

## Prevalence and Risk Factors Associated with Low Back Pain among Nurses in Abha, Saudi Arabia: A Cross-Sectional Study

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### Abstract

**Background:** Low back pain (LBP) is a common health issue among healthcare workers and is more common in nurses. It negatively impacts nurses' productivity, leading to low-quality care.

**Objectives:** To investigate the prevalence and risk factors of LBP among nurses in Abha, Kingdom of Saudi Arabia (KSA).

**Design:** Cross-sectional analytic study with multistage random and clustered sampling techniques.

**Setting:** This study was performed among nurses working at three government hospitals and three primary healthcare centers (PHCCs) in Abha, KSA. Cluster sampling was used for five PHCCs located in the northern, central, southern, eastern, and western areas of Abha.

**Patients and Methods:** A self-administered questionnaire comprising four parts (a sociodemographic, work-related, and medical factors questionnaire; the Nordic musculoskeletal questionnaire; the perceived stress scale; and the Oswestry LBP disability questionnaire) was distributed to nurses from the selected institutions.

**Main Outcome Measures:** Prevalence and risk factors for LBP.

**Sample Size:** With a population size of 1,900, a sample of 152 participants was required; however, to accommodate non-respondents, the sample size was increased to 175 participants.

**Results:** Overall, 166 of the 175 nurses participated. Multiple regression analysis for factors that are independently associated with LBP revealed that nurses who were Saudi (adjusted odds ratio [aOR] = 3.32; 95% confidence interval [CI]: 1.44 - 7.65), were married (aOR = 4.21; 95% CI: 1.59 - 11.14), lifted and assisted patients manually (aOR = 5.42; 95% CI: 1.53 - 19.19), had increased stress scores (aOR = 1.09; 95% CI: 1.01 - 1.18), and worked more than 8 h/day (aOR = 3.33; 95% CI: 1.41 - 7.82) were more likely to experience LBP.

**Conclusion:** The LBP prevalence in the study population was high; the cumulative, annual, and weekly LBP prevalence rates were 65.0%, 89.8%, and 56.7%, respectively. Risk factors significantly associated with LBP in nurses included being Saudi, being married, lifting and assisting patients manually, stress, and working more than 8 h/day.

**Limitations:** First, we were unable to determine any causal relationships between exposure (such as perceived stress) and LBP. Second, self-reported questionnaires can be affected by a participant's feelings. Third, due to the small number of male nurses, it was difficult to determine whether there was an association between sex and LBP.

**Keywords:** Low Back Pain; Prevalence; Risk Factors; Nurses

## Introduction and Background

One of the most common health conditions worldwide is low back pain (LBP) [1]. It severely impacts a person's physical, social, psychological, and economic health [2]. In total, 18.8% of Saudis have LBP [3] and LBP is the most common occupational condition and the leading cause of lost work time and absenteeism [4].

Sociodemographic characteristics like age, employment experience, sex, and body mass index (BMI) affect LBP incidence [5-8]. Recent research indicates that workplace characteristics like physical handling and patient lifting assistance, number of nurses per shift, and number of shift work hours can affect LBP incidence [5,9,10]. A significant connection between object lifting frequency and LBP has been reported [11]. LBP can result from lifestyle variables (e.g. poor exercise) and psychological issues (e.g. stress, job dissatisfaction) [8,11]. Workplace stress is a risk factor for LBP and harms healthcare providers.

## Literature review of LBP in nurses

LBP is a prevalent issue among nurses, with various definitions encompassing discomfort between the costal margins of the twelfth rib and the gluteal folds [11].

Intensive care unit (ICU) nurses have a higher prevalence of LBP (34.5 - 100%) than other nurses [12], whereas nurses on general surgery wards have a decreased incidence of LBP [13]. Primary health unit nurses have a high LBP risk similar to that of hospital nurses [14].

In Italy, LBP prevalence ranged from 33% to 86%, with 3-months and point prevalence rates at 71% and 40%, respectively [15]. African studies showed an average LBP incidence of 64.07%, with West African nurses having the highest prevalence [16]. Iranian nurses exhibited LBP prevalence rates of 63% throughout their careers and 61.2% during the last year [7]. Czech nurses reported 84.7% LBP occurrence in the past year and 76.6% in the previous month [17]. In Saudi Arabia, LBP prevalence varied across regions: Riyadh and Jeddah documented 74.8% and 65.7%, respectively, in the last year [6,18]. Studies between 2019 and 2021 in various Saudi cities showed a range of 61.7 - 79.5% for nurses experiencing LBP [10,11,13,19]. The 1-week prevalence of LBP among Saudi nurses is approximately 45.9% [20]. Risk factors for LBP include female sex, marital status, night shifts, and work dissatisfaction [21]. Particularly in ICU nurses, job stress significantly correlated with LBP [22]. Patient handling and lifting, lack of exercise, and medical factors such as BMI and back trauma were also associated with LBP [8,9,11,18]. Physical activity, however, acted as a protective factor against LBP [8,18]. Disability due to LBP affected physical performance of more than 19% of healthcare professionals [23].

## Summary

Overall, LBP among nurses is a considerable concern with multifaceted risk factors that need to be addressed for prevention and management. However, little is known regarding the effects of stress as a risk factor for LBP, and most studies do not consider that LBP affects healthcare workers, specifically nurses, differently in different working environments, such as primary healthcare centers (PHCCs) and hospital wards. Furthermore, functional disability has not been evaluated, although it could further affect the health status of nurses; therefore, it is important to evaluate and cross-reference all impending risk factors of LBP.

## Significance of the Study

Nurses play a vital role and represent the majority of healthcare workers. Nurses must be healthy to perform clinical activities; hence, LBP risk factors must be addressed in healthcare working environments. We know of few studies in the Kingdom of Saudi Arabia (KSA) on LBP prevalence and risk factors; thus, further studies are needed to help management teams reduce LBP prevalence among healthcare personnel.

## Aim of the Study

This study investigated the prevalence and risk factors of LBP among nurses in Abha, KSA.

## Patients and Methods

A cross-sectional analytical study was conducted among nurses working at government hospitals and PHCCs in Abha, KSA, with the aim of investigating the prevalence of LBP and its associated risk factors. The study's design, population, sampling, data collection tools, methods, and statistical analysis were comprehensively outlined. The study included nurses with at least 1 year of work experience who consented to participate. Nurses with underlying health issues, spinal or nerve problems, or pregnancy were excluded. Using Raosoft Inc. software, a sample size of 152 participants was calculated based on a response distribution of 50%, a 5% margin of error, a population size of 1,900, and an 80% confidence level. To account for non-respondents, the sample size was increased to 175 participants.

The research was conducted in Abha, located in the Aseer region of KSA. It included four government hospitals and 37 PHCCs. Different PHCCs operated for varying hours (24, 16, and 8h). A multistage random clustered sampling technique was used. The study was conducted in three selected hospitals, and the departments were divided into surgical, medical, and ICU departments. Three PHCCs were also randomly selected for comparison (one PHCC 24h and two PHCCs 16h). A cluster sampling technique was used for five PHCCs 8h located in the northern, central, southern, eastern and western areas of Abha. Data collection involved a questionnaire divided into four parts: sociodemographic, work-related, and medical factors; the Nordic musculoskeletal questionnaire; the perceived stress scale (PSS); and the Oswestry LBP disability questionnaire. The first part captured participants' background information, work-related details, and medical factors. The Nordic musculoskeletal questionnaire gauged LBP prevalence and its consequences. This questionnaire was translated for accuracy and tested in a pilot study. The PSS-10 measured perceived stress levels, and the Oswestry disability index (ODI) assessed the impact of LBP on daily activities. Both questionnaires were tested for validity and reliability through pilot studies.

Questionnaires were distributed to participating nurses via a QR code link. The pilot study confirmed the feasibility of the questionnaire and study design. Ethical considerations were observed, with ethical approval obtained, from Aseer institutional review board with IRB Log No: REC20-02-2022 informed consent collected, and confidentiality ensured. Statistical analysis included descriptive methods, Pearson's correlation coefficients, chi-squared tests, Fisher's exact tests, one-way ANOVA, independent t-tests, odds ratios, and multiple logistic regression analysis. Factors associated with LBP were determined using multivariate analysis, with age and stress treated as continuous variables and other factors as categorical variables. Data analysis was performed using Stata Statistical Software version 13 (StataCorp. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP).

## Results

This study aimed to investigate the prevalence and factors associated with LBP among nurses. Of 175 approached nurses, 166 participated in the study, yielding a response rate of 94.8%. The demographic characteristics of the participants are outlined in table 1. The majority of nurses were female (91.57%), non-Saudi (53%), under 30 years old (45.18%), married (51.2%), and held at least a bachelor's degree (66.27%).

Work-related factors were analyzed (Table 1), revealing that nurses working in hospitals comprised the largest proportion (74.10%), followed by those working in medical departments (33.13%) and PHCCs (25.9%). Over half of the nurses worked  $\leq 8$  h/day, and 64.46% revealed that they were understaffed during shifts. A significant portion manually lifted and assisted patients (88.55%), and more than half were trained to lift and transfer patients (56.63%). Additionally, 64.46% lifted heavy objects at work, and 77.71% moved wheelchairs or beds at work. Only 32.53% of nurses took sick leave because of LBP. Experience levels varied, with 44.58% having 1 - 5 years of experience and 29.52% having  $\geq 11$  years.

Medical factors related to LBP were also examined (Table 1). BMI categories included normal weight (46.39%), overweight (33.73%), obese (13.25%), and underweight (6.63%). Most nurses were non-smokers (88.55%). High or low blood pressure affected 86.75% of participants, and 89.76% had diabetes mellitus. One to two times per week exercise was reported by 43.98% of nurses.

Variables	Frequency	Percentage
Age (years)		
• < 30	75	45.18
• 30 - 39	74	44.58
• ≥ 40	17	10.24
Sex		
• Male	14	8.43
• Female	152	91.57
Nationality		
• Saudi	78	46.99
• Non-Saudi	88	53.01
Marital status		
• Single	72	43.00
• Married	85	51.20
• Widowed and divorced	9	5.42
Educational level		
• Diploma	56	33.73
• Bachelor	110	66.27
Workplace		
• Primary healthcare center	43	25.90
• Hospital	123	74.10
Department		
• Intensive care unit	40	24.10
• Surgical	28	16.87
• Medical	55	33.13
• Primary healthcare center	43	25.90
Working hours (per day)		
• ≤ 8h	91	54.82
• > 8h	75	45.18
Understaffed		
• No	59	35.54
• Yes	107	64.46
Lift and assist patient manually		
• No	19	11.45
• Yes	147	88.55
Never been trained to lift and transfer patients		
• No	94	56.63
• Yes	72	43.37
Lift heavy objects at work		
• No	59	35.54
• Yes	107	64.46

Push wheelchairs or beds		
• No	37	22.29
• Yes	129	77.71
Sick leave		
• No	112	67.47
• Yes	54	32.53
Experience (years)		
• 1 - 5	74	44.58
• 6 - 10	43	25.90
• $\geq 11$	49	29.52
Body mass index		
• Underweight	11	6.63
• Normal weight	77	46.39
• Overweight	56	33.73
• Obese	22	13.25
Smoking		
• No	147	88.55
• Yes	19	11.45
Diabetes mellitus		
• No	149	89.76
• Yes	17	10.24
Low/high blood pressure		
• No	144	86.75
• Yes	22	13.25
Exercise (per week)		
• None	57	34.34
• 1 - 2 times	73	43.98
• $\geq 3$ times	36	21.69
Bariatric surgery		
• No	159	95.78
• Yes	7	4.22

**Table 1:** Frequency distribution of sociodemographic, work-related, and medical factors in the study population ( $n = 166$ ).

The prevalence of LBP and its consequences are detailed in table 2. Around 65% experienced LBP in their lifetime, with higher percentages reported in the past year (89.81%), week (39.81%), and every day in the last year (18.52%). The prevalence of LBP in the last 7 days was 56.7%. Medical consequences included hospitalization due to LBP (18.52%), seeking medical advice (31.96%), changing jobs (35.19%), and reducing work (69.07%) and leisure (62.89%) activities due to LBP.

Perceived stress levels were assessed, with 3.61% having high, 72.89% moderate, and 23.49% low stress levels. LBP disability was measured using the ODI, indicating minimal effects on activities of daily living for 60.19% of nurses, moderate disability for 33.33%, and severe disabilities for 6.48% of nurses (Table 2).

Variables	Frequency	Percentage
Ever had low back pain (n = 166)		
• No	58	34.94
• Yes	108	65.06
Hospitalized because of low back pain (n = 108)		
• No	88	81.48
• Yes	20	18.52
Changed jobs due to low back pain (n = 108)		
• No	70	64.81
• Yes	38	35.19
Low back pain during last year (n = 108)		
• 0 days	11	10.19
• 1 - 7 days	43	39.81
• 8 - 30 days	18	16.67
• > 30 but not every day	16	14.81
• Every day	20	18.52
Reduced work activity (n = 97)		
• No	30	30.93
• Yes	67	69.07
Reduced leisure activity (n = 97)		
• No	36	37.11
• Yes	61	62.89
Prevented from doing normal work (at home or away from home) during the last 12 months (n = 97)		
• 0 days	24	24.74
• 1 - 7 days	45	46.39
• 8 - 30 days	16	16.49
• > 30 days	12	12.37
Seen by a doctor (n = 97)		
• No	66	68.04
• Yes	31	31.96
Low back pain during the last 7 days (n = 97)		
• No	42	43.30
• Yes	55	56.70
Oswestry Disability Index (n = 108)		
• Minimal disability	65	60.19
• Moderate disability	36	33.33
• Severe disability	7	6.48
• Crippled	0	0
Perceived stress (n = 166)		
• Low	39	23.49
• Moderate	121	72.89
• High	6	3.61

**Table 2:** Prevalence of low back pain and its consequences in the study population.

Bivariate analysis revealed associations between LBP and several factors (Table 3). Sociodemographic factors like age, nationality, marital status, and education level were strongly associated with LBP history. Work-related factors such as working hours per day, insufficient nursing staff, manual lifting, lifting heavy objects, taking sick leave, experience, and stress levels were significantly related to LBP. Medical factors like weekly exercise and high or low blood pressure also had significant associations.

Variables	LBP		LBP		$\chi^2$	P value
	Yes		No			
	N	%	N	%		
Age (years)					20.49	<.0001*
• < 30	35	46.67	40	53.33		
• 30 - 39	60	81.08	14	18.92		
• ≥ 40	13	76.47	4	23.53		
Sex						.772**
• Male	10	71.43	4	28.57		
• Female	98	64.47	54	35.53		
Nationality					15.97	<.0001*
• Saudi	63	80.77	15	19.23		
• Non-Saudi	45	51.14	43	48.86		
Marital status					20.69	<.0001*
• Single	33	45.83	39	54.17		
• Married	68	80.00	17	20.00		
• Widowed and divorced	7	77.78	2	22.22		
Educational level					5.11	.024*
• Diploma	43	76.79	13	23.21		
• Bachelor	65	59.09	45	40.91		
Workplace					0.565	.452*
• PHCC	30	69.77	13	30.23		
• Hospital	78	63.41	45	36.59		
Department					1.62	.654*
• ICU	24	60.00	16	40.00		
• Surgical	20	71.43	8	28.57		
• Medical	34	61.82	21	38.18		
• PHCC	30	69.77	13	30.23		
Working hours (per day)					13.43	<.0001*
• ≤ 8h	48	52.75	43	47.25		
• > 8h	60	80.00	15	20.00		
Understaffed					17.74	<.0001*
• No	26	44.07	33	55.93		
• Yes	82	76.64	25	23.36		
Lift and assist patient manually					10.58	.001*
• No	6	31.58	13	68.42		
• Yes	102	69.39	45	30.61		
Trained to lift and transfer patients					1.86	.172*
• No	57	60.64	37	39.36		
• Yes	51	70.83	21	29.17		

Lift heavy objects at work							
• No	29	49.15	30	50.85	10.189	.001*	
• Yes	79	73.83	28	26.17			
Push wheelchairs or beds							
• No	22	59.46	15	40.54	0.657	.418*	
• Yes	86	66.67	43	33.33			
Sick leave							
• No	60	53.57	52	46.43	19.99	<.0001*	
• Yes	48	88.89	6	11.11			
Experience (years)							
• 1 - 5	36	48.65	38	51.35	21.957	<.0001*	
• 6 - 10	28	65.12	15	34.88			
• ≥ 11	44	89.80	5	10.20			
Perceived stress							
• Low	15	38.46	24	61.54	16.15	<.0001*	
• Moderate	88	72.73	34	27.27			
• High	5	83.33	1	16.67			
BMI							
• Underweight	6	54.55	5	45.45	5.25	.154*	
• Normal weight	45	58.44	32	41.56			
• Overweight	39	69.74	17	30.36			
• Obese	18	81.82	4	18.18			
Smoking							
• No	94	63.95	53	36.05		.456**	
• Yes	14	73.68	5	26.32			
Diabetes mellitus							
• No	94	63.09	55	36.91	2.49	.114*	
• Yes	14	82.35	3	17.65			
High/low blood pressure							
• No	89	61.81	55	38.19	5.063	.024*	
• Yes	19	86.36	3	13.64			
Exercise (per week)							
• None	44	77.19	13	22.81	7.417	.025*	
• 1 - 2 times	46	63.01	27	36.99			
• ≥ 3 times	18	50.00	18	50.00			

**Table 3:** Association of LBP with sociodemographic, work-related, and medical factors (n = 166).

\* $\chi^2$  test.

\*\*Fisher's exact test.

BMI: Body Mass Index; ICU, Intensive Care Unit; LBP, Low Back Pain; PHCC, Primary Healthcare Center;  $\chi^2$ , Chi Square.

The relationship between LBP disability scores and LBP occurrence was examined, showing associations between ODI score and LBP occurrence during the past year and last 7 days (Table 4). Additionally, a significant positive correlation was found between LBP disability and perceived stress scores (Table 5).



Variable	Summary of ODI#				
	N	Mean	SD		
<b>LBP during the last year (n = 108)</b>					
• 0 day	11	4.54	6.87		
• 1-7 days	43	13.84	9.80		
• 8- >30 days but not every day	34	22.95	10.93		
• Every day	20	24.85	13.64		
Total	108	17.80	12.41		
<b>Source</b>	<b>SS</b>	<b>DF</b>	<b>MS</b>	<b>F</b>	<b>P value</b>
Inter-group	4504.0	3	1501.3	13.0	< .001*
Intra-group	11988.6	104	115.27		
Total	16492.6	107	154.14		
<b>Variable</b>	<b>ODI#</b>				<b>P value</b>
	<b>Mean</b>	<b>SD</b>	<b>T</b>	<b>DF</b>	
<b>LBP last 7 days (n = 97)</b>					
• No	13.28	9.20	-4.79	95	< .001**
• Yes	23.92	11.94			

**Table 4:** Relationships of LBP disability scores with LBP during the past year and last week.

\*One-way ANOVA.

\*\*Independent t-test.

ANOVA: Analysis of Variance; LBP: Low Back Pain; ODI: Oswestry Disability Index; SD: Standard Deviation.

Variable	Perceived stress scale score	P value
	<b>r</b>	
Oswestry Disability Index	0.31	.001*

**Table 5:** Correlation between Oswestry disability index and perceived stress scale scores (n = 108).

\*Pearson correlation coefficient.

Multiple regression analysis identified factors independently associated with LBP occurrence. Saudi nationality, marital status, manual patient lifting, higher stress scores, and working more than 8 h/day were significantly linked to LBP occurrence (Table 6).

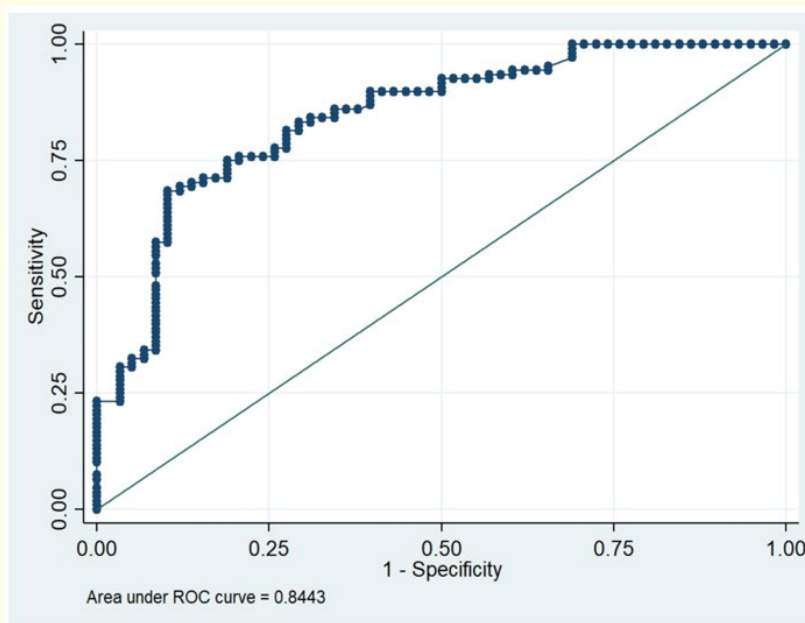
Predictors	aOR	SE	Z	P value	95% CI	
Nationality						
• Non-Saudi	Ref.					
• Saudi	3.32	1.41	2.81	.005	1.44	7.65
Marital status						
• Single	Ref.					
• Married	4.21	2.09	2.90	.004	1.59	11.14
• Widowed and divorced	2.86	3.09	0.97	.332	0.34	23.82
Lift and assist patients manually						
• No	Ref.					
• Yes	5.42	3.50	2.62	.009	1.53	19.19

Stress score	1.09	0.04	2.13	.033	1.01	1.18
Working hours (per day)						
• ≤ 8h	Ref.					
• > 8h	3.33	1.45	2.76	.006	1.41	7.82
Age	1.04	0.04	1.02	.307	0.96	1.12

**Table 6:** Multivariate analysis for factors associated with LBP (n = 166).

aOR: Adjusted Odds Ratio; CI: Confidence Interval; LBP: Low Back Pain; SE: Standard Error.

The study concluded that LBP is prevalent among nurses and is associated with a range of factors, including sociodemographic, work-related, and medical factors, as well as stress levels. The study’s model fit was assessed and validated using statistical methods (Figure 1). Overall, the findings contribute to a better understanding of LBP in the nursing profession and underscore the need for interventions and policies to address this issue.



**Figure 1:** Area under the receiver operating characteristic (ROC) curve.

**Discussion**

The study examined the prevalence of LBP among nurses in the KSA and explored risk factors associated with LBP. The cumulative prevalence of LBP among nurses was 65%, falling within the range observed in previous KSA studies [10,11,13,19]. Notably, the LBP prevalence in the past year and week were 89.8% and 56.7%, respectively, slightly higher than earlier findings [9]. This increase might be attributed to a larger study population that encompassed multiple hospitals and PHCCs.

Various risk factors associated with LBP occurrence among nurses were examined. Nationality was identified as a significant factor, as non-Saudi nurses were less likely to report LBP than Saudi nurses. This difference might be attributed to the annual evaluations and

contract extensions for non-Saudi nurses based on job performance [24]. Marital status also influenced LBP occurrence, with married nurses demonstrating higher susceptibility. This might be linked to cultural expectations where married women are often responsible for household chores, potentially leading to increased pressure and LBP risk [9]. However, few studies have examined the association between LBP occurrence and marital status; hence, further research is required to clarify this association. Our results are consistent with previous research findings in that being married was a significant predictor of LBP, with a high prevalence among nurses [25,26]. Furthermore, over 32% of nurses reported taking sick leave because of LBP, with only a small percentage being non-Saudi nurses. This finding was also reported in a Saudi study [13], which indicated that in nurses, approximately 30% of absences from work were due to LBP.

Furthermore, this study found that nurses who manually assisted patients had a higher risk of developing LBP, which corroborates previous study findings [9,11]. A possible explanation for these results may be the lack of adequate devices for lifting, transferring, and repositioning of patients in government hospitals in Abha. A study [18] reported that the majority of nurses within government hospitals did not know how to use assistive devices; however, this research was based on one hospital in Riyadh. Hence, further research should be conducted to examine whether this is also the case for other hospitals in the KSA, as manual handling was found to be a significant predictor for developing LBP [18]. High workload puts extra pressure on nurses and may lead them to use non-recommended procedures to lift patients manually without support or aids, ultimately putting them at a higher risk of experiencing LBP [27]. Additionally, one study found that the length of time spent handling patients was a significant determinant of LBP development [18].

Prolonged working hours per day were a predictor for developing LBP, with the odds of reporting LBP being 3.33 times higher among nurses working more than 8 h/day compared with those who worked 8h or less, after adjusting for other predictors. Previous studies have shown that daily work lasting 1h or more increases the risk for LBP by 35% [28]; however, Alshahrani [10] found that working hours, specifically full-time, increased the overall risk in nurses. This is similar to the current study findings, suggesting that shorter shifts or longer breaks may reduce LBP risk in the long-term [10].

Psychological factors in the workplace have been shown to significantly increase the risk for future back pain [29]. Furthermore, a prospective cohort study found a strong link between high levels of perceived stress and an increased risk for LBP [30]. Few studies have addressed stress as a risk factor for LBP among nurses in the KSA [11,13,31]. Abuzeid Atta Elmannan, *et al.* [13] and Bin Homaid, *et al.* [31] found no association between LBP and stress. By contrast, Jradi, *et al.* [11] reported an association between work-related stress and LBP. These studies used non-validated methods to measure perceived stress. In the current study, stress was found to be significantly associated with LBP in both bivariate and multivariate analyses. For each score increase in perceived stress, LBP increased by 9% on average, after controlling for other variables. This finding is consistent with the results of a study conducted among elderly Japanese care nurses, in which LBP increased by 5% for every one-score increase in perceived stress (adjusted odds ratio: 1.05) [32].

Although 47% of the nurses in this study were overweight or obese, no statistically significant association between BMI and LBP was found. This result is in agreement with those of other studies conducted in the KSA [9,11,31]. Exercise was significantly associated with LBP in the bivariate analysis but not in the multivariate analysis. Moreover, 34.3% of nurses reported that they did not exercise at all, which is comparable with the findings of Jradi, *et al.* [11] and other studies conducted in the KSA [9,13,31]. In addition, the majority of the participants were aged < 39 years; however, age was not significantly associated with LBP occurrence in the multivariate analysis, which is consistent with the findings of other studies [9-11,31]. Likewise, a systematic review and meta-analysis of studies with 11,752 nurses in 10 countries found no association of age or exercise with LBP occurrence [21].

Although a higher proportion of nurses with LBP had been in their current job for more than 6 years (66.7%), years of work experience was not significantly associated with LBP occurrence in the logistic regression analysis. This finding is consistent with those reported by

Al-Eisa, *et al.* [18] and Alshahrani [10]. Our findings indicate that nurses who worked in surgical departments had the highest prevalence of LBP. However, there was no significant association between the work department and LBP risk.

Regarding disability, we found that more than 33% of the nurses had LBP with moderate disability, indicating that they experienced more pain and difficulty in sitting, lifting, and standing. Moreover, we observed a significant difference between the means of the different durations of LBP during the last 12 months and the ODI, as well as a significant positive correlation between disability and perceived stress.

### Strengths and Limitations

This study examined the prevalence and risk factors of LBP among nurses in the KSA. It has strengths such as its diverse inclusion of nurses from various hospital departments and PHCCs, the investigation of psychological factors using a validated stress assessment tool, and the pioneering measurement of LBP disability in KSA nurses. However, its cross-sectional design limits causal inference between factors like stress and LBP, and potential response biases in self-reporting are acknowledged. Additionally, the scarcity of male nurses hinders a conclusive assessment of sex-related associations with LBP.

### Conclusion

In this study, LBP prevalence was high; the cumulative, annual, and weekly LBP prevalence rates were 65.0%, 89.8%, and 56.7%, respectively. Approximately 60.0% of the nurses reported that LBP had minimal effects on the activities of daily living, and thus they could cope with most living activities. However, 33.3% of the participants had moderate disability; experienced more pain; and had difficulty sitting, lifting, and standing. Seven nurses had severe disabilities, affecting their activities of daily living.

The risk factors that were significantly associated with LBP occurrence in nurses included being Saudi, being married, lifting and assisting patients manually, stress, and working more than 8 h/day.

### Recommendations

The prevention of LBP in nurses involves multiple approaches. Administration should supply proper lifting devices and train nurses in their usage, limit work time to 8h per day, or offer longer breaks to prevent LBP. Regular screenings aid early LBP detection and identification of nurses at high risk of LBP. Education should focus on training programs for manual handling techniques and stress management. Practicing regular stretching and relaxation during work mitigates LBP. Research gaps encompass longitudinal studies to identify LBP risk factors and ensure a safe work environment. Further investigation should compare nurses across sectors and settings to determine variations.

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### Conflicts of Interests

None.

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