DETERMINANTS OF LOW BACK PAIN AMONG HEALTHCARE WORKERS IN CRITICAL CARE UNITS AT A MAJOR PRIVATE UNIVERSITY HOSPITAL IN NAIROBI KENYA

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International Academic Journal of Health, Medicine and Nursing (IAJHMN) | ISSN 2523-5508

Received: 6th September 2026

Published: 21st September 2026

Full Length Research

Available Online at: https://iajournals.org/articles/iajhmn_v2_i2_249_262.pdf

Citation: Mutisya, O. M., Meng'anyi, L.W., Barako, T. (2026). Determinants of low back pain among healthcare workers in critical care units at a major private university hospital in Nairobi Kenya. *International Academic Journal of Health, Medicine and Nursing, 2*(2), 249-262.

ABSTRACT

Purpose: Low back pain is common among healthcare workers in critical care units, where patient handling, prolonged standing, awkward posture, limited rest, and work stress are frequent. This study established the proportion of healthcare workers who experienced low back pain and examined organizational and individual factors associated with low back pain at a major private Hospital in Nairobi.

Methods: An analytical cross-sectional study was conducted among nurses and physiotherapists working in four adult critical care units. Ninety-six of 120 eligible healthcare workers participated. Data were collected using a modified Nordic Musculoskeletal Questionnaire and an equipment checklist. Descriptive statistics summarized the findings. Chi-square tests examined associations, and multivariable logistic regression assessed organizational predictors while adjusting for selected demographic factors.

Findings: Seventy-eight participants reported low back pain, giving a prevalence of 81.3%. Among participants with low back pain, 89.7% were nurses and 10.3% were physiotherapists. The main triggers among nurses were lifting patients (82.9%), bending or twisting (74.3%), and prolonged standing (58.6%). Chronic low back pain was reported by 70.5% of affected participants, and 76.9% stated that pain often or always affected their work. Consistent shift breaks were significantly associated with lower low back pain occurrence (adjusted odds ratio 2.73, 95% confidence interval 1.06-7.05, p = .037). Profession also predicted low back pain (adjusted odds ratio 5.59, 95% confidence interval 1.18-26.41, p = .030). Exercise frequency, diagnosed musculoskeletal conditions, difficulty maintaining posture, work-related stress, and inadequate rest were significantly associated with low back pain.

Unique Contribution to Theory Practice and Policy: The findings support the biopsychosocial model by showing that physical demands, work organization, stress, rest, and individual health act together. Critical care units should provide structured shift breaks, adequate staffing, reliable lifting equipment, practical ergonomic training, early assessment, and access to exercise and physiotherapy support. These actions may reduce pain and protect workforce productivity.

Keywords: Low Back Pain; Critical Care; Healthcare Workers; Nurses; Physiotherapists; Ergonomics; Occupational Health; Kenya.

INTRODUCTION

Low back pain is a major occupational health problem among healthcare workers. Critical care work places nurses and physiotherapists in situations that require frequent patient lifting, repositioning, bending, twisting, and prolonged standing. These tasks can place repeated strain on the lumbar spine. Long shifts, insufficient recovery, staffing gaps, and emotional stress may add to the physical burden. Low back pain can reduce mobility and quality of life, increase sick leave, and cause healthcare workers to continue working while in pain (Al Amer, 2020; Hartvigsen et al., 2018; Tefera et al., 2021).

The burden is especially important in critical care units because many patients are unable to move independently. Workers may need to turn, transfer, mobilize, or support critically ill patients several times during a shift. Mechanical equipment can reduce strain, but the equipment may not always be available or used. Work may also continue without planned breaks when patient needs are urgent. These conditions can create repeated exposure before the body has enough time to recover (Alkhawaldeh et al., 2020; Yang et al., 2019).

Previous studies have reported high levels of work-related musculoskeletal pain among nurses and other healthcare professionals. A systematic review in Saudi Arabia found that low back pain was common and linked with occupational and personal factors (Al Amer, 2020). Studies of intensive care nurses in Ethiopia and China also connected low back pain with physical workload, awkward posture, work patterns, and limited exercise (Tefera et al., 2021; Yang et al., 2019). However, healthcare systems, staffing levels, equipment access, and work culture differ across settings. Local data are therefore needed before prevention programs are developed.

Evidence from Kenya has mainly addressed nurses in general or specialized wards. Less is known about low back pain among nurses and physiotherapists working in private hospital critical care units. Physiotherapists may have training in body mechanics and exercise, but their work also includes repeated manual therapy and patient mobilization. Examining the two groups together can show shared risks and profession-specific patterns.

This study used the biopsychosocial model to understand low back pain. The model explains pain through the interaction of biological, psychological, and social conditions rather than through physical injury alone. In this study, biological and individual factors included age, body mass index, exercise, previous musculoskeletal conditions, sleep, and posture. Psychological and social factors included stress, supervision, staffing, breaks, workload, training, and access to ergonomic equipment. The model was useful because critical care workers experience several of these factors at the same time.

Statement of the Problem

Healthcare workers should be physically able to provide safe care without developing preventable injury. In critical care units, however, workers regularly handle dependent patients and complete physically demanding tasks under time pressure. Low back pain may lead to discomfort, reduced concentration, short-term absence, presenteeism, lower productivity, and possible long-term disability. These outcomes can also affect continuity and quality of patient care.

Despite ergonomic training and the use of lifting aids in some hospitals, low back pain remains common. There was limited setting-specific information on the proportion of affected critical care workers and on the organizational and individual factors linked with pain at the university Hospital. Without this information, interventions may focus only on worker behavior and overlook work systems such as staffing, breaks, equipment, and supervision. This study addressed that gap.

Purpose and Objectives

The purpose of the study was to establish the determinants of low back pain among healthcare workers in the critical care units at the Hospital. The specific objectives were to: determine the proportion of healthcare workers who experienced low back pain; identify organizational factors associated with low back pain; and identify individual factors associated with low back pain.

RESEARCH METHODOLOGY

Study Design and Setting

An analytical cross-sectional design with a quantitative approach was used. The study was conducted in the adult critical care services at Major Private University Hospital in Nairobi, with a bed capacity of 280. The hospital had four adult critical care areas: the general intensive care unit, high-dependency unit, cardiac care unit, and cardiac catheterization or cardiothoracic critical care service. Together, these areas had 46 beds and served patients from Kenya and the wider East African region.

Study Population and Eligibility

The source population included 110 nurses and 15 physiotherapists assigned to adult critical care services. Healthcare workers were eligible when they provided direct patient care, had worked in critical care for more than six months, and provided informed consent. Workers who were on leave during data collection were excluded. Workers whose chronic low back pain was clearly attributed to an external condition, such as a road traffic injury, were also excluded.

Sampling and Sample

All eligible nurses and physiotherapists were invited because the available population was small. Questionnaires were distributed across day and night shifts at times that did not interrupt patient care. Of 120 eligible healthcare workers, 96 completed the questionnaire, giving an 80.0% response rate. The final sample included 86 nurses and 10 physiotherapists.

Data Collection Instruments and Procedure

Data were collected with a modified Nordic Musculoskeletal Questionnaire and a researcher-developed equipment checklist. The questionnaire covered demographic information, health behaviors, posture, exercise, stress, rest, work organization, pain occurrence, pain characteristics, work effects, and coping methods. The checklist assessed the availability of equipment used for patient movement and other critical care tasks. Participants completed paper questionnaires privately and returned them to the researcher.

Content validity was assessed by university supervisors and clinical experts. The questionnaire was pretested among 11 nurses and 3 physiotherapists in a comparable critical care setting. Test-retest procedures were completed two weeks apart. A reliability coefficient of at least .70 was considered acceptable before the instrument was used in the main study.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 28. Frequencies, percentages, means, and proportions described the participants and low back pain patterns. Chi-square tests examined associations between low back pain and categorical organizational or individual factors. Multivariable logistic regression estimated the independent contribution of organizational factors while adjusting for sex, age, and critical care experience. Statistical significance was set at $p < .05$, and adjusted odds ratios were reported with 95% confidence intervals.

Ethical Considerations

Ethical approval was obtained from the Kenyatta University Ethics Review Committee and the University Hospital Institutional Scientific and Ethics Review Committee. A research permit was obtained from the National Commission for Science, Technology and Innovation. Participants received study information and provided written informed consent. Participation was voluntary. Questionnaires did not contain participant names, and study records were secured with restricted access.

RESEARCH FINDINGS

Participant Characteristics and Prevalence

Ninety-six healthcare workers participated. Eighty-six (89.6%) were nurses and 10 (10.4%) were physiotherapists. Seventy-eight participants reported low back pain, giving an overall prevalence of 81.3%. Among those affected, 70 (89.7%) were nurses and 8 (10.3%) were physiotherapists. Most nurses with low back pain were female and were between 30 and 49 years old. Low back pain affected workers across all experience and body mass index groups.

Table 1 Participant Characteristics by Profession and Low Back Pain Status

Characteristic	Nurses LBP n = 70	Nurses no LBP n = 16	Physiotherapists LBP n = 8	Physiotherapists no LBP n = 2
Female	47 (67.1%)	9 (56.3%)	4 (50.0%)	1 (50.0%)
Male	23 (32.9%)	7 (43.7%)	4 (50.0%)	1 (50.0%)
Age 20-29 years	15 (21.4%)	5 (31.3%)	3 (37.5%)	1 (50.0%)
Age 30-39 years	30 (42.9%)	5 (31.3%)	5 (62.5%)	1 (50.0%)
Age 40-49 years	16 (22.9%)	4 (25.0%)	1 (12.5%)	0
Age 50 years or older	9 (12.9%)	2 (12.5%)	0	0
CCU experience 3-6 years	25 (35.7%)	3 (18.8%)	4 (50.0%)	0
Normal BMI	34 (48.6%)	9 (56.3%)	2 (25.0%)	1 (50.0%)
Overweight	17 (24.3%)	5 (31.3%)	4 (50.0%)	2 (100.0%)
Obese	15 (21.4%)	1 (6.3%)	0	0

Note. LBP = low back pain; CCU = critical care unit; BMI = body mass index. Percentages are within each profession and LBP-status group.

Pain Pattern Work Effect and Coping

Among the 78 participants with low back pain, 44.9% reported weekly pain and 32.1% reported occasional pain. Pain often or always affected work for 76.9%. Moderate pain was the most common intensity, and 70.5% of affected participants described chronic low back pain. Age group was significantly associated with chronicity (chi-square = 8.25, df = 3, p = .041). Chronic pain was highest among workers aged 40-49 years (87.5%) and lowest among those aged 20-29 years (40.0%). Sex and profession were not significantly associated with chronicity.

Table 2 Low Back Pain Pattern and Work Effect Among Affected Participants

Measure	Nurses n = 70	Physiotherapists n = 8	Total N = 78
Weekly pain	32 (45.7%)	3 (37.5%)	35 (44.9%)
Occasional pain	23 (32.9%)	2 (25.0%)	25 (32.1%)
Daily pain	5 (7.1%)	1 (12.5%)	6 (7.7%)
Pain often or always affects work	54 (77.1%)	6 (75.0%)	60 (76.9%)
No leave days	21 (30.0%)	1 (12.5%)	22 (28.2%)
One or two leave days	24 (34.3%)	4 (50.0%)	28 (35.9%)
Moderate pain	33 (47.1%)	3 (37.5%)	36 (46.2%)
Severe pain	19 (27.1%)	3 (37.5%)	22 (28.2%)
Chronic low back pain	50 (71.4%)	5 (62.5%)	55 (70.5%)
Radiating pain	40 (57.1%)	4 (50.0%)	44 (56.4%)

Note. Percentages are within profession.

The leading triggers among nurses were lifting patients (82.9%), bending or twisting (74.3%), and prolonged standing (58.6%). For physiotherapists, bending or twisting and prolonged sitting were each reported by 50.0%. The main coping methods were changing posture or movement and taking short breaks. Medication was used more often by nurses, while physiotherapists more often used stretching and physical therapy. About one third of each group continued working without changing their activity despite pain.

A dull ache was the most common pain description (66.7%), followed by sharp pain (50.0%) and stiffness (42.3%). More than half of affected workers reported radiating pain. Rest was the most common relief method (64.1%), followed by medication (52.6%) and stretching exercise (47.4%). These findings show that many participants used short-term symptom relief while remaining exposed to workplace triggers.

Organizational Factors

Most nurses (62.8%) and physiotherapists (70.0%) reported that supportive supervision was absent. Staffing was described as inadequate by 81.4% of nurses and 90.0% of physiotherapists. Most participants received ergonomic training at least once a year, but training gaps remained. About four in five workers reported access to some ergonomic support. However, lifting equipment was only sometimes available to 84.9% of nurses and 70.0% of physiotherapists, while 15.1% and 30.0%, respectively, reported that lifting equipment was never available.

In the adjusted model, shift breaks and profession were significant predictors. Consistent breaks were associated with lower low back pain occurrence. Physiotherapists had higher adjusted odds of reporting low back pain than nurses, but the confidence interval was wide because only 10 physiotherapists participated. Supportive supervision, staffing adequacy, training frequency, patient load, ergonomic support, and lifting equipment did not reach statistical significance in the model.

Table 3 Multivariable Logistic Regression for Organizational and Selected Demographic Factors

Variable	Adjusted odds ratio	95% confidence interval	p value
Consistent shift breaks	2.73	1.06-7.05	.037
Profession physiotherapist	5.59	1.18-26.41	.030
Supportive supervision	1.55	0.73-3.28	.238
Staffing adequacy	1.64	0.69-3.89	.222
Training frequency	1.45	0.61-3.45	.318
Patient load	1.02	0.44-2.39	.967
Ergonomic support	1.31	0.57-3.00	.451
Lifting equipment	0.88	0.35-2.21	.751
Male sex	1.98	0.96-4.09	.062
Age group	1.21	0.55-2.64	.604
Critical care experience	0.74	0.33-1.66	.479

Note. Statistical significance was set at $p < .05$. Coding in the source analysis treated consistent breaks as the protective category.

Individual Health Factors

Several individual factors were associated with low back pain. Exercise frequency was significant ($p = .0332$). Low back pain was reported by 95.0% of workers who did not exercise and by 66.7% of those who exercised at least five days each week. Every participant with a diagnosed musculoskeletal condition reported low back pain ($p < .001$). Difficulty maintaining posture was also significant ($p = .0068$), while knowledge of correct posture alone was not protective.

Work-related stress was associated with low back pain ($p = .0217$). Low back pain affected 92.3% of workers reporting high stress, compared with 68.2% of those reporting lower stress. Believing that stress contributed to pain was also associated with low back pain ($p = .0335$). Feeling well rested at work had a strong association with low back pain ($p < .001$). Participants with low back pain reported a mean sleep duration of 5.8 hours compared with 7.1 hours among those without low back pain. Body mass index, balanced diet, mental health treatment, smoking, and alcohol use did not show statistically significant associations.

Table 4 Associations Between Individual Health Factors and Low Back Pain

Factor	p value	Interpretation
Exercise frequency	.0332	Significant
Diagnosed musculoskeletal condition	< .001	Significant
Difficulty maintaining posture	.0068	Significant
Work-related stress	.0217	Significant
Belief that stress contributes to pain	.0335	Significant
Feeling well rested at work	< .001	Significant
Self-rated physical fitness	.3077	Not significant
Knowledge of correct posture	.2714	Not significant
Body mass index category	.2533	Not significant
Balanced diet frequency	.6661	Not significant
Smoking	.3632	Not significant
Alcohol use	1.0000	Not significant

Note. Chi-square tests were used. Statistical significance was set at $p < .05$.

RESEARCH DISCUSSION

Burden and Pattern of Low Back Pain

The 81.3% prevalence found in this study indicates a high occupational burden. The finding is close to levels reported among intensive care nurses in other settings, where repeated handling of dependent patients and demanding work schedules are common (Alkhawaldeh et al., 2020; Tefera et al., 2021; Yang et al., 2019). The finding also shows that low back pain was not a minor or occasional problem. More than two thirds of affected participants had chronic pain, and about three quarters stated that pain often or always affected work.

Low back pain may affect patient care even when it does not cause long absence. Workers may remain on duty while limiting movement, avoiding difficult tasks, or relying on coworkers. The finding that 71.8% took at least one leave day also shows direct effects on staffing. At the same time, around one third continued working without adjusting their activity when pain occurred. This pattern may reflect commitment to patients, limited staffing, or a workplace culture that normalizes pain. Continuing heavy work without recovery can contribute to chronic symptoms.

Age was associated with chronicity. Workers aged 40-49 years had the highest proportion of chronic low back pain, while those aged 20-29 years had the lowest. This pattern may reflect cumulative exposure to lifting, awkward postures, and long shifts together with age-related changes in physical recovery. Sex and profession were not associated with chronicity in the bivariate analysis. Prevention should therefore begin early and continue across the worker's career rather than starting only after pain becomes persistent.

Physical Triggers and Coping

Lifting patients, bending or twisting, and prolonged standing were the leading triggers among nurses. These tasks are common in critical care because patients may be sedated, ventilated, weak, or unable to follow instructions. The findings agree with research linking manual patient handling and awkward posture with musculoskeletal symptoms among nurses (Al Amer, 2020; Yang et al., 2019). Reliable lifting aids and team-based handling procedures are important because knowledge of correct body mechanics may not be enough when the worker lacks equipment or help.

Coping patterns differed between professions. Nurses more often used medication, while physiotherapists more often used stretching and physical therapy. This difference may reflect professional training and access to exercise-based methods. Rest and medication can provide short-term relief, but they do not remove the exposure that caused the pain. Workplace programs should make active coping methods practical during the workday and should connect workers with early physiotherapy assessment when symptoms continue.

Organizational Factors

Consistent shift breaks were significant in the adjusted analysis. Critical care work often involves continuous attention, but planned short breaks may reduce cumulative muscular strain and fatigue. Breaks also allow workers to change posture, hydrate, and recover after heavy patient handling. A break policy is only useful when staffing and unit workflow allow workers to take the break. Managers should therefore monitor actual break use rather than only the presence of a written policy.

Most participants viewed staffing as inadequate, and many reported weak supervisory support. Although these variables were not statistically significant in the adjusted model, they remain clinically important. Inadequate staffing can reduce opportunities for team lifting, task rotation, and rest. Supportive supervisors can encourage early reporting, arrange temporary task changes, and reinforce safe handling. A small sample and limited variation in responses may have reduced the ability to detect adjusted effects.

Profession predicted low back pain, with physiotherapists showing higher adjusted odds than nurses. This estimate should be interpreted carefully because the physiotherapy group was small and the confidence interval was wide. Physiotherapists complete repeated mobilization and manual therapy, while nurses complete frequent lifting, turning, and bedside procedures. Each group needs prevention strategies that match its actual tasks. A single general training session may not address these different exposures.

Access to ergonomic support was reported by many participants, but reliable availability of lifting equipment was limited. This difference suggests a gap between having some resources and having the correct equipment available at the time of care. Equipment should be easy to reach, maintained, suitable for the patient, and supported by enough trained staff. Practical observation and competency checks may be more useful than annual classroom instruction alone.

Individual and Psychosocial Factors

Exercise frequency, existing musculoskeletal conditions, difficulty maintaining posture, work stress, and inadequate rest were associated with low back pain. These findings support a biopsychosocial view of occupational pain. Physical conditioning may improve strength and recovery, but exercise should not be used to place responsibility only on workers. A physically active worker may still develop pain when staffing, equipment, and work organization remain unsafe.

Posture knowledge was not significantly associated with low back pain, while difficulty maintaining posture was significant. This distinction is important. Workers may know the correct posture but be unable to maintain it when beds are poorly positioned, space is limited, equipment

is unavailable, or patient needs are urgent. Prevention should therefore change the work environment as well as provide education.

Stress and poor rest were also important. Stress can increase muscle tension and affect pain perception, while limited sleep reduces recovery. The difference in mean sleep duration between affected and unaffected workers was clinically meaningful. Scheduling, break protection, supervisor support, and access to mental health or wellness resources should be included in a prevention plan. These measures should be offered together with ergonomic and physical interventions.

Unique Contribution to Theory Practice and Policy

The study applies the biopsychosocial model to critical care workers in a Kenyan private hospital. The findings show that low back pain cannot be explained by patient lifting alone. Pain was connected with physical tasks, work organization, stress, recovery, exercise, posture, and previous musculoskeletal conditions. This supports a combined prevention approach.

For practice, the study identifies immediate areas for action: protected shift breaks, dependable lifting equipment, team handling, early assessment, profession-specific ergonomic coaching, exercise support, and physiotherapy access. For policy, the findings support routine occupational health monitoring and clear standards for safe patient handling, staffing, break coverage, equipment maintenance, and reporting of musculoskeletal symptoms. These actions can help healthcare facilities protect workers while maintaining safe patient care.

Limitations

The study was conducted in one private tertiary hospital, so the findings may not represent other hospitals or regions. The cross-sectional design identifies associations but cannot establish cause and effect. Low back pain and several exposures were self-reported and may be affected by recall or reporting bias. The physiotherapist subgroup was small, which produced imprecise estimates and limits profession comparisons. Some workers with severe symptoms may have been absent during data collection. Future multicenter studies should use larger professional groups, prospective follow-up, and direct ergonomic observation.

Conclusion

Low back pain affected more than four in five participating nurses and physiotherapists in the adult critical care units. Pain was often chronic and frequently affected work. Patient lifting, bending, twisting, prolonged standing, limited rest, stress, difficulty maintaining posture, low exercise frequency, and existing musculoskeletal conditions were important concerns. Consistent shift breaks and profession remained significant in the adjusted organizational model. The findings support a prevention program that addresses both workplace systems and individual health.

Recommendations

Critical care managers should schedule and monitor protected short breaks during each shift. The hospital should maintain enough accessible lifting and transfer equipment and monitor its use at the bedside.

Safe patient handling should use team-based procedures and profession-specific competency assessment.

Staffing plans should allow breaks, task rotation, and assistance with dependent patients. Occupational health services should assess low back pain early and provide timely physiotherapy, exercise guidance, and temporary work modification when needed.

Wellness programs should address sleep, work stress, physical activity, and recovery without shifting responsibility away from the organization.

Future studies should include several hospitals and larger samples of physiotherapists to confirm profession-specific risks.

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