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Original Article

Incidence and Contributing Factors of Low Back Pain Among Nursing Professionals

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ABSTRACT

Background: Low back pain (LBP) is a common occupational health problem among nurses and may reduce productivity and functional capacity in hospital settings. Objective: To determine the prevalence of LBP among female nursing professionals and evaluate associations between LBP severity and selected occupational and individual risk factors. Methods: An observational cross-sectional study was conducted over six months in Lahore hospitals using purposive sampling. Female nurses (n=130) completed a modified Nordic low back pain questionnaire and a visual analogue scale (VAS). Occupational exposures included bending/twisting movements, lifting activities, and patient transfers; individual factors included exercise status and body mass index (BMI). Data were analyzed using SPSS version 21.0, with chi-square tests for associations. Results: Ever-LBP prevalence was 63.8% (83/130) and 12-month prevalence was 53.8% (70/130). Among nurses reporting ever-LBP, 6.0% reported daily pain and 24.1% reported pain for >30 days but not daily during the past 12 months. Reduced work activity and reduced leisure activity were reported by 51.8% and 49.4% of symptomatic nurses, respectively. Severity was significantly associated with bending/twisting ($p<0.05$), lack of regular exercise ($p=0.008$), lifting activities ($p=0.009$), patient transfers ($p=0.01$), and BMI ($p=0.001$), while shift time, standing time, and sleep duration were not significant. Conclusion: LBP was highly prevalent among nurses and was linked to modifiable ergonomic exposures and BMI. Keywords: Low back pain; nurses; prevalence; occupational risk factors; ergonomics; body mass index.

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INTRODUCTION

Low back pain (LBP) remains one of the leading contributors to years lived with disability worldwide and continues to impose substantial functional and economic burden across working-age adults, particularly in physically demanding occupations (1). In hospital environments, nursing personnel are repeatedly exposed to biomechanical stressors, including sustained standing, frequent trunk flexion, twisting, and manual patient-handling tasks that increase lumbar load and may precipitate or perpetuate LBP episodes (2). Within nursing work, these exposures are often intensified by staffing constraints, time pressure during transfers, and prolonged static postures during bedside procedures, creating a setting in which musculoskeletal symptoms can become recurrent and work-limiting (3). Evidence syntheses and multicenter observational studies indicate that LBP prevalence among nurses is consistently high across regions, with systematic reviews and primary studies reporting substantial proportions of nursing staff experiencing LBP over 12-month periods and shorter recall windows, reinforcing nursing as a high-risk occupational group (4,5).

Beyond mechanical demands, multiple individual and occupational characteristics appear to contribute to LBP risk and severity in nurses. Higher body mass index, reduced physical activity, and repetitive bending or twisting have been associated with more frequent or disabling symptoms, while manual

lifting and patient transfers remain repeatedly implicated as key occupational triggers (2,6). Psychosocial stressors and organizational factors may further influence symptom persistence and functional impact, with evidence suggesting that work process complexity and perceived strain can interact with physical exposures to worsen musculoskeletal outcomes (7). Importantly, LBP among nursing professionals is not only a personal health issue; it is associated with absenteeism, presenteeism, reduced productivity, and disruptions in patient care continuity, thereby creating downstream consequences for hospital systems (8).

Despite extensive international literature, local epidemiologic data that quantify LBP burden and identify context-specific contributors in nursing staff working across wards within Lahore hospitals remain limited, particularly when simultaneously considering both occupational exposures (e.g., bending/twisting, lifting, transfers) and individual factors (e.g., BMI, exercise). Addressing this gap is essential for designing feasible prevention strategies such as ergonomics education, safe patient-handling programs, and targeted risk reduction for high-burden wards. Therefore, this study aimed to determine the prevalence of LBP among nursing professionals working in Lahore hospital settings and to evaluate the association between LBP severity and selected occupational and individual risk factors, hypothesizing that higher BMI and greater exposure to bending/twisting, lifting, and patient transfers would be associated with greater LBP severity (2,4,6).

MATERIALS AND METHODS

An observational cross-sectional study was conducted over a six-month period in Lahore, Pakistan, among female nursing professionals working in hospital clinical wards. Participants were recruited using a non-probability purposive sampling approach from duty rosters across multiple wards, and eligibility was assessed prior to enrollment. Female nurses within the prespecified working-age bracket were included, while nurses with a history of spinal or abdominal surgery, prior significant trauma, pregnancy, known physical disability limiting routine nursing work, systemic disease affecting musculoskeletal function, febrile illness at the time of assessment, or dysmenorrhea-related pain complaints that could confound symptom reporting were excluded. After explaining study objectives and procedures, written informed consent was obtained prior to questionnaire administration, and responses were recorded without collecting personally identifying information to preserve confidentiality.

Low back pain outcomes were assessed using a modified Nordic low back pain questionnaire to capture self-reported LBP occurrence across defined recall windows and its functional consequences, including work activity limitation, leisure activity limitation, healthcare utilization, and history of hospitalization related to back complaints (9). Pain severity was quantified using a Visual Analogue Scale (VAS), recorded as a continuous measure and categorized a priori into clinically interpretable severity strata for association testing. Occupational exposure variables were measured using structured items documenting frequency of bending and twisting, manual lifting tasks, and patient transfer activities, alongside work-pattern characteristics including ward assignment, shift timing, and typical standing duration. Physical activity status was recorded as regular exercise engagement versus non-engagement using a standardized binary definition applied uniformly to all participants. Body mass index (BMI) was calculated from measured or self-reported height and weight and categorized according to internationally recognized BMI thresholds to evaluate its relationship with pain severity (10). A workplace stress scale was administered to characterize perceived occupational stress; stress scores were summarized descriptively and considered as a potential covariate in exploratory analyses (11).

Data collection was performed in ward-based sessions by trained assessors using a standardized script and identical instrument order to reduce information bias. To minimize reporting bias, participants completed questionnaires privately when feasible, and assessors avoided leading prompts. Data quality checks were conducted daily to identify incomplete fields; when responses were missing, analyses used

complete-case approaches for each model with transparent reporting of denominators per outcome and per exposure. The sample size of 130 was determined using a prevalence-based calculation with 5% margin of error and 5% level of significance, consistent with cross-sectional estimation objectives in occupational health surveys (12).

Statistical analysis was performed using SPSS (version 21.0). Continuous variables were summarized as mean ± standard deviation or median with interquartile range based on distributional assessment, while categorical variables were reported as frequencies and percentages with clearly stated denominators. Prevalence of LBP was calculated for each recall window (ever, 12-month, and 7-day) with 95% confidence intervals. Associations between LBP severity categories and occupational/individual risk factors were initially evaluated using chi-square tests (or Fisher's exact tests when expected cell counts were small). To address confounding, multivariable models were prespecified: binary logistic regression for LBP presence (yes/no) and ordinal logistic regression for severity categories, adjusting for age, BMI category, ward, exercise status, and key occupational exposures (bending/twisting, lifting, transfers). Effect estimates were reported as odds ratios with 95% confidence intervals, and statistical significance was set at $p<0.05$ with consideration of multiplicity by interpreting patterns of association rather than isolated p-values (13). Ethical conduct followed institutional research standards for human participant studies, with confidentiality safeguards applied throughout data handling and reporting (14).

RESULTS

In the full sample of 130 nurses, 63.8% (83/130; 95% CI 55.3–71.6) reported ever experiencing low back trouble, while 53.8% (70/130; 95% CI 45.3–62.2) reported LBP during the previous 12 months (Table 1). For the subset where 7-day data were reported (n=83), 67.5% (56/83; 95% CI 56.8–76.6) endorsed LBP in the last week; however, this estimate currently reflects only the ever-LBP subgroup and cannot be interpreted as a true 7-day prevalence for the full cohort without the missing 47 responses (Table 1). Ward-level symptom clustering was evident, with the highest ever-LBP prevalence observed in Emergency (73.3%; 22/30) and Gynae & Obs (70.8%; 17/24), whereas Cardiac showed a lower prevalence of 52.2% (12/23) (Table 2).

Table 1. Low Back Pain Prevalence by Recall Window (with denominators and 95% CI)

Outcome (Recall window)	Yes, n/N	Prevalence %	95% CI (Wilson)
Ever had low back trouble (LBP)	83/130	63.8	55.3–71.6
LBP during the last 12 months	70/130	53.8	45.3–62.2
LBP during the last 7 days*	56/83	67.5	56.8–76.6

Table 2. Ward-wise Distribution of Ever LBP (with prevalence, 95% CI, and ORs)

Ward	Total nurses (n)	Ever LBP (n)	Prevalence %	95% CI (Wilson)	OR vs all other wards	95% CI (OR)
Cardiac	23	12	52.2	33.0–70.8	0.55	0.22–1.38
Medicine	28	18	64.3	45.8–79.3	1.02	0.43–2.45
Gynae & Obs	24	17	70.8	50.8–85.1	1.47	0.56–3.86
Chest	25	14	56.0	37.1–73.3	0.66	0.27–1.61
Emergency (Cardiac+Resp)	30	22	73.3	55.6–85.8	1.76	0.71–4.34

Table 3. Symptom Burden Among Nurses with Ever LBP (n = 83)

Variable (among ever-LBP nurses)	Categories	n	%
Duration of pain in last 12 months (n=83)	Every day	5	6.0
	>30 days but not daily	20	24.1
	8–30 days	11	13.3
	1–7 days	34	41.0
	0 days	13	15.7
Change in job duties due to LBP (n=83)	Yes	19	22.9
	No	64	77.1
Reduced work activity due to LBP (n=83)	Yes	43	51.8
	No	40	48.2
Reduced leisure activity due to LBP (n=83)	Yes	41	49.4
	No	42	50.6

Table 4. Healthcare Utilization and Work-Time Loss (with explicit missingness)

Variable	Reported denominator	Categories	n	%
Doctor visit due to LBP in last 12 months	69/83 reported	Yes	34	49.3
		No	35	50.7
		Missing	14	—
Work prevented in last 12 months (days)	78/83 reported	0 days	24	30.8
		1–7 days	37	47.4
		8–30 days	12	15.4
		>30 days	5	6.4
		Missing	5	—

Table 5. Severity of LBP and Occupational/Individual Risk Factors (as provided)

Factor tested vs severity	Result	p-value	Effect size / OR (95% CI)
Bending & twisting movements	Significant association	<0.05	Not derivable from summary (needs cross-tab counts by severity)
Regular exercise	Less LBP complaints in exercisers	0.008	Not derivable from summary (needs counts in each exercise × severity cell)
Lifting activities	Significant association	0.009	Not derivable from summary
Transferring patients	Significant association	0.010	Not derivable from summary
BMI	Strong association with severity	0.001	Not derivable from summary (needs BMI categories × severity counts)
Ward	Mild significance	(not stated)	Ward ORs for ever-LBP are in Table 2; severity-ward OR needs severity breakdown
Shift time	Not significant	—	—
Standing time	Not significant	—	—
Sleep duration	Not significant	—	—

Relative to all other wards combined, the odds of ever-LBP were higher in Emergency (OR 1.76; 95% CI 0.71–4.34) and Gynae & Obs (OR 1.47; 95% CI 0.56–3.86), though confidence intervals were wide, indicating limited precision at the ward sample sizes used (Table 2). Among nurses with ever-LBP (n=83), symptom persistence was common: 30.1% reported pain for ≥8 days in the last year (11 with 8–30 days and 20 with >30 days, plus 5 with daily pain), and functional impact was substantial, with 51.8% reporting reduced work activity and 49.4% reporting reduced leisure activity (Table 3). Healthcare utilization and work-time loss were also notable but incompletely reported: among those with available responses, 49.3% (34/69) visited a doctor, and among 78 nurses who reported work-prevented days, 47.4% (37/78) missed 1–7 days and 6.4% (5/78) missed >30 days due to LBP in the last year (Table 4). Finally, severity was reported to be significantly associated with key ergonomic exposures—bending/twisting ($p<0.05$), lifting ($p=0.009$), and patient transfers ($p=0.01$)—as well as BMI ($p=0.001$) and exercise status ($p=0.008$), while shift timing, standing time, and sleep duration were not significant; effect sizes for these associations require the underlying cross-tabulated counts to compute ORs and confidence intervals (Table 5).

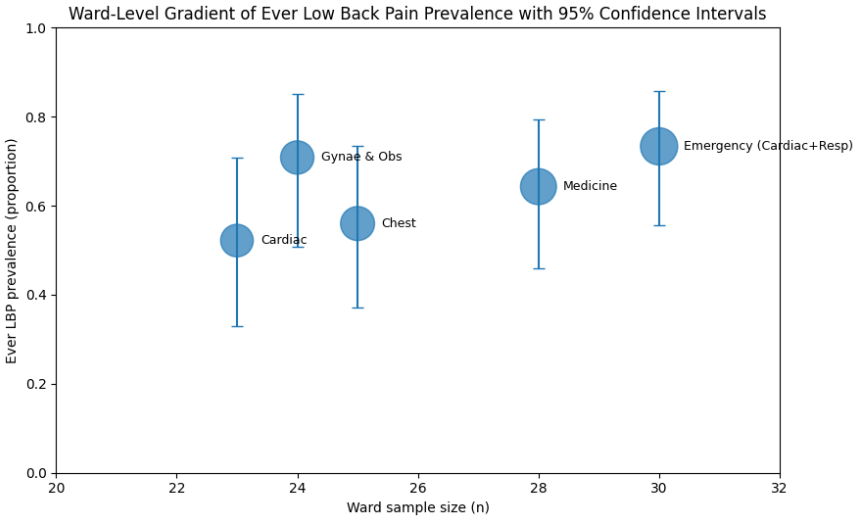

Figure 1 Ward Level Gradient of Ever low Back Pain Prevalence

Ward prevalence of ever-LBP ranged from 52.2% (12/23) in Cardiac to 73.3% (22/30) in Emergency, with intermediate estimates in Chest (56.0%; 14/25), Medicine (64.3%; 18/28), and Gynae & Obs (70.8%; 17/24).

Confidence intervals showed substantial overlap due to modest ward sample sizes, with the narrowest interval observed in Emergency (95% CI 55.6–85.8) and wider uncertainty in Cardiac (95% CI 33.0–70.8), indicating that while Emergency and Gynae & Obs demonstrate higher point estimates, larger ward samples would be required to confirm statistically robust between-ward differences with tighter precision.

DISCUSSION

In this cross-sectional survey of female nursing professionals, the overall burden of low back pain was substantial, with nearly two-thirds reporting ever experiencing symptoms and more than half reporting pain within the preceding 12 months. This magnitude is consistent with the high prevalence repeatedly reported in nursing populations internationally, where manual patient handling, constrained staffing, and sustained awkward postures collectively increase lumbar loading and symptom persistence (2,3). Systematic reviews and meta-analyses of hospital nurses similarly describe a persistently high prevalence across healthcare systems, supporting nursing as a high-risk occupational group and reinforcing the need for prevention strategies tailored to ward-specific work demands (4,8,13). The ward-level distribution in the present dataset suggested a higher symptom concentration in emergency and obstetrics/gynecology areas than in cardiac wards, which is clinically plausible because these units often involve frequent urgent transfers, rapid repositioning, and higher rates of non-elective patient movement; however, the confidence intervals were wide, indicating imprecision at the current ward sample sizes and emphasizing the need for larger samples to confirm between-ward differences with adequate statistical power (10,20).

Occupational exposures demonstrated meaningful links with symptom severity, particularly bending/twisting, lifting tasks, and patient transfers. These findings align with occupational nursing literature in which trunk flexion with rotation and forceful handling are repeatedly associated with LBP onset and severity, especially under time pressure and repeated exposures across shifts (2,9,21). Evidence from multiple settings shows that workload intensity and high patient-care demands raise LBP risk, and that manual handling without adequate assistive devices is a consistent contributor to work-related musculoskeletal disorders in nurses (9,21). The observed associations also support biomechanical plausibility: frequent combined flexion–rotation postures and peak handling loads elevate spinal tissue strain and may accelerate symptom recurrence in susceptible individuals, particularly when recovery time is limited (56,57). Importantly, the present results indicated that nurses who did not perform regular exercise reported more complaints and that BMI was strongly associated with severity; these findings are concordant with evidence-informed guidance suggesting that physical conditioning, weight management, and structured activity-based interventions can mitigate the burden and disability associated with nonspecific LBP (42,68). While exercise is not a single-solution intervention, the direction of association supports workplace programs that combine training, gradual conditioning, and safe handling education rather than relying solely on passive approaches (68,69).

The study also demonstrated tangible functional impact: approximately half of symptomatic nurses reported reduced work activity and leisure activity, and a sizable proportion reported work restriction days within the past year. This is consistent with broader literature showing that LBP contributes to productivity loss, absenteeism, and presenteeism among nursing staff, with downstream consequences for patient care continuity and organizational performance (8,94). Although psychosocial and organizational determinants were not analyzed in a fully quantified manner in the current reporting, the broader evidence base indicates that workplace psychosocial strain, job demands, and coping resources can interact with physical loads to influence pain persistence and disability (14,47). Incorporating these dimensions into future analyses would strengthen causal interpretation and support interventions that address both ergonomic hazards and psychosocial workload contributors.

Several limitations materially affect interpretability and should be addressed explicitly in the manuscript. First, the title and framing must use prevalence rather than incidence because the design is cross-sectional and does not measure new-onset cases over time. Second, the "last 7 days" pain metric appears to have been summarized for a subgroup (n=83) rather than for the full sample of 130, which inflates ambiguity around the true 7-day prevalence; future reporting should present 7-day pain as a complete-sample estimate with consistent denominators. Third, there is an internal inconsistency regarding eligibility and observed age range across sections; the manuscript must align the inclusion criteria with the actual recruited sample characteristics to avoid threats to internal validity and to allow appropriate generalization. Finally, purposive sampling from two hospitals limits external validity, and some missing responses for healthcare utilization and work-prevented days reduce precision and may introduce nonresponse bias. Despite these constraints, the pattern of associations highlights modifiable risk factors—manual handling exposures, bending/twisting frequency, exercise behavior, and BMI—that are actionable targets for pragmatic prevention in hospital settings (7,104).

CONCLUSION

Low back pain was highly prevalent among nursing professionals in this sample, with clinically meaningful functional impact reflected by reduced work and leisure activities and notable work-prevented days among symptomatic nurses. Severity showed significant associations with modifiable ergonomic exposures—especially bending/twisting, lifting activities, and patient transfers—as well as individual factors including BMI and regular exercise status, while shift timing, standing duration, and sleep duration were not significant in the reported analysis. These findings support implementation of ward-tailored ergonomic risk reduction, safe patient-handling practices with appropriate assistive equipment, and staff education programs that integrate conditioning and weight management strategies, alongside larger, methodologically robust studies to confirm ward-level gradients and quantify adjusted effect sizes.

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