

# Low Back Pain Among Nurses Working In A Tertiary Hospital In Madinah, Saudi Arabia: A Cross-Sectional Study

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## **Abstract:**

**Background:** Healthcare providers, in particular nurses, are at high risk of developing Low Back Pain (LBP). Many factors play a role in this distressing symptom, including frequent patient handling, prolonged standing, awkward body positioning, and repetitive physical activity. Many studies have explored the prevalence and risk factors of LBP across Saudi Arabia, but limited data are available from the Madinah Region.

**Objective:** This study aimed to determine the prevalence of low back pain among nurses working at a tertiary hospital in Madinah and to identify demographic and occupational factors associated with its occurrence.

**Methods:** 186 nurses representing different departments in a tertiary hospital in Madinah, Saudi Arabia, participated in this cross-sectional study. Data collected using a structured self-administered questionnaire along with the Keele STarT Back Screening Tool. Participant characteristics were summarized using descriptive statistics. Due to the non-normality of data distribution, continuous variables were reported using medians and interquartile ranges (IQRs). Associations and clinical relevance between categorical variables and LBP were assessed using Pearson's chi-square and binary logistic regression.

**Results:** 78.0% of nurses reported low back pain, with a median total STarT Back score of 2 (IQR = 3), and the psychosocial subscore had a median of 1 (IQR = 2). Significant relationships were found between LBP and department assignment ( $p < 0.001$ ) as well as exposure to heavy lifting ( $p = 0.003$ ). Working in ICU/CCU appeared to increase the odds of LBP in nurses when compared to working in the operating room, as shown in the logistic regression analysis (OR = 0.11, 95% CI: 0.03–0.34,  $p < 0.001$ ). Nurses who are not lifting heavy objects/patients demonstrated lower risk of LBP (OR = 0.19, 95% CI: 0.06–0.54,  $p = 0.002$ ).

**Conclusion:** Low back pain is highly prevalent among nurses working in a tertiary healthcare center in Madinah. Occupational factors, particularly department assignment and heavy lifting, appear to be substantially associated with the problem. Workplace ergonomic interventions and safer patient-handling practices may help reduce the burden of musculoskeletal disorders among nursing staff.

**Key Words:** Low back pain; nurses; occupational health; musculoskeletal disorders; heavy lifting; Saudi Arabia

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## I. Introduction

Nursing is a dynamic profession that involves patient transfers, prolonged standing, and frequent bending, making nurses at high risk of developing occupational musculoskeletal disorders, particularly low back pain (LBP), which is among the most frequently reported health complaints among nurses [1-3]. Low back pain not only affects physical well-being but also job performance, absenteeism, and overall quality of life [4,5].

A variety of international studies report that nurses working in high-acuity units are at higher risk of LBP due to repeated patient positioning and long working hours [6]. Research also emphasizes that preventing LBP requires measures beyond general ergonomic education, including department-based preventive strategies and safer patient-handling interventions [5,7].

Several studies conducted in different countries have identified heavy lifting, prolonged standing, awkward posture, and psychological stress as important contributors to LBP in nurses [7-9]. Critical care nurses, in particular, may experience higher rates of musculoskeletal problems because many patients require complete assistance during repositioning and transfer procedures [6].

Within Saudi Arabia, interest in occupational musculoskeletal disorders among healthcare workers has increased in recent years. Previous local studies and systematic reviews have reported high rates of LBP among nurses and other healthcare professionals in different regions of the country [1,10]. However, information regarding nurses working in Madinah remains limited despite the unique workload pressures experienced by hospitals in the region, especially during seasonal pilgrimage periods.

Understanding the prevalence of LBP and the factors associated with it is important for improving occupational health policies and designing targeted preventive interventions. Therefore, this study aimed to assess the prevalence of low back pain among nurses at a tertiary hospital in Madinah and to examine demographic and occupational factors associated with its occurrence.

## **II. Materials And Methods**

**Study Design and Setting** A cross-sectional study was conducted among nurses working at a tertiary hospital in Madinah, Saudi Arabia. The study aimed to evaluate the prevalence of low back pain (LBP) and identify occupational and demographic factors associated with its occurrence among nursing staff.

**Study Duration:** Data collection was conducted during the period from September 2025 to December 2025.

**Sample Size Calculation:** Sample size was estimated using a single-proportion formula based on previously reported prevalence rates of low back pain among nurses in regional and international studies. Assuming an expected prevalence of 70%, a confidence level of 95%, and a margin of error of 5%, the minimum required sample size was estimated to be 323 participants. Because of logistical limitations and voluntary participation, a total of 186 nurses were ultimately included in the final analysis.

**Subjects and Selection Method:** The study population consisted of nurses working in direct clinical care at a tertiary hospital in Madinah. Participants were recruited from multiple clinical departments, including intensive care and coronary care units (ICU/CCU), inpatient wards, operating rooms, outpatient departments, and the cardiac catheterization laboratory.

Eligible nurses were invited to participate voluntarily through convenience sampling during the study period. Nurses who agreed to participate completed a structured self-administered questionnaire. Incomplete questionnaires were excluded from the final analysis.

### **Inclusion Criteria**

1. Registered nurses working at the selected tertiary hospital.
2. Nurses involved in direct patient care.
3. Nurses working in ICU/CCU, inpatient wards, operating rooms, outpatient departments, or the cardiac catheterization laboratory.
4. Nurses willing to participate in the study.

### **Exclusion Criteria**

1. Nurses who declined participation.
2. Nurses who submitted incomplete questionnaires.
3. Nurses not directly involved in clinical patient care during the study period.
4. Administrative or non-clinical nursing staff.

**Procedure Methodology:** Data were collected using a structured self-administered questionnaire designed to assess demographic characteristics, occupational factors, and low back pain-related variables. The questionnaire included information regarding age, gender, body mass index (BMI), smoking status, department assignment, exposure to heavy lifting, frequent body bending, exercise habits, and methods used to relieve low back pain symptoms.

The Keele STarT Back Screening Tool was incorporated into the questionnaire to evaluate symptom severity and psychosocial risk among participants reporting low back pain. The tool categorizes participants into low-, medium-, and high-risk groups according to total and psychosocial subscores.

**Outcome Measures:** The primary outcome of the study was the presence of low back pain based on participant self-reporting. Secondary outcomes included STarT Back total scores, psychosocial subscores, and occupational factors associated with low back pain.

**Statistical Analysis:** Data analysis was performed using IBM SPSS Statistics version 26 (IBM Corp., Armonk, NY, USA). Categorical variables were summarized using frequencies and percentages. Normality of data distribution was tested using the Shapiro-Wilk test. Continuous variables with non-normal distribution were described using medians and interquartile ranges (IQRs).

Pearson's chi-square test was used to assess associations between categorical variables and low back pain. Variables demonstrating statistical significance or clinical relevance in univariate analysis were entered into a binary logistic regression model to identify independent predictors of low back pain. Odds ratios (ORs)

with 95% confidence intervals (CIs) were reported. A p-value of less than 0.05 was considered statistically significant.

**Ethical Considerations:** Ethical approval was obtained from the Institutional Review Board of Madinah Cardiac Center. Participation was voluntary, and completion of the questionnaire was considered implied consent. Participant confidentiality and anonymity were maintained throughout the study.

### III. Results

#### Participant Characteristics

**Table No.1:** A total of 186 nurses participated in the study. Most participants were female (97.8%), and nearly half were between 30 and 40 years of age (48.4%). ICU/CCU nurses represented the largest departmental group (39.8%). Exposure to occupational physical strain was common, with 81.2% reporting heavy lifting and 93.0% reporting frequent bending during work activities.

**Table 1. Sociodemographic and Occupational Characteristics of Participants (N = 186)**

Variable	Category	n (%)
Age	<30 years	86 (46.2)
	30–40 years	90 (48.4)
	>40 years	10 (5.4)
BMI	Underweight	9 (4.8)
	Normal	131 (70.4)
	Overweight	44 (23.7)
Gender	Obese	2 (1.1)
	Male	4 (2.2)
	Female	182 (97.8)
Department	ICU/CCU	74 (39.8)
	Ward	41 (22.0)
	Operating Room	22 (11.8)
	Cath Lab	26 (14.0)
	Outpatient Department	23 (12.4)
Heavy Lifting	Yes	151 (81.2)
	No	35 (18.8)
Body Bending	Yes	173 (93.0)
	No	13 (7.0)
Exercise	Yes	109 (58.6)
	No	77 (41.4)

#### Prevalence and Severity of Low Back Pain

**Table no. 2:** Low back pain was reported by 78.0% of participants. The median total STarT Back score was 2 (IQR = 3), while the median psychosocial subscore was 1 (IQR = 2). Based on the STarT Back classification system, most participants were categorized as low risk, whereas smaller proportions were classified as medium or high risk. Although LBP prevalence was high, many participants experienced lower levels of psychosocial risk related to persistent disability.

**Table 2. Prevalence and Severity of Low Back Pain Among Nurses**

Variable	Result
Prevalence of Low Back Pain	145 (78.0%)
Median Total STarT Back Score (IQR)	2 (3)
Median Psychosocial Subscore (IQR)	1 (2)
Low Risk Category	134 (72.0%)
Medium Risk Category	40 (21.5%)
High Risk Category	12 (6.5%)

#### Factors Associated with Low Back Pain

**Table No. 3 and 4:** Department assignment and heavy lifting demonstrated statistically significant associations with LBP. Nurses working in ICU/CCU and inpatient wards reported higher frequencies of low back pain compared with nurses in other departments. In contrast, no statistically significant associations were identified for smoking status, exercise habits, or gender.

**Table 3. Association Between Department Assignment and Low Back Pain**

Department	LBP Present n (%)	LBP Absent n (%)	p-value
ICU/CCU	64 (86.5)	10 (13.5)	
Ward	37 (90.2)	4 (9.8)	
Operating Room	10 (45.5)	12 (54.5)	
Cath Lab	18 (69.2)	8 (30.8)	
Outpatient Department	16 (69.6)	7 (30.4)	<0.001*

\*Pearson chi-square test.

**Table 4. Association Between Heavy Lifting and Low Back Pain**

Heavy Lifting	LBP Present n (%)	LBP Absent n (%)	p-value
Yes	125 (82.8)	26 (17.2)	
No	19 (55.9)	15 (44.1)	0.003*

\*Pearson chi-square test

### Logistic Regression Analysis

**Table No. 5:** Binary logistic regression analysis demonstrated that operating room nurses had significantly lower odds of reporting LBP compared with ICU/CCU nurses (OR = 0.11, 95% CI: 0.03–0.34, p < 0.001). In addition, nurses who were not exposed to heavy lifting had significantly reduced odds of low back pain (OR = 0.19, 95% CI: 0.06–0.54, p = 0.002).

**Table 5. Binary Logistic Regression Analysis of Factors Associated with Low Back Pain Among Nurses**

Variable	Adjusted OR	95% CI	p-value
ICU/CCU (Reference)	1.00	—	—
Ward	1.36	0.39–4.81	0.632
Operating Room	0.11	0.03–0.34	<0.001*
Cath Lab	0.33	0.11–1.01	0.053
Outpatient Department	1.06	0.28–4.03	0.936
Heavy Lifting (No)	0.19	0.06–0.54	0.002*

\*Statistically significant at p < 0.05.

### Low Back Pain Relief Practices

**Table No. 6:** Rest was the most frequently reported method used to relieve symptoms, followed by medication use, physiotherapy, and other self-directed physical measures.

**Table 6. Methods Used to Relieve Low Back Pain Symptoms**

Relief Method	n (%)
Rest	105 (56.5)
Medications	18 (9.7)
Physiotherapy	14 (7.5)
Other Methods	11 (5.9)
Not Applicable	38 (20.4)

## IV. Discussion

The present study demonstrated a high prevalence of low back pain among nurses working in a tertiary healthcare setting in Madinah. The observed prevalence is comparable to findings reported in several regional and international studies evaluating occupational musculoskeletal disorders among healthcare workers [1,2,10]. Nursing practice involves repeated exposure to physical strain, including patient transfer, prolonged standing, repetitive bending, and sustained awkward posture, all of which may contribute to lower back symptoms over time.

The relatively high prevalence identified in ICU/CCU nurses may be explained by the nature of critical care practice. Patients in these units often require extensive physical assistance during repositioning, transfer, hygiene care, and emergency procedures. These repeated activities may increase spinal loading and mechanical stress on the lumbar region. Similar observations have been reported in previous studies examining musculoskeletal disorders among critical care nurses [6].

An important finding in this study was the significant association between heavy lifting and low back pain. Nurses exposed to frequent heavy lifting demonstrated substantially greater odds of experiencing LBP compared with nurses who were not routinely exposed to such activities. This result is consistent with previous studies reporting that manual patient handling remains one of the strongest occupational contributors to musculoskeletal injury among healthcare professionals [5,7].

The STarT Back Screening Tool findings<sup>11</sup> provide additional insight into symptom severity and psychosocial risk. Although a large proportion of nurses reported low back pain, most participants were categorized within the low-risk group. This pattern may indicate that many nurses continue to function occupationally despite experiencing symptoms. It is also possible that some participants had intermittent or mild pain episodes without significant psychosocial impact.

In contrast, a smaller proportion of nurses demonstrated medium- or high-risk scores, which may suggest greater vulnerability to persistent pain, functional limitation, or psychosocial distress. Identification of these individuals may be important for early intervention and occupational support.

No statistically significant relationships were observed between low back pain and variables such as smoking status or exercise habits. Although previous studies have reported inconsistent findings regarding lifestyle-related factors [8-9], occupational exposure may represent the dominant contributor within physically demanding clinical environments.

These results highlight the need for occupational health strategies targeting workplace ergonomics. Hospitals may benefit from strengthening safe patient-handling policies, improving staffing support during physically demanding tasks, and increasing the availability of mechanical lifting devices. Periodic ergonomic education and early musculoskeletal screening programs may also contribute to reducing long-term occupational burden.

**Recommendations:** Healthcare institutions should consider implementing structured ergonomic training programs and reinforcing safe patient-handling protocols across clinical departments. Greater attention is needed toward high-risk units such as ICU/CCU and inpatient wards. Future multicenter studies with larger sample sizes are recommended to further evaluate occupational and psychosocial contributors to low back pain among nurses in Saudi Arabia.

**Strengths:** This study contributes regional data regarding low back pain among nurses in Madinah, an area where limited published evidence currently exists. Inclusion of nurses from multiple departments and the use of a recognized screening tool strengthened the assessment of occupational factors associated with LBP.

**Limitations:** Several limitations should be considered when interpreting the findings. First, the cross-sectional design does not allow conclusions regarding causality. Second, the study relied on self-reported data, which may introduce recall or reporting bias. Finally, because the study was conducted in a single institution, the findings may not be generalizable to all healthcare settings in Saudi Arabia.

## V. Conclusion

Low back pain is highly prevalent among nurses working in tertiary healthcare centers in Madinah. Clinical allocation and heavy lifting were found to be the main contributors to LBP. Ergonomic protocols and safe patient-handling techniques need to be reinforced at the institutional level to help reduce occupational musculoskeletal problems in nurses.

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