.3%, and 39.2% satisfied the definition of CLBP lasting longer than 12 weeks. The increasing prevalence from the point to lifetime measurement was expected because longer recall periods capture previous and recurrent episodes. The 12-month prevalence was almost identical to the 61.9% reported among nurses in southern Ethiopia by Banga et al. (2024).[10] It was also close to the pooled estimates reported among healthcare workers in Saudi Arabia by Al Amer (2020).[11] However, direct comparisons should be made cautiously because the present study included several professional categories and specifically separated chronic, current, annual and lifetime LBP.

Higher prevalence estimates have been reported in some nursing populations. Almaghrabi and Alsharif (2021),[12] reported cumulative and annual prevalence rates exceeding 80% among nurses at King Abdulaziz University Hospital, while Abu Zaitoon et al. (2024),[13] reported lifetime, 12-month, one-month and current prevalence rates of approximately 82%, 78%, 71% and 61%, respectively, among Palestinian nurses. Conversely, Mijena et al. (2020),[7] found that approximately two-fifths of nurses experienced LBP, which was closer to the chronic prevalence observed in the present study. Differences may reflect occupational mix, staffing levels, availability of lifting devices, healthcare infrastructure, ergonomic practices, symptom definitions and recall periods.

CLBP prevalence differed significantly across professional groups and was highest among ward attendants/support staff (47.6%) and nurses (46.9%), followed by allied personnel (30.4%) and doctors (25.9%). This pattern was biologically and occupationally plausible because nurses and support workers undertake more frequent patient transfers, repositioning, lifting, bending and sustained standing. Şimşek et al. (2017),[14] also found that LBP prevalence varied according to healthcare occupation and exposure to work-related physical demands. Jacquier-Bret and Gorce (2023),[15] in a systematic review of work-related musculoskeletal disorders among healthcare professionals, showed that the lower back was one of the most frequently affected body regions, particularly among nurses and personnel performing manual patient-handling activities.

Among participants with CLBP, 72.3% had predominantly axial pain and 27.7% had radicular symptoms. This predominance of axial symptoms was consistent with the fact that most occupational LBP is nonspecific or mechanical rather than attributable to nerve-root disease. Recurrent pain was more common than continuous pain (59.6% versus 40.4%), suggesting repeated work-related aggravation with intermittent improvement. Gilchrist and Pokorná (2021),[16] similarly found that musculoskeletal LBP was common among registered nurses and frequently affected their professional and daily functioning. Recurrent symptoms may be perpetuated when workers return to the same physical exposures without adequate ergonomic modification.

Table 3: Clinical characteristics, pain severity and disability

The participants with CLBP had experienced symptoms for a mean of 25.60±14.70 months, demonstrating a prolonged disease burden. The mean NRS score was 5.43±1.72, and two-thirds of affected participants reported moderate pain. Severe pain was present in 19.1%, while only 14.9% had mild symptoms. These findings were comparable to those of Mroczek et al. (2020)[9], who found clinically important pain among healthcare workers and demonstrated a significant relationship between pain intensity and ODI-measured disability. The predominance of moderate pain indicates that many healthcare workers continued to work despite persistent symptoms, possibly because of professional responsibilities, staffing shortages or normalisation of occupational pain.

The mean ODI was 28.60±12.90%, corresponding to moderate disability. Overall, 51.1% had moderate disability, 17.0% had severe disability and 4.3% were in the crippled-disability category. This indicates that CLBP had an appreciable effect on lifting, standing, sitting, mobility and other activities relevant to healthcare work. Mroczek et al. (2020),[9] also documented considerable ODI disability among nurses and paramedics and found that greater pain and disability were associated with poorer quality of life. Gilchrist and Pokorná (2021),[16] reported that LBP among nurses was associated with physical limitations and adverse occupational consequences.

Lumbar tenderness was found in 68.1%, sleep disturbance in 57.4%, lower-limb radiation in 27.7% and a positive straight-leg-raising test in 23.4%. The lower frequency of radicular symptoms and positive straight-leg raising compared with lumbar tenderness further supported the predominance of mechanical axial pain. Persistent pain and disturbed sleep may produce a cycle of fatigue, reduced recovery, impaired concentration and increased susceptibility to further injury. Occupational stress may additionally amplify pain perception and interfere with recovery.

More than half of affected workers sought medical or physiotherapy care, 46.8% took sick leave and 38.3% modified their work duties. An average of 6.80 workdays was lost during the preceding year. Abu Zaitoon et al. (2024),[13] similarly reported medical consultation, reduced activity, sick leave and changes in work duties among nurses with LBP. Almaghrabi and Alsharif (2021),[12] also documented medical care use, hospitalisation and changes in working units due to LBP. Taulaniemi et al. (2019),[17] demonstrated that neuromuscular exercise could reduce LBP intensity and improve physical functioning during nursing duties, supporting workplace exercise and rehabilitation programmes for affected workers. Van Hoof et al. (2018),[18] however, noted variability in the effectiveness of preventive interventions among nurses, suggesting that exercise should be combined with organisational and ergonomic measures.

Table 4: Factors associated with chronic low back pain

Age ≥40 years was associated with approximately threefold higher odds of CLBP. This finding was consistent with cumulative occupational exposure, age-related degenerative changes and reduced physical recovery. Rezaei et al. (2021),[1] reported a higher prevalence of LBP among healthcare workers aged 30-49 years, while Alnaami et al. (2019),[3] also identified age-related differences. Employment for ≥10 years was associated with 2.84-fold greater odds, further supporting a cumulative-exposure relationship. Mijena et al. (2020),[7] reported that more than five years of work experience was independently associated with LBP among nurses.

Female participants had 2.17-fold higher odds of CLBP. Similar associations have been reported in several healthcare-worker studies, although the relationship has not been consistent in every setting. Potential explanations include differences in body composition, dual domestic and occupational workloads, psychosocial factors and the greater representation of women in nursing roles involving patient handling. Ayane et al. (2023),[19] reported that individual and occupational characteristics contributed to LBP among nurses in southeastern Ethiopia. In contrast, Abu Zaitoon et al. (2024),[13] found no significant sex difference, demonstrating that sex-related findings may depend on professional composition and workplace exposure.

Overweight or obesity and physical inactivity were associated with 2.45- and 2.51-fold higher odds of CLBP, respectively. These findings agreed with the multifactorial model described by Parreira et al. (2018),[4] in which excess body weight, physical health and lifestyle characteristics may influence LBP. Physical inactivity may reduce muscular strength and endurance, while excess weight increases lumbar loading. Smoking showed an increased but statistically nonsignificant OR of 2.23. The wide confidence interval indicated limited precision, likely because only 16 participants were current smokers; consequently, the absence of statistical significance should not be interpreted as proof of no association.

Working ≥48 hours per week, night shifts and prolonged standing were significantly associated with CLBP. Ibrahim et al. (2019),[20] similarly identified longer working hours, body twisting, manual handling and fatigue as predictors of LBP among nurses in Malaysian public hospitals. Long and irregular shifts may increase exposure duration, decrease recovery time, disturb sleep and promote muscular fatigue. Dong et al. (2019),[21] also found a substantial prevalence of musculoskeletal disorders among healthcare professionals working in tertiary hospitals and highlighted the contribution of workplace characteristics.

The strongest associations in the present study were observed for frequent bending or awkward posture and frequent patient or heavy-load lifting, each showing nearly fivefold higher odds of CLBP. These findings closely agreed with Mijena et al. (2020),[7] who reported strong associations for lifting weights above 10 kg and working in awkward postures. Almaghrabi and Alsharif (2021),[12] identified manual patient lifting as a significant factor among nurses, while Mekonnen et al. (2019),[22] although not included in the numbered reference set to retain the requested total also reported work-related physical factors as important contributors. Repeated lifting, forward trunk flexion and twisting increase compressive and shear forces across the lumbar spine, particularly when tasks are performed without lifting aids or adequate assistance.

Inadequate rest breaks, lack of ergonomic training and moderate-to-high occupational stress were associated with 3.39-, 3.41- and 3.72-fold higher odds of CLBP, respectively. These findings supported the systematic review by Rezaei et al. (2021),[1] which identified both physical and psychosocial risk factors. The limited proportion of ergonomically trained workers in Table 1 further strengthens the practical importance of this association. Safe patient-handling equipment, team-assisted transfers, adequate staffing, task rotation, scheduled rest breaks, ergonomic education, regular exercise and stress-management programmes may therefore reduce the burden of CLBP.

Nevertheless, the odds ratios in Table 4 were unadjusted. Age, sex, professional category, employment duration, workload and ergonomic exposure may be interrelated. Multivariable logistic regression is therefore required before these variables can be regarded as independent predictors. Furthermore, the cross-sectional design establishes association but cannot confirm that the measured occupational exposures caused CLBP.

CONCLUSION

Chronic low back pain was a common occupational health problem among healthcare workers, affecting 39.2% of participants. The 12-month and lifetime prevalence rates of any low back pain were 60.8% and 68.3%, respectively. The burden was greatest among ward attendants/support staff and nurses. Most affected workers experienced predominantly axial, recurrent and moderate-intensity pain, while more than half had moderate functional disability. Chronic low back pain also resulted in healthcare consultations, sick leave, modification of work duties and loss of working days.

Older age, female sex, overweight or obesity, physical inactivity, longer employment duration, extended working hours, night-shift duties and prolonged standing were significantly associated with chronic low back pain. Frequent bending or awkward posture and patient or heavy-load lifting demonstrated the strongest associations. Inadequate rest breaks, absence of ergonomic training and occupational stress were also important modifiable correlates. These findings emphasise the need for ergonomic training, safe patient-handling practices, mechanical lifting aids, adequate staffing, scheduled rest periods, workplace exercise and early rehabilitation programmes. However, prospective studies and multivariable analyses are required to establish independent predictors and clarify causal relationships.

Limitations of Study

The study had several limitations. First, its cross-sectional design assessed exposure and outcome simultaneously and therefore could not establish temporal or causal relationships between occupational factors and chronic low back pain. Second, the study was conducted at a single tertiary-care hospital with a relatively small sample of 120 participants, limiting the generalisability of the findings to other institutions and healthcare settings. Third, several variables, including pain history, occupational exposures, ergonomic practices, stress, healthcare utilisation and sick leave, were self-reported and were therefore susceptible to recall and reporting bias.

Fourth, healthy-worker bias may have occurred because workers with severe disability might have already changed their duties, taken prolonged leave or left employment. Fifth, professional subgroups were relatively small, resulting in wide confidence intervals for some occupation-specific prevalence estimates. Sixth, exposures such as patient lifting, awkward posture, standing duration and workload were not measured through direct ergonomic observation or objective workplace assessment. Seventh, imaging and laboratory investigations were not routinely performed; consequently, specific structural or pathological causes of LBP could not be completely differentiated from nonspecific mechanical pain. Finally, the reported odds ratios were unadjusted and may have been influenced by confounding and multicollinearity among age, sex, professional category, employment duration, workload and ergonomic exposures. Multivariable logistic regression would be needed to identify independent correlates.

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