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Low back pain among academic staff at a university in Ethiopia: a cross-sectional study

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ABSTRACT

Objective Low back pain (LBP) is a common occupational health problem among academic staff, often associated with prolonged sitting, poor ergonomics and psychosocial stress. This study aimed to assess the prevalence of LBP and its associated factors among academic staff at a university in Ethiopia.

Design and setting A cross-sectional survey was conducted among academic staff at the University of Gondar (Gondar, Ethiopia) using simple random sampling from March to April 2021.

Participants A total of 607 workers participated in the study.

Outcome measures A self-administered, structured Nordic Musculoskeletal Questionnaire was used to assess the occurrences of LBP over the past 12 months. Data were analysed using Stata (V.14), and associations between variables were examined using binary logistic regression. Results are presented as adjusted ORs (AOR) with 95% CIs, with statistical significance set at p<0.05.

Results The prevalence of LBP in the last 7 days was 44.8% (95% CI 40.8% to 48.86%), and over the past 12 months it was 55.68% (95% CI 51.63% to 59.68%). A significant difference in 7-day prevalence was observed between female and male participants (39.86% vs 15.81%, respectively; $\chi^2 = 0.887$; p=0.02). In the multivariable logistic regression analysis, being female was associated with higher odds of LBP (AOR=1.72; 95% CI 1.15 to 2.57; p=0.009), as was working more than 8 hours per day (AOR=1.45; 95% CI 1.02 to 2.10; p=0.038), physical inactivity (AOR=1.88; 95% CI 1.30 to 2.72; p=0.001) and prolonged standing during work hours (AOR=1.63; 95% CI 1.03 to 2.59; p=0.036).

Conclusion The prevalence of LBP among academic staff is high. Targeted interventions are recommended to address LBP, focusing on gender-sensitive strategies to mitigate the additional burden on female staff, time management to reduce long working hours and workplace programmes to limit sedentary behaviour, encourage physical activity and improve ergonomic awareness.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study provides valuable insights into low back pain among university academic staff, a population often overlooked in musculoskeletal research.
⇒ It uses a validated data collection tool (Nordic Musculoskeletal Questionnaire).
⇒ The single-institution setting may limit the generalisability of the findings to other academic settings.
⇒ Reliance on self-reported data over a 12-month recall period may introduce recall bias and under-reporting.
⇒ The cross-sectional design and limited details on physical activity could constrain causal inference, particularly for modifiable behavioural and occupational factors.

INTRODUCTION

Low back pain (LBP) is a leading cause of disability worldwide, significantly affecting occupational health. In professions like academia, which involve prolonged sitting and repetitive tasks, the risk of LBP is particularly high.[1] Additionally, academic staff often face additional stressors, such as heavy workloads and inadequate ergonomic facilities, which can further exacerbate the development and severity of LBP.[2–5] In 2020, LBP affected 619 million people globally, with projections indicating this number will rise to 843 million by 2050, driven largely by population growth and ageing.[6] LBP can severely reduce quality of life, impair physical functioning and limit participation in daily activities.[6 7] Beyond its impact on individuals, LBP places a significant burden on public health and is associated with substantial economic loss.[8]

Research indicates that the epidemiology of LBP varies depending on the definitions used and the populations studied.[9] The literature suggests that approximately 90% of the global population experiences LBP at some point in their lives,[10] with global point prevalence ranging from 1.0% to 58.1%, and 1 year prevalence ranging from 0.8% to 82.5%.[11 12]

Studies suggest that over a third (37%) of all LBP cases can be attributed to workplace-related factors.[13 14] Academic professionals may be at particular risk because of the

sedentary demands of teaching, research and administrative duties. Reported 12-month prevalence estimates also vary across settings, with studies reporting 47.62% in Pakistan,[15] 48.1% in Cameroon,[16] 54.8% in Brazil[17] and 40.3% in Ethiopia.[18] The occurrence of LBP in academic staff is multifactorial, often arising from prolonged static postures during tasks such as lecturing, grading, attending meetings and preparing manuscripts.[4] These activities can exacerbate pain and contribute to muscle strain or injuries.[18–21]

Other occupational factors linked to LBP include long working hours[18] and physical exposure, such as vibration.[13 14] In addition, sociodemographic characteristics (eg, sex, age, education level and experience) and lifestyle behaviours (eg, physical inactivity, smoking) have been shown to increase the risk of LBP.[13 14 18 20 22–24] Furthermore, psychosocial factors, including job satisfaction, job stress and depression, have been associated with LBP.[14 20]

Research on work-related musculoskeletal disorders among academic staff in low-income and middle-income countries (LMICs) remains largely unexplored, despite the growing global burden of these conditions. Ethiopia, as a rapidly developing country with a burgeoning higher education sector, presents a unique context where occupational health challenges for academic staff are compounded by limited resources, inadequate ergonomic support and high teaching demands. Prolonged sitting, repetitive physical tasks and inadequate access to preventive healthcare may contribute to the increased prevalence of LBP among university staff. However, the lack of region-specific research in this area means that the unique risk factors faced by Ethiopian academics remain poorly understood, leaving a gap in the development of appropriate workplace health strategies.

This study aims to address this gap by investigating the prevalence and contributing factors of LBP among Ethiopian academic staff, localised data that can inform targeted interventions. By identifying and analysing factors that exacerbate LBP, the study will provide evidence to guide the development of practical, tailored solutions aimed at improving the health and well-being of academic staff. The findings have the potential to enhance the educational experience in Ethiopia and provide valuable lessons that can be applied to other LMICs facing similar occupational health challenges, promoting a healthier, more productive academic workforce. This issue is also of global concern, as LBP is among the leading causes of disability worldwide.[25] Addressing it contributes to global priorities such as the Sustainable Development Goals, (SDGs) particularly SDG 3 (Good Health and Well-being) and SDG 8 (Decent Work and Economic Growth).[26]

METHODS

Study design and setting

An institution-based cross-sectional study was conducted from 17 March to 17 April 2021, during the COVID-19 pandemic, to assess LBP and its associated factors among academic staff at the University of Gondar, Ethiopia.

The study was conducted within the academic faculties of the University of Gondar, which is situated in the historical city of Gondar, north-western Ethiopia, approximately 737 km from Addis Ababa, the capital of Ethiopia.[27] The University was established in 1954 and currently comprises five campuses: the College of Medicine and Health Sciences and Comprehensive Specialized Hospital, Maraki, Atse Tewdros, Atse Fasil and Teda.[28] During the study period, the university had a total of 2858 academic staff members.

Source and study populations

The source population for this study consisted of all academic staff at the University of Gondar. A random sample of academic staff from each campus was selected to form the study population.

Inclusion and exclusion criteria

Inclusion criteria were academic staff with at least 1 year of teaching experience who were available during the data collection period. Exclusion criteria included individuals on sick, annual, maternity or sabbatical leave, as well as those with a history of chronic back pain or major traumatic injuries (eg, car accidents, spinal disorders) unrelated to work. This ensured that participants with potentially work-related LBP within the past 12 months were included, whereas those whose pain was due to non-occupational or long-standing conditions were excluded.

Sample size determination and sampling procedure

The sample size was calculated using the single population proportion formula,[29] assuming a prevalence of 40.30% for back pain from a previous study,[18] 4% margin of error (d) and 95% CI based on the following formula:

$$n = \left(Z\alpha/_2\right)^2 \frac{[p\ (1-p)]}{d^2}$$

Where n=initial sample size, Z=1.96, the corresponding Z-score for the 95% CI, p=proportion =40.30%, d=margin of erro =4% =0.04

$$n = \left(1.96\right)^2 \frac{[0.403\ (1-0.403)]}{0.04^2} = 578$$

Finally, the total sample size (n=636) was obtained with an additional non-response rate of 10%.

It should be noted that the sample size was calculated to estimate the prevalence of LBP with sufficient precision. However, it was not specifically powered to detect associations in multivariable logistic regression analyses. This may limit the ability to identify statistically significant associations after adjusting for multiple confounders.

A simple random sampling technique was employed to select study participants using data obtained from the human resources departments of the respective campuses. The OpenEpi Random Program (V.3) was

used to randomly select academic staff from the official staff list. The selected staff members were subsequently invited to participate in the study.

Variable measurement and definition of terms

LBP: Defined as pain localised between the twelfth rib and the inferior gluteal folds, with or without leg pain, experienced at any point during the last 12 months.[30]

Repetitive work: The same motion with less than 30 s with little or no variation for more than a total of 2 hours per day.[31]

Body mass index (BMI): Weight in kilograms divided by the square of the height in metres (kg/m^2) categorised as underweight=BMI <18, normal (health)=BMI 18.5–24.9, overweight=BMI 25.0–29.9 and obese=BMI ≥30.0.[32]

Static postures: Sitting or standing in a restricted space for two or more hours without changing positions.[33]

Cigarette smoking: Smoking at least one stick of cigarettes per day.[34]

Alcohol consumption: Consumption of any kind of alcohol by academic staff at least two times per week.[34]

Physical activity: Doing any kind of physical/sporting activities at least two times per week, with a duration of at least 30 min.[35]

Ergonomic training: Educational actions for credentials by employees, risk factors accountable for musculoskeletal disorders related to work, use of suitable work practices, proper equipment choice, correct use of tools and adjustments of the workplace.[36]

Habit of taking a break: Taking at least 5–20 min breaks after 1–2 hours of continuous work.[37]

Khat chewer: Chewing khat three times a week for at least 12 months.[38 39]

Job satisfaction: Sum of the generic job satisfaction scale score of 32 or above.[40]

Job stress: Workplace stress scale score of 21 or above.[41]

Data collection tools and procedures

Data were collected through a self-administered structured questionnaire comprising four sections with various items. The first section assessed sociodemographic characteristics, including age, sex, educational status, work experience and monthly salary. The second section contained questions aimed at evaluating LBP. A structured self-administered questionnaire adapted from the Nordic Musculoskeletal Questionnaire was used to assess symptoms of back pain.[42] This questionnaire has been widely used in previous studies within the Ethiopian context.[43–46] The third section addressed behavioural and psychosocial factors, including cigarette smoking (yes/no), BMI in kg/m², physical activity, alcohol consumption (yes/no), history of systemic illness (yes/no) and workload (yes/no). The fourth section encompassed characteristics of the working environment, such as daily working hours, habits of taking breaks, type of sitting chair, working postures (sitting or standing and repetitive work), ergonomic training and methods of carrying laptops. The fifth section of the questionnaire addresses psychosocial factors, including job stress and job satisfaction (online supplemental material). The overall questionnaire was initially translated from English to Amharic (the native language of the study area) and subsequently retranslated back to English by professional translators and physiotherapists to ensure consistency.

Data quality control

To ensure the quality of the data, a pretest was conducted 1 week before the actual data collection, involving 5% (31) of the sample size at Teda Health Sciences College in Gondar City, which was not included in the main survey. Based on the findings from the pretest, the questionnaire was revised and modified, and the estimated time for data collection was determined. Additionally, 1 day of training was provided to data collectors and supervisors regarding the study's purpose, data collection tools and techniques, ethical considerations and the timing of data collection to accommodate participants' regular duties. Data collectors were supervised daily, and completed questionnaires were reviewed by supervisors and the principal investigator each day. Any deficiencies encountered during data collection were promptly addressed through feedback from the principal investigator, supervisors and data collectors.

Data processing and analysis

Data were checked for completeness and entered into EpiData V.4.6 before being exported to Stata (V.14) for further analysis. Descriptive statistics were conducted, and the results are presented through narrative summaries and tables. Prior to regression analysis, assumptions of normality, outlier detection and multicollinearity were assessed. Multicollinearity was evaluated using the variance inflation factor (VIF), and all variables had VIF values below 5, indicating no evidence of multicollinearity. Notably, although age and working experience are conceptually related, both demonstrated acceptable VIF values and were retained in the model without collinearity concerns.

Bivariable binary logistic regression was performed to identify candidate variables for the multivariable model. Variables with values of p<0.2 in the bivariable logistic regression analysis were included in the multivariable logistic regression to control for potential confounding effects. Statistically significant variables were identified at a value of p<0.05 in the multivariable binary logistic regression model. Adjusted ORs (AORs) with a 95% CI were reported to measure the strength and direction of the association. Statistical significance was set at p<0.05. Model fit was evaluated using the Hosmer–Lemeshow goodness-of-fit test, which indicated an acceptable fit to the data (p=0.740). Additionally, a test for linear trend was conducted for ordinal variables, including working experience; however, the trend was not statistically significant.

Patient and public involvement

There was no participant, patient or public involvement in the design and conduct of the study. The study results were shared with the study participants.

RESULTS

Sociodemographic characteristics of study participants

A total of 607 questionnaires were correctly completed out of 636 distributed, yielding a response rate of 95.44%. More than two-thirds (71.83%) of the participants were male. The age of the respondents ranged from 21 years to 70 years, with a mean of 32.39 (SD±6.80) years. The majority of the respondents (59.64%) were married. In terms of educational status, 416 participants (68.53%) held a master's degree. Approximately 191 participants (31.47%) had over 10 years of work experience. The median monthly income of the study participants was 11 305 Ethiopian Birr (ETB), with an IQR of ETB10 700–13 600 (table 1).

Behavioural and psychosocial characteristics

Of the study participants, 108 (17.79%) reported being cigarette smokers, while 148 (24.38%) indicated they had a habit of alcohol consumption. Additionally, 202 participants (33.28%) stated they engaged in physical activity at least twice per week. The majority of respondents, 434 (71.50%), had a normal BMI. Thirty-two participants (5.27%) reported a history of systemic illness. Regarding psychosocial factors, 516 participants (85.01%) expressed satisfaction with their current job, while 381 participants (62.77%) reported experiencing job-related stress (table 2).

Work environment and ergonomics characteristics

A total of 220 respondents (36.24%) reported working more than 8 hours per day. Nearly half (54.20%) indicated that they took rest breaks during work. Only 31% (n=190) of the participants stated that they used an adjustable sitting chair. Around 15% of the respondents reported standing in a confined working area for two or more hours while performing tasks. Approximately a third (452) of the participants (74.46%), indicated their

Table 1 Sociodemographic characteristics of the sampled academic staff, University of Gondar, North-West Ethiopia, 2021 (n=607)

Variables	Frequency (n)	Percentage (%)
Sex		
Male	436	71.83
Female	171	28.17
Age (years)		
21–29	226	37.23
30–39	301	49.59
≥40	80	13.18
Marital status		
Single	245	40.36
Married	362	59.64
Educational status		
Bachelor	94	15.49
Master	416	68.53
PhD	97	15.98
Work experience in years		
≤5	167	27.51
6–10	249	41.02
>10	191	31.47
Monthly salary (ETB)		
<10 000	99	16.31
10 000–13 000	331	54.53
>13 000	177	29.16

ETB, Ethiopian Birr (currency).

Table 2 Behavioural and psychosocial characteristics of the sampled academic staff, University of Gondar, North-West Ethiopia, 2021 (n=607)

Variables	Frequency (n)	Percentage (%)
Cigarette smoker		
Yes	108	17.79
No	499	82.21
Alcohol consumption habit		
Yes	148	24.38
No	459	75.62
Khat chewing behaviour		
Yes	19	3.13
No	588	96.87
Physical activity		
Yes	202	33.28
No	405	66.72
Body mass index (BMI)		
BMI <25 kg/m² (underweight + normal)	482	79.41
BMI ≥25 kg/m² (overweight/obese)	125	20.59
Systemic illness		
Yes	32	5.27
No	575	94.73
Job satisfaction		
Satisfied	516	85.01
Not satisfied	91	14.99
Job stress		
Stressed	381	62.77
Not stressed	226	37.23
Workload		
Yes	506	83.36
No	101	16.64

jobs involved repetitive movements, and 225 respondents (37.07%) reported doing stretching exercises at their workplace. Only 13.01% of the participants had received safety training. Regarding laptop carrying methods, 264 participants (43.49%) reported carrying their laptop on both shoulders, while 269 (44.32%) carried it on one shoulder and 74 (12.19%) held it in one hand (table 3).

Prevalence of LBP

The prevalence of LBP among academic staff in the past 12 months was 55.68% (95% CI 51.63% to 59.68%). The point prevalence (within the past 7 days) was 44.8% (95% CI 40.8% to 48.86%). A statistically significant difference in 7-day prevalence was observed between female and male participants, with rates of 39.86% and 15.81%, respectively (χ^2=0.887, p=0.02).

Table 3 Work environment and ergonomics characteristics of the sampled academic staff, University of Gondar, North-West Ethiopia, 2021 (n=607)

Variables	Frequency (n)	Percentage (%)
Working hours per day		
≤8 hours	387	63.76
>8 hours	220	36.24
Habit of taking breaks		
Yes	329	54.20
No	278	45.80
Adjustable chair		
Yes	190	31.30
No	417	68.70
Prolonged standing		
Yes	96	15.82
No	511	84.18
Prolonged sitting		
Yes	85	14.00
No	522	86.00
Repetitive activity		
Yes	452	74.46
No	155	25.54
Stretching exercise		
Yes	225	37.07
No	382	62.93
Have safety training		
Yes	79	13.01
No	528	86.99
Methods of carrying the laptop		
Hanging on both shoulders	264	43.49
Hang on one side shoulder	269	44.32
Hold in one hand	74	12.19

Factors associated with LBP

In the bivariable logistic regression analysis, several factors, including sex, work experience, daily working hours, cigarette smoking, physical activity, BMI, job satisfaction, prolonged standing, taking breaks, ergonomic training and stretching exercises, were associated with LBP at p<0.2. However, in the multivariable binary logistic regression analysis, only sex, daily working hours, physical activity, and prolonged standing remained statistically significant (p<0.05). Variables such as work experience, cigarette smoking, BMI, job satisfaction, taking breaks and stretching exercises did not retain statistical significance after adjustment.

Female workers were nearly twice as likely to develop LBP compared with their male counterparts (AOR=1.72, 95% CI 1.15 to 2.57). Employees who worked more than 8 hours per day had a 1.45 times greater likelihood of developing back pain compared with those who worked 8 hours or fewer per day (AOR=1.45, 95% CI 1.02 to 2.10). Additionally, workers who did not engage in physical activities were 1.88 times more likely to experience back pain compared with those who did (AOR=1.88, 95% CI 1.30 to 2.72). Participants who stood in confined workspaces for two or more hours were 1.63 times more likely to develop back pain compared with those who did not work standing in confined areas (AOR=1.63, 95% CI 1.03 to 2.59) (table 4).

Regarding work experience, the odds of LBP appeared to increase with longer years of service (AOR=1.45, 95% CI 0.96 to 2.19 for 6–10 years; AOR=1.48, 95% CI 0.95 to 2.30 for >10 years). Although the linear trend test suggested a possible upward trend (p-trend=0.076), this was not statistically significant (p>0.05). Therefore, no firm conclusions can be drawn about a dose–response relationship.

Multicollinearity diagnostics confirmed no strong correlation among the independent variables. Specifically, although age and work experience are conceptually related, both showed acceptable VIF values below 5, indicating no multicollinearity concerns. The final model demonstrated good fit based on the Hosmer–Lemeshow test (p=0.740).

DISCUSSION

Understanding the prevalence and associated factors of LBP is essential for informing targeted interventions and optimising resource allocation. This study investigated the prevalence and associated factors of LBP among academic staff at the University of Gondar, Ethiopia, and found that over half of the participants experienced symptoms of LBP during the past 12 months. Notably, factors such as being female, working more than 8 hours per day, physical inactivity and prolonged standing during work were statistically associated with LBP. These findings

Table 4 Multivariable logistic regression analysis of factors associated with low back pain (LBP) in the past 12 months among sampled academic staff, University of Gondar, North-West Ethiopia, 2021 (n=607)

Variables	% with LBP	COR with 95% CI	AOR with 95% CI	P value
Sex				
Male	53.6%	1	1	
Female	62.5%	1.49 (1.04 to 2.14)	1.72 (1.15 to 2.57)*	**0.009**
Work experience in years				
≤5	49.7%	1	1	
6–10	57.0%	1.34 (0.91 to 1.99)	1.45 (.96 to 2.19)	0.078
>10	59.2%	1.47 (0.96 to 2.22)	1.48 (0.95 to 2.30)	0.080
Working hours per day				
≤8 hours	52.7%	1	1	
>8 hours	60.9%	1.39 (0.99 to 1.96)	1.45 (1.02 to 2.10)*	**0.038**
Cigarette smoker				
No	54.3%			
Yes	62.0%	1.37 (0.89 to 2.10)	1.42 (0.91 to 2.22)	0.122
Physical activity				
Yes	46.5%	1	1	
No	60.3%	1.74 (1.23 to 2.44)	1.88 (1.30 to 2.72)	**0.001**
BMI				
<25 kg/m²	53.9%	1	1	
≥25 kg/m²	62.4%	1.45 (0.97 to 2.18)	1.38 (0.91 to 2.12)	0.120
Job satisfaction				
Satisfied	56.6%	1	1	
Not satisfied	56.9%	0.74 (0.48 to 1.16)	0.72 (0.45 to 1.14)	0.161
Prolonged standing				
No	18.2%	1	1	
Yes	62.7%	138 (0.89 to 2.13)	1.63 (1.03 to 2.59)	**0.036**
Habit of taking breaks				
Yes	51.5%	1	1	
No	57.6%	1.28 (0.93 to 1.77)	1.30 (0.92 to 1.82)	0.134
Have ergonomic training				
Yes	43.0%	1	1	
No	57.6%	1.79 (1.11 to 2.89)	1.43 (0.86 to 2.36)	0.165
Stretching exercise				
Yes	84.1%	1	1	
No	40.5%	1.30 (0.94 to 1.82)	1.19 (0.84 to 1.70)	0.323

The bold values in Table 4 represent variables that were significantly associated with LBP in the multivariable logistic regression analysis ($p < 0.05$).
*significant at $p < 0.05$ in multivariable logistic regression analysis, Hosmer and Lemeshow test p = 0.740.
1, reference category; AOR, adjusted OR ; COR, crude OR; LBP, low back pain.

point to the importance of developing workplace health and safety strategies that address sociodemographic differences, behavioural risks and occupational contexts to reduce the burden of LBP in university settings.

Prevalence of LBP

This study revealed a high burden of LBP among academic staff, with a 12-month prevalence of 55.68% and a 7-day point prevalence of 44.8%. These estimates are consistent with previous studies from similar academic settings in LMICs, including Brazil, Cameroon and Ethiopia, where LBP prevalence ranges from 40% to over 50% among university staff.[15 17 18 47] The elevated prevalence observed may reflect the nature of academic work, which typically involves prolonged sitting, repetitive tasks, limited physical activity and often suboptimal ergonomic conditions. The high prevalence may reflect the sedentary nature of

academic work, frequent engagement in repetitive tasks, limited movement and suboptimal ergonomic environments. Compared with a study from Nigeria (59.8%),[48] our findings were similar, reflecting a substantial burden of LBP that may be linked to comparable academic workload, ergonomic conditions and institutional constraints across the two contexts.

Conversely, our prevalence estimates were higher than those reported in studies conducted in other regions of Ethiopia (40.3%)[18] and Cameroon (48.1%).[16] These differences could be attributed to variations in sample size, timing of data collection and the impact of contextual factors such as the COVID-19 pandemic, which may have led to increased sedentary behaviours during remote teaching periods.[20] Recent global studies have similarly reported higher rates of musculoskeletal complaints, including LBP, during and after the pandemic, largely due to remote teaching, teleworking and suboptimal ergonomic conditions.[49–51] Methodological differences, such as variations in sample size (104 participants in the study from Cameroon) and differences in the definitions and measurements of symptoms of LBP may also explain the discrepancy.

Sex differences in reported LBP

This study found that both the 12-month prevalence (62.5% vs 53.6%) and the 7-day prevalence (39.9% vs 15.8%) of LBP were higher among female compared with male staff. These findings are consistent with the multivariable logistic regression analysis, which showed that female participants had significantly higher odds of reporting LBP after adjustment for confounders (AOR=1.72; 95% CI 1.15 to 2.57). Together, these results indicate a consistent pattern of higher prevalence and greater risk of LBP among women.

It is important, however, to interpret these sex differences with caution. While the adjusted association suggests that women are more vulnerable, contributing factors such as reproductive health, hormonal fluctuations (eg, menstruation) and domestic responsibilities, although relevant, are not exclusively occupational. This blurs the boundary between occupational and non-occupational influences. Prior studies suggest that women may also be more likely to report musculoskeletal discomfort due to increased pain sensitivity, different psychosocial stress responses, and greater household responsibilities in addition to formal employment.[24 47]

The intersection between academic work and domestic life may disproportionately affect women. Female academics may have less time for rest and recovery due to overlapping demands from childcare and household management, which could contribute to physical strain and delayed muscle repair. Moreover, biological and psychosocial factors such as pregnancy, childbirth and cyclical hormonal changes have been linked to variations in pain perception and susceptibility to musculoskeletal discomfort.[52 53] While these factors may help explain the elevated odds of LBP among female participants, they extend beyond strictly occupational determinants and highlight the complexity of attributing causality in cross-sectional research.

Physical activity and sedentary behaviour

In this study, participants who did not report engaging in regular physical activity had significantly higher odds of reporting LBP. While moderate and consistent physical activity is generally associated with musculoskeletal health benefits,[14 54] the relationship between physical activity and LBP is not straightforward. The 'physical activity paradox' highlights that occupational physical activity, characterised by repetitive tasks, static postures or prolonged standing, may contribute to musculoskeletal strain, whereas leisure-time physical activity often offers protective effects.[55 56] This paradox underscores the physiological differences in load, recovery and cardiovascular response between occupational and leisure-time activity, which may lead to contrasting health outcomes despite similar energy expenditures.

Prolonged sitting, however, represents more than general sedentarism. It is a harmful posture that increases spinal load, reduces circulation and contributes to stiffness and musculoskeletal discomfort, all of which can exacerbate LBP symptoms.[1] Furthermore, existing literature suggests a non-linear or U-shaped relationship between physical activity and LBP risk.[57] Both sedentary behaviour and high-intensity or excessive physical exertion have been linked to increased LBP symptoms, suggesting that only moderate and context-appropriate physical activity levels may confer protection.[57–59] Given that this study relied on a binary (yes/no) self-report measure of physical activity without capturing intensity, type or context (occupational vs recreational), the results should be interpreted with caution. This limitation may obscure important nuances in how different forms of physical activity uniquely influence LBP risk.

Occupational risk factors

This study identified working more than 8 hours per day and prolonged standing during work as factors statistically associated with LBP. These findings are consistent with prior research suggesting that extended working hours and static postures are linked to increased musculoskeletal discomfort and fatigue.[18 60] However, given the cross-sectional nature of the study, causal inferences cannot be drawn. It remains unclear whether these work conditions contribute to the development of LBP or whether individuals experiencing LBP modify their work behaviours (eg, adopting prolonged standing or resting postures) in response to discomfort.

Within the Ethiopian academic setting, prolonged sedentary behaviour is a common occupational pattern. Academics often spend extended periods sitting while preparing lectures, conducting research and supervising students, as well as standing for long durations while teaching. These demands, compounded by inadequate ergonomic resources and limited opportunities for

physical movement, may contribute to the high prevalence of LBP in this group. Similar patterns have been reported in studies conducted in Poland[61] and Vietnam,[20] as well as in postpandemic studies showing that remote teaching/telework, increased screen time, and suboptimal home-office ergonomics were associated with higher musculoskeletal complaints, particularly in the low back.[49 50 62] Our results differed from a Cameroonian study,[16] likely due to methodological differences, particularly in how physical activity was assessed. The Cameroonian study used the Ricci–Gagnon Questionnaire to evaluate activity levels, whereas our study employed a binary (yes/no) self-report approach, which may limit comparability and precision in capturing activity intensity or context.

This study identified prolonged standing during work as a significant factor associated with LBP. The association between prolonged standing and LBP is well documented in occupational health literature.[15 47] Prolonged standing may increase intramuscular pressure and lead to muscle fatigue, spasms and impaired circulation, all of which may contribute to musculoskeletal discomfort. When compounded over time, this effect may reduce functional capacity and exacerbate pain symptoms. Although postural adjustments may provide temporary relief, compensatory behaviours can in turn cause biomechanical strain and perpetuate pain cycles.[63 64] It is important to note, however, that postural strain is multifactorial and can be influenced by footwear, floor surface and opportunities for postural variation, factors not captured in the present study.[65] Future research should therefore use more nuanced instruments to assess work-related postures and activity patterns, including both their occupational and leisure-time contexts.

Strengths and limitations

This study contributes novel insights into LBP among university academic staff, a population often overlooked in musculoskeletal research. By highlighting the prevalence and associated occupational and behavioural factors, the study provides evidence to support targeted workplace interventions. The use of a validated tool (Nordic Musculoskeletal Questionnaire), a relatively large sample and multivariable adjustment enhances the study's methodological rigour.

However, several limitations must be acknowledged. The single-institution design may limit the generalisability of findings to other academic settings. Although the sample size was relatively large for a single-institution study, no formal calculation was performed to determine the appropriate sample size for the multivariable logistic regression analysis. This could limit the ability to detect associations statistically. Additionally, the reliance on self-reported data over a 12-month recall period may introduce recall bias and under-reporting. The use of a binary measure for physical activity, without detail on intensity or context, limits interpretation, especially given the complexity of the physical activity paradox. Lastly, the cross-sectional design prevents causal inference, particularly for modifiable risk factors such as working hours, physical activity and posture. However, temporally fixed variables like sex and age are less affected by this limitation. The results should therefore be interpreted with caution. These limitations provide opportunities for future research to build on our work and address the remaining gaps.

Implications for practice and research

This study highlights an important occupational health concern within academic institutions in Ethiopia, where over half of university staff reported experiencing LBP in the past year. The findings suggest that interventions should prioritise sex/gender-sensitive strategies, given the increased risk among female staff, as well as organisational changes to address long working hours and promote ergonomic working conditions. Efforts to encourage physical activity should be context-specific and informed by the physical activity paradox, acknowledging that while moderate, leisure-time exercise is generally protective, physically demanding work or inappropriate exercise intensity may increase the risk of musculoskeletal problems. Workplace health programmes must therefore support staff in engaging in safe, effective forms of physical activity that align with their work demands and personal capacity.

While this cross-sectional study offers valuable insights into the prevalence and correlates of LBP among academic staff, a group often overlooked in occupational health research, it also underscores the need for further investigation. Future studies should employ longitudinal designs to explore causal pathways and better understand how workplace conditions, psychosocial stressors and domestic responsibilities intersect to influence musculoskeletal health. Using validated instruments to measure physical activity and ergonomic exposures will improve data accuracy and relevance. Structural changes, such as the appointment of dedicated health and safety officers at the faculty level and the introduction of regular musculoskeletal health monitoring, should also be explored as part of a comprehensive approach to reducing LBP in higher education settings.

CONCLUSIONS

This study revealed that LBP is highly prevalent among university academic staff, with over half of the participants reporting LBP in the past year. The academic environment in Ethiopian universities is characterised by high workloads, where staff engage in a combination of teaching, research and administrative duties, often under suboptimal ergonomic conditions. These factors contribute to prolonged sitting, standing and the adoption of awkward postures, which increase the risk of musculoskeletal complaints.

The study identified female sex, working more than 8 hours per day, physical inactivity and prolonged standing as significant risk factors for LBP. While these

are individual-level risk factors, broader structural and organisational factors also warrant attention. In particular, reducing excessive working hours may improve work–life balance, support physical activity engagement and help alleviate work-related stress. Although stress was not significantly associated with LBP in this study, its high prevalence among participants highlights the need for institutional mental health support. We recommend that university management adopt sex/gender-sensitive, health-promoting workplace policies that address both individual and systemic contributors to LBP, by improving ergonomic conditions, promoting physical activity, managing workloads and addressing occupational stress.

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