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Occupational back pain among nurses: A challenge to the quality of care in the city of Kindu, Democratic Republic of the Congo

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ABSTRACT

Introduction

Lower back pain among nurses represents a common yet insufficiently investigated occupational health issue.

Purpose

This study aimed to determine the prevalence and contributory factors associated with lower back pain among nursing professionals in Kindu.

Methods

A total of 165 nurses from two institutions — Kindu General Referral Hospital and Lumbulumbu Mapon Hospital Centre — were included. Data were collected using a structured questionnaire. Chi-square tests were applied to determine correlations between potential risk factors and the occurrence of lower back pain.

Results

The prevalence of lower back pain was 70%. Significant associated factors included professional seniority of less than five years (OR = 1.5; 95% CI: 1.1–2.0; p = 0.03), educational level (OR = 1.4; 95% CI: 1.0–1.9; p = 0.04), prolonged standing (OR = 1.3; 95% CI: 0.9–1.7; p = 0.03), lack of training in patient lifting techniques (OR = 1.4; 95% CI: 1.0–1.7; p = 0.03), and absence of assistive equipment (OR = 1.3; 95% CI: 1.0–1.7; p = 0.04). Emotional stress (OR = 1.3; 95% CI: 1.0–1.7; p = 0.04), time pressure (OR = 1.3; 95% CI: 1.0–1.7; p = 0.01), and lack of psychological support (OR = 1.3; 95% CI: — ; p ≤ 0.04) were also significantly correlated with the incidence of lower back pain.

Conclusion

Effective management of occupational lower back pain among nurses calls for targeted ergonomic training, provision of lifting aids, and comprehensive strategies to improve working conditions and the overall quality of patient care.

INTRODUCTION

Back pain constitutes a significant public health issue, affecting approximately 80% of the global population at some point in their lives (Abd ElHafeez et al., 2023). Ayane et al. (2023) highlight that this condition ranks as the second leading cause of disability worldwide, immediately

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following cardiovascular diseases. In this regard, Bagg et al. (2022) note that nurses, due to the physical demands inherent in their profession, are at increased risk of experiencing this common ailment. According to Silva et al. (2023), patient handling, prolonged standing or squatting postures, and carrying heavy loads are factors that contribute to the onset of back pain.

The occurrence of back pain can have significant consequences on nurses' quality of life. Bagg et al. (2022) illustrate that the pain experienced can hinder their ability to perform daily tasks while also impacting their emotional state and sleep quality. Moreover, this health issue may compel nurses to take time off work, potentially affecting their professional careers and the quality of care provided. An epidemiological study conducted by Rosen et al. (2020) examining occupational factors associated with the development of low back pain among nurses revealed that their profession involves significantly more frequent handling of heavy objects, requiring unnatural postures, as well as frequent physical contact with patients compared to sedentary workers. Shan et al. (2021) demonstrated that the nursing work environment presents an elevated risk for developing musculoskeletal disorders, including work-related low back pain.

In the Democratic Republic of Congo (DRC), nurses constitute the most widely available frontline healthcare personnel across most health facilities, performing a broad range of functions. Similar to other African countries, Nhokovedzo and Nembaware (2022) emphasised that these responsibilities are typically accompanied by a substantial workload. However, academic research specifically addressing this issue remains insufficient. According to Bihabwa Mahano (2016), this gap accounts for the absence of specialised literature as well as the lack of reliable data necessary to support future investigations. Observations conducted in two hospital settings revealed that at least three nurses were absent from duty due to lower back pain (Ridel, 2020). Furthermore, it is important to highlight the deficit of knowledge specific to the DRC (Okello et al., 2020).

Okello (2020) underscored a notable scarcity of local data: despite the abundance of international studies concerning back pain among nurses or similar populations, systematically collected data within the DRC remain rare and fragmented, particularly due to disparities related to measurement tools, indicators, and operational definitions employed. In addition, few truly contextualised assessments are available; existing research rarely describes organisational realities specific to the Congolese context— such as workload per department, equipment availability, or safety culture—thereby limiting the transferability of international recommendations. Okello et al. (2020) also pointed out that information remains lacking regarding both the prevalence and risk factors specific to Kindu. Within this framework, Nlunda Mukiese et al. (2024) indicated that the actual magnitude of back pain among nurses, its distribution across departments, as well as the influence of local factors remain poorly documented. This is compounded by a manifest insufficiency of data relating to its impact on the quality of care provided.

This study seeks to examine the prevalence, contributory factors, and potential interventions for work-related back pain among nurses in Kindu, Democratic Republic of Congo. To facilitate investigation into back pain within the context of Kindu city, an integrated theoretical framework addressing back pain was employed as a reference model (Bastide, 2021). This model incorporates biophysical, psychosocial, organisational, and individual factors.

METHODS

Study Design

This study employed a quantitative, descriptive design with an analytical objective. This approach, based on the collection and analysis of numerical data, enabled the examination of relationships between various variables to provide an in-depth understanding of the subject, identify trends, and formulate potential hypotheses for future research.

Study Setting

The study was conducted from November 2023 to April 2024 in two hospitals located in the city of Kindu: the General Referral Hospital of Kindu and the Lumbulumbu Mapon Hospital Centre. The selection of these institutions was justified by the diversity of resources and technical facilities available. The contrast between the insufficient technical equipment observed at the General Referral Hospital (HGR) of Kindu and the relatively adequate

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facilities at Lumbulumbu Hospital Centre allowed for a thorough examination of the impact of professional context on nurses' health. Additionally, the significant size of personnel in both institutions enhanced the statistical robustness of the findings, facilitating their generalisation. Furthermore, variations in management practices between the public and private sectors offered valuable insights into contributing factors.

Population and Sampling Technique

The study population consisted of active nurses who had worked in either hospital within the past 12 months. Eligibility criteria required participants to be practising nurses at one of the two hospitals during the survey period, possess at least one year of professional experience, and have provided informed consent documented by a form signed by both the investigator and respondent upon completing the questionnaire.

An exhaustive sampling method, also referred to as a census, was implemented, involving 165 nurses. According to Lecointre (1993), this type of sampling entails observing, measuring, or collecting data from all units within the targeted population without any partial selection. In this study, the sample comprised all nurses meeting the inclusion criteria within the selected hospital institutions. Including the entire eligible nursing staff aimed to maximise representativeness and eliminate selection bias. Consequently, the sample size encompassed all available nursing personnel in both hospitals during the study period, thereby offering a comprehensive perspective on influencing factors.

Data Collection

The primary instrument used for data collection was a structured questionnaire administered via KoboToolbox, a digital platform chosen for its efficiency in gathering health-related data in low-resource environments. The questionnaire comprised several sections addressing different dimensions based on the integrated theoretical framework serving as a reference model. It included items related to individual characteristics, psychosocial and psychological factors, and ergonomic aspects concerning pain management strategies such as treatments received and rest breaks taken.

Data Collection Process

Prior to the final data collection, a pilot test was conducted with a limited sample of nurses from Alunguli Hospital to assess the clarity of the questions and to prevent any comprehension bias. As highlighted by Imani Ramazani (2023), this phase necessitated adjustments to the questionnaire. The administration of the questionnaire was carried out via the KoboToolbox platform. According to Taber et al. (2020), this tool enables researchers to collect responses using tablets or smartphones. Cereda et al. (2020) asserted that this method ensures optimal speed and reliability in data collection. The data collection took place in person, thereby facilitating interactions with participants to address any queries and encourage their engagement. To guarantee anonymity and uphold participants' rights, each individual was informed about the study's objectives and provided informed consent prior to completing the questionnaire.

Data Analysis

Within the scope of this research, Microsoft Excel version 10 and SPSS version 26 software were utilised for processing the data collected from participants. Microsoft Excel was employed for database management as well as for conducting basic descriptive analyses, including the calculation of frequencies, means, and proportions related to key variables such as the prevalence of back pain and sociodemographic factors. For more advanced statistical analyses, SPSS version 26 facilitated the implementation of bivariate correlation tests (Swank & Mullen, 2017). Specifically, the Chi-square test was used to identify associations between the dependent variable (back pain: yes vs. no) and various independent variables such as age, professional experience, ergonomics, and stress. Furthermore, odds ratios (OR), accompanied by their 95% confidence intervals (CI), were employed to assess the strength and precision of these relationships. Results were considered statistically significant when the p-value was less than 0.05.

Ethical Considerations

To conduct ethical research on work-related back pain among nurses at Kindu General Hospital and the Lumbulumbu Mapon Health Centre, several critical considerations were meticulously addressed. The research

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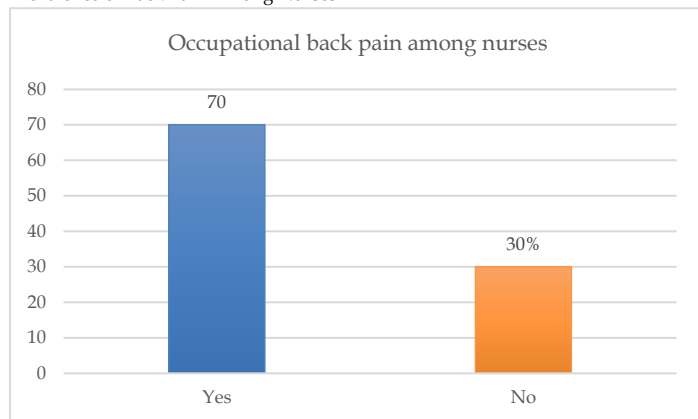
protocol was submitted to the Research Ethics Committee of ISTM Kindu, which granted its approval under decision No. Ref: 05/ISTM-KD/C.E.R.I/IRBE/2024. Ensuring confidentiality and anonymity was paramount to prevent unauthorised disclosure of personal information. Participants were informed about the study objectives, the types of data collected, their intended use, and their rights, including the right to withdraw at any stage. Informed consent was obtained before participation. Data handling adhered strictly to prevailing ethical standards, particularly regarding secure storage and restricted access.

Methodological Limitations

This study has certain limitations, notably a limited sample drawn from only two hospitals, which may restrict generalisability to a broader population. Additionally, since questionnaire responses were self-reported, there is a risk of reporting bias influenced by participants' recall or their desire to provide socially acceptable answers. Finally, the quantitative approach adopted—without qualitative data inclusion—limits the in-depth understanding of participants' individual experiences, thereby constraining analysis of nuances and personal contexts that could have enriched the study's conclusions.
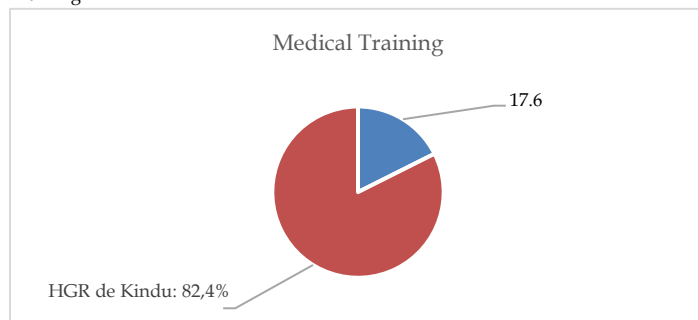
RESULTS

Figure 1:
Prevalence of Back Pain Among Nurses

This **Figure** illustrates that a significant majority of the surveyed nurses (70%) reported experiencing work-related back pain. The affected segment is highlighted in red.

Figure 2:
Distribution of Occupational Back Pain Among Nurses Based on Their Medical Training

This **Pie Chart** shows that, among the two healthcare facilities studied, occupational back pain is more prevalent among nurses at the General Referral Hospital (HGR) of Kindu.

Table 1:
Analysis of Work-Related Back Pain Based on Individual Variables

Individual Variables	Work-Related Back Pain in Nursing				
	Yes (%)	No (%)	OR	95% CI	p-value
Age					**0.04**
20–39 years	49 (29.7)	27 (16.4)	1.1	(0.8–1.5)	
40–59 years	37 (22.4)	15 (9.1)	1.3	(1.5–4.1)	
≥ 60 years	30 (18.2)	7 (4.2)	0.9	1	
Gender					**0.051**
Male	58 (35.1)	18 (10.9)	1.2	(0.9–1.5)	
Female	58 (35.1)	31 (18.8)	1.0	1	

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Individual Variables	Work-Related Back Pain in Nursing				
Education Level					0.02
A2	18 (10.9)	0 (0.0)	1.1	(0.8–1.4)	
A1	49 (29.7)	21 (12.7)	1.4	(1.1–1.8)	
L2	49 (29.7)	28 (16.9)	1.2	1	
Professional Experience in the Field					0.03
< 5 years	50 (30.3)	25 (15.2)	1.3	(1.3–5.4)	
5–10 years	23 (13.9)	17 (10.3)	1.2	(0.9–1.5)	
> 10 years	43 (26.1)	7 (4.2)	1.0	1	
Department Assignment					0.04
Surgery	18 (10.9)	15 (9.1)	1.1	(0.8–1.4)	
Obstetrics and Gynaecology	25 (15.2)	13 (7.9)	1.3	(1.4–3.7)	
Paediatrics	31 (18.8)	8 (4.9)	1.1	(0.8–1.5)	
Internal Medicine	42 (25.5)	13 (7.9)	1.2	1	
Experience Within the Department					0.03
< 5 years	53 (32.1)	26 (15.8)	1.3	(1.1–3.5)	
5–10 years	29 (17.6)	16 (9.7)	1.2	(0.9–1.5)	
> 10 years	34 (20.6)	7 (4.2)	1.0	1	

The analysis of the results presented in **Table 1** indicates that nurses aged between 40 and 59 years exhibit an approximately 30% increased risk of work-related back pain compared to their younger counterparts (OR = 1.3). Furthermore, nurses holding an A1 diploma show about a 40% higher likelihood of back pain relative to the reference group. Similarly, those with less than five years of professional experience face elevated risks. Working in obstetrics and gynaecology is also associated with a heightened risk of back pain. Finally, shorter tenure within the department appears linked to a greater probability of experiencing back pain.

Table 2:
Examination of Back Pain in Relation to Occupational Characteristics of Nurses

Work-Related Characteristics	Work-Related Back Pain in Nursing				
	Yes (%)	No (%)	OR	95% CI	p-value
Duration of Back Pain					0.04
< 1 year	51 (30.9)	32 (16.5)	1.3	(2.2–6.1)	
≥ 1 year	65 (39.4)	17 (10.3)	1.0	1	
Pain Location					0.04
Lower back	107 (64.9)	15 (9.1)	1.2	(0.9–1.5)	
Middle back	21 (12.7)	9 (5.5)	1.3	(1.2–2.9)	
Upper back	9 (5.5)	4 (2.4)	1.1	1	
Pain Trigger					0.03
Specific movements	72 (43.6)	37 (22.4)	1.2	(0.9–1.5)	
Prolonged posture	18 (10.9)	3 (1.8)	1.3	(1.3–4.8)	
Stress and/or fatigue	26 (15.8)	9 (5.5)	1.0	1	
Consultation for Back Pain					0.002
No	56 (33.9)	12 (7.2)	70.78	(25.14–199.25)	
Yes	60 (36.4)	37 (22.4)	1.0		
					0.04

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Work-Related Characteristics	Work-Related Back Pain in Nursing			
Type of Care Received				
Medical care	21 (12.7)	4 (2.4)	1.3	(0.9–1.7)
Traditional care	12 (7.2)	5 (2.4)	4.90	(1.8–11.3)
No care	24 (14.6)	98 (2.4)	1.0	1

This **Table** demonstrates a statistically significant association between back pain and nurses with less than one year of experience, a relationship further intensified by prolonged standing. A notable association is also observed among nurses who have not sought consultation for back pain, as well as those using traditional treatments.

Table 3:
Analysis of Work-Related Back Pain in Relation to Ergonomic Risk Factors

Ergonomic Risk Factors	Work-Related Low Back Pain in Nursing				
	Yes n (%)	No n (%)	OR	IC (95%)	p
Repetitive manual lifting of patients without the use of assistive equipment					0.001
Yes	103 (62.4)	49 (29.7)	3.4	(1.1 – 1.8)	
No	10 (7.9)	3 (0)	1		
Lack of training on proper lifting techniques					0.03
Yes	101 (61.2)	49 (29.7)	2.3	(1.0 – 1.7)	
No	11 (9.1)	5 (0)	1		
Prolonged standing periods					0.03
Yes	99 (60.0)	49 (29.7)	2.2	(1.9 – 3.7)	
No	11 (10.3)	6 (0)	1		
Poorly arranged workspaces					0.04
Yes	96 (58.2)	48 (29.1)	2.2	(1.0 – 2.7)	
No	16 (12.1)	4 (0.6)	1		
Staff shortages leading to excessive workloads					0.04
Yes	87 (52.7)	27 (16.4)	2.3	(1.0 – 1.6)	
No	29 (17.6)	22 (13.3)	1		
Long working hours without sufficient breaks					0.056
Yes	46 (27.9)	10 (6.1)	1.2	(0.9 – 1.6)	
No	70 (42.4)	39 (23.6)	1		
Frequent job rotation					0.03
Yes	51 (30.9)	32 (19.4)	3.3	(1.0 – 1.7)	
No	65 (39.4)	17 (10.3)	1		
Lack of assistive equipment					0.051
Yes	56 (33.9)	42 (25.5)	1.2	(0.9 – 1.5)	
No	60 (36.4)	7 (4.2)	1		
Old or poorly maintained equipment					0.04
Yes	65 (39.4)	37 (22.4)	1.3	(1.1 – 2.3)	
No	51 (30.9)	12 (7.3)	1		
Absence of ergonomic supplies					0.003
Yes	28 (17.0)	4 (2.4)	1.3	(1.4 – 3.5)	
No	88 (53.3)	45 (27.3)	1		

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The **Table** highlights that repeated manual handling without assistance, lack of training in lifting techniques, prolonged standing, poorly designed workspaces, outdated equipment, staff shortages, increased workloads, and the absence of properly functioning ergonomic equipment are significantly associated with occupational back pain among nurses.

Table 4:

Analysis of Back Pain Among Nurses Based on Sociotechnical Factors

Sociotechnical Factors	Work-Related Low Back Pain in Nursing				
	Yes n (%)	No n (%)	OR	IC (95%)	p
Emotional stress associated with challenging working conditions					0.04
Yes	61 (40.0)	44 (26.7)	1.4	(1.2 – 2.6)	
No	55 (33.3)	5 (3.0)	1		
Time pressure to complete tasks quickly					0.01
Yes	73 (44.2)	40 (24.2)	1.3	(1.0 – 1.7)	
No	43 (26.1)	9 (5.5)	1		
Lack of psychological support or wellness programs					0.001
Yes	32 (19.4)	44 (26.7)	1.3	(1.1 – 4.7)	
No	84 (50.9)	5 (3.0)	1		
Little or no ongoing training on safe work methods					0.53
Yes	10 (9.7)	6 (0)	1.2	(0.7 – 1.6)	
No	100 (60.6)	49 (29.7)	1		
Lack of awareness regarding ergonomic risks specific to the profession					0.03
Yes	16 (9.7)	1 (0.6)	1.3	(1.3 – 2.7)	
No	100 (60.6)	48 (29.0)	1		
Absence of clear protocols for reporting and managing back pain					0.051
Yes	76 (46.1)	21 (12.7)	1.2	(0.9 – 1.5)	
No	40 (24.2)	28 (17.0)	1		
Individual medical predispositions to back pain					0.07
Yes	51 (30.9)	19 (11.5)	1.3	(0.3 – 1.5)	
No	65 (39.4)	30 (18.2)	1		
Absence of physical strengthening or conditioning programs for nurses					0.067
Yes	103 (63.4)	48 (29.0)	1.2	(0.9 – 1.5)	
No	13 (7.9)	1 (0.6)	1		

This **Table** shows that stresses applied to the spine—particularly during twisting movements, forward bending, or bed transfers—represent significant risk factors. Insufficient training in proper lifting techniques, prolonged standing, and poorly adapted work environments further exacerbate these risks. Additionally, outdated equipment, understaffing leading to excessive workload, and the lack of ergonomic supplies contribute substantially to the heightened risk of occupational back pain among nurses.

DISCUSSION

Our findings reveal a high prevalence of back pain among nurses, with variations influenced by seniority, educational level, and institutional context. The increased risk observed at HGR Kindu compared to the Lumbulumbu Mapon Hospital Centre suggests a complex interplay between structural factors—such as work organisation, technical facilities, and availability of assistive equipment—and the quality of ergonomic training. This observation aligns with Lawan et al. (2024), who demonstrated that structured prevention and training programmes significantly reduce musculoskeletal disorders in high-demand healthcare environments.

The association between age and pain, which is more pronounced among both younger and older professionals,

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supports Bayartai et al.'s (2023) hypothesis regarding differentiated vulnerabilities: lack of experience and protective strategies among the young versus cumulative microtraumas and comorbidities among older professionals. Hawker et al. (2021) further highlight the positive impact of higher educational attainment on ergonomic awareness, a finding echoed here (p = 0.02), emphasising the need for reinforced ergonomic education. Similarly, Azizpour et al. (2017) note that professionals with less than five years of experience are more likely to develop back pain due to service transitions and inadequate equipment—underscoring the importance of mentorship and peer support. Gilchrist and Pokorná (2021) stress the development of targeted training for different career stages and the need to adapt workloads and resources to specific service demands.

Clinically, pain duration and frequency (p = 0.04 and p = 0.03) correlate with reduced performance and deteriorating quality of life, consistent with Klein and Tremblay (2020) and Wieland et al. (2022). The predominance of lumbar pain (p = 0.04) aligns with Wieland et al. (2022), who underscore interventions such as correct lifting techniques, micro-breaks, and ergonomic workstation adjustments.

The primary challenge lies not only in managing pain symptoms but also in preventing chronicity. Aminu et al. (2023) and Gilchrist and Pokorná (2021) recommend cost-effective strategies—early reporting systems, short on-site training, and structured rest breaks—that are feasible in low-resource settings. IJzelenberg et al. (2023) also advocate for accessible rehabilitation and therapeutic education, reinforcing the need for locally adaptable approaches.

Traditional ergonomic factors—manual lifting, prolonged standing, poor workspace design, and outdated equipment—remain key contributors (p = 0.001–0.04). Wieland et al. (2022) and Paintsil et al. (2022) advocate for pragmatic "frugal" solutions such as using transfer aids, postural checklists, and short ergonomics exercises integrated into daily routines.

Emotional stress, time pressure, and lack of psychological support also show significant correlations with pain (p = 0.001–0.04), consistent with Johnson et al. (2021), who link organisational stressors to muscle tension. Brantley (2023) suggests non-punitive reporting systems, support groups, and debriefing sessions to foster open communication about pain.

Studies from Ethiopia (Ayane et al., 2023) and China (Liu et al., 2021) corroborate these findings, revealing similar occupational stressors in low-resource contexts. By contextualising these insights in the Maniema region, this study contributes to a broader understanding of how material conditions, maintenance, and management practices affect nurses' musculoskeletal health (Bolan et al., 2021).

Operationally, this research proposes low-cost interventions such as short on-site ergonomic training, simple assistive tools, and standardised pain-reporting protocols. Early detection and referral can help prevent chronicity—an often neglected component in African studies.

Strengths, Limitations, and Future Directions
This study's strengths include a multi-site design, integration of ergonomic and sociotechnical variables, and alignment with recent global evidence. Limitations include reliance on self-reported data and the cross-sectional design, which restricts causal inference. Future research should employ longitudinal methods and incorporate objective ergonomic assessments, such as observational data or absenteeism metrics.

CONCLUSION
This study underscores the multidimensional nature of work-related back pain among nurses, influenced by sociodemographic, ergonomic, and psychosocial factors. Seniority, education, and poor ergonomic conditions—especially lack of assistive equipment—are major contributors. Emotional stress, inadequate training, and lack of psychological support further increase vulnerability. To address these challenges, it is crucial to implement comprehensive strategies, including mandatory ergonomics training, accessible assistive tools, ongoing education, and psychological support systems. These interventions can enhance nurse well-being, improve productivity, and strengthen the overall quality of care. Implementing holistic preventive and management frameworks will be pivotal to achieving sustainable improvements in healthcare work environments.

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