

# Prevalence and Associated Factors of Low Back Pain Among Bank Workers in Gondar City, Northwest Ethiopia

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**Introduction:** Low back pain is a very common health problem that most people experience at some point in their working life. It results in sick leave, disability, producing significant restrictions on usual activity and participation among many office workers. The working style of bank workers is sedentary mostly and the alignment of their chairs, table, and computers is not designed based on their health aspects which exposes them to low back pain.

**Objective:** This study aimed to assess the prevalence and associated factors of low back pain among bank workers in Gondar city.

**Methods:** Institution-based cross-sectional study was conducted from 20th October to 10th November 2020 at banks in Gondar city. A simple random sampling technique was employed to select 296 bank workers. A structured pretested self-administered questionnaire was used to collect data. Data were entered in epi-info version 7, analyzed using SPSS version 21, and presented by frequencies, percentages, and tables. Bivariable and multivariable analyses were employed using a binary logistic regression model. Variables with a p-value < 0.05 were considered as factors significantly associated and the odds ratio with a 95% CI was used to determine the strength of association.

**Results:** The prevalence of low back pain among bank workers in the last 12 months was 55.4%. Being female, work-related stress, lack of physical activity, using a fixed chair and a chair without an armrest, and lifting heavy objects increases the risk of developing low back pain.

**Conclusion:** The prevalence of low back pain among bank workers in Gondar city was high. It is better to establish a health screening team, avail a movable chair and a chair with an armrest, and give special attention to female workers and bank workers with stress, and do physical activity to reduce the risk of developing low back pain.

**Keywords:** banks, bank workers, low back pain, prevalence, associated factors, Ethiopia

## Introduction

The term low back pain (LBP) can be defined as chronic or acute pain of the lumbosacral, buttock, or upper leg region, and low-back disorders are associated with work-related awkward postures.<sup>1</sup> It interferes with quality of life and work performance.<sup>2</sup> LBP is a very common health problem that most people experience at some point in their working life.<sup>3</sup> It has been considered as one of the most costly disorders among the working population in developed as well as in developing countries.<sup>4,5</sup>

According to the 2010 Global Burden of Disease Study, LBP was identified among the top ten diseases and the sixth most important contributor to the global

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disease burden (death and disability).<sup>6</sup> It also has a greater impact on global health than malaria, Human Immunodeficiency Virus, obstructive pulmonary diseases, tuberculosis, diabetes, and lung cancer.<sup>7</sup> Among many office workers, LBP results in sick leave, substantial levels of disability, and significant restrictions on usual activity and participation including limitations of work activity.<sup>8</sup>

The nature of office work and the office environment has been associated with increased risks of LBP.<sup>9</sup> The working style of bank workers is sedentary mostly and the alignment of their chairs, table, and computers is not designed based on their health aspects. Due to prolonged sitting and standing the stress on their lower back increases and finally leads to LBP.<sup>10</sup> LBP among office workers including bankers leads to a negative economic impact, which includes an increased absence from work and lost productivity.<sup>11</sup> It is causing global implications to various sectors like economical, societal, and public health.<sup>12</sup>

The lifetime incidence of LBP was 58–84% globally which affects as much as 80% of people in developed countries.<sup>13</sup> A study conducted in Kuwait among computer users who work in Bank showed that 80% of workers suffered from at least 1 attack of a musculoskeletal disorder in the previous year, and 57% suffered from attacks during the previous week. LBP among bank workers accounted for more than half of all musculoskeletal system disorders (MSDs).<sup>14</sup>

Among the African continent, the prevalence of LBP is also increasing, but the lack of information regarding this in developing countries is a major limitation.<sup>15</sup> A study conducted in Kigali, Rwanda showed that the prevalence of low back pain among the bank staff was 45.8%.<sup>16</sup> A study conducted in Addis Ababa, Ethiopia showed that the lower back was the most affected body region (54.3%) than other work-related musculoskeletal disorders among bank workers.<sup>17</sup> Obesity, smoking, weight lifting, stooping, prolonged sitting, poor fitness level, sedentary life-style, and awkward posture at work were identified as the factors most associated with LBP.<sup>18</sup>

Studies conducted in different parts of Ethiopia regarding LBP focus on industrial and hospital staff. But there is a lack of information on the prevalence and associated factors of LBP among bank workers. Knowing the prevalence and associated factors of low back pain helps to design preventive activities. Therefore, this study is intended to assess the prevalence and associated factors of LBP among bank workers in Gondar city, northwest Ethiopia.

## Methods

### Study Design and Period

An institutional-based cross-sectional study was employed from 20th October to 10th November 2020.

### Study Setting

The study was conducted in Gondar city administration. Gondar city is located about 727 km away from Addis Ababa, the capital city of Ethiopia, 180 km away from Bahir Dar the capital city of Amhara Regional State. Gondar city has a total area of 192.3Sq.KM. The city has a total population of 338, 646 peoples with 256,041 people whose age is between 18 and 65 years old in 6 sub-cities and 27 Kebele with a total of 78,772 households. In the city, there are a total of 57 banks of them 20 are public.

### Study Participants

All bank workers in Gondar city who worked for at least six months were included in the study. A bank worker who had any previous illness and/or injuries that might have contributed to LBP, female workers who were pregnant, workers who had a past medical history of LBP, workers who had past slipping/fall history, and seriously ill were excluded from the study.

### Sample Size Determination

The sample size was computed using a single population proportion formula by taking the proportion of low back pain 54.3%,<sup>17</sup> 95% confidence interval, and a 5% margin of error. The final sample size was 296 after using the correction formula and adding a 10% non-response rate.

### Sampling Technique and Procedure

A stratified simple random sampling technique was employed to recruit the required participants for the study. First, we stratified participants into governmental bank workers and private bank workers, and then we allocated the required sample for each stratum proportionally. Finally, we selected study participants from each stratum by simple random sampling.

### Operational Definitions

Bank workers: Employees that perform financial activities that include supervisor, customer service, public relations, accounting clerks, loan officers, and managers.

Low back pain: A bank worker who had a perceived ache, pain, or discomfort localized below the coastal

margin and above the inferior gluteal fold during the last 12 months was considered as having LBP.

**Perform physical activity:** A bank worker was considered physically active if he/she exercises or doing any kind of sports activity including walking at least 150 min/week in a planned, structured, and repetitive manner.<sup>27</sup>

**Body mass index (BMI):** <18.5 = underweight, 18.5–24.9 = normal, 25.0–29.9 = overweight, and  $\geq$  30.0 = obese.<sup>28</sup>

**Fixed postures:** Bank workers perform activities by prolonged sitting in a limited space for 2 or more hours without changing positions for the last 12 months.<sup>29</sup>

**Stress:** Participants who score 26 and above on the workplace stress measurement scale were considered as having stress.<sup>30</sup>

## Data Collection Instruments and Procedures

Data were collected using a structured pre-tested self-administered questionnaire. The questionnaire contains 36 questions arranged into five sections; the first section contains seven questions regarding the socio-demographic characteristics of the participants, the second section contains three questions regarding behavioral related characteristics of the participants, the third section contains thirteen work-related questions, the fourth section contains five low back pain-related questions, and the last section contains eight workplace stress-related questions. The Workplace Stress Scale from the American Institute of Stress which contains eight statements about how bank workers usually feel was used to assess stress. Data were collected with the help of four trained BSc nurse data collectors and two MSc nurse supervisors. A written guideline was given to the data collectors to assure that every participant received the same directions and information. The anonymity of the participant was kept by informing them not to write their name. The instruments were distributed among the study population, after guarantying their willingness to take part in the study, and then it was collected by the data collectors after completion. During data collection data collectors and supervisors followed the recommended precautions to prevent COVID-19.

## Data Processing and Analysis

Following data collection, each questionnaire was reviewed for completeness and consistency and possible amendments were done by investigators. Data were

entered into Epi-info version 7 and transferred into SPSS version 21 and then, data cleaning and coding were done to make it ready for analysis. The results of the descriptive statistics were expressed as mean, standard deviation, percentage, and frequency using tables, graphs, and charts. Binary logistic regression was employed to identify factors associated with LBP. Those variables with a p-value less than or equal to 0.2 from the bivariable analysis were a candidate for multivariable analysis. The multivariable analysis was used to control potential confounders and to declare the significance of the association, p-value <0.05 was used. Moreover, the magnitude of the association between different independent variables with dependent variables was measured using odds ratios with a 95% confidence interval.

## Data Quality Assurance

The data collection instrument was prepared in English and translated into the local language, Amharic, and back-translated to English by language experts to check for consistency. A pretest was done on 5% of the total sample size on areas that are not selected for the study. Necessary amendments were made upon the identification of ambiguity in the questionnaire. We recruited, trained, and assigned four BSc nurses and two MSc nurses for data collection and supervision respectively. One day of training was given to both the data collectors and supervisors. The training included a discussion about the objective of the study, the technique of data collection, the content of the questionnaire, and the issue of confidentiality of the participants.

## Results

### Socio-Demographic Characteristics of the Respondents

A total of 285 bank workers participated in this study, with a 96.3% response rate. Nearly two-thirds (65.6%) of the respondents were male and 60.4% of them were married. The mean age of the respondents was  $30.24 \pm 4.95$  SD years and more than half (53.7%) of them fall in the age range of 20–29 years. More than three-fourths (78.9%) of the respondents were BSc holders and 73.3% of them were costumer caregivers. More than two-thirds (67%) of the respondents were in the normal range of body mass index (BMI). Nearly one fifth (21.1%) of the respondents had work-related stress (Table 1).

**Table 1** Socio-Demographic Characteristics of Bank Workers in Gondar City, Northwest Ethiopia (N= 285)

Variables	Category	Frequency (n= 285)	Percentage (100%)
Age	20–29	153	53.7
	30–39	112	39.3
	≥40	20	7.0
Sex	Female	98	34.4
	Male	187	65.6
Marital Status	Single	110	38.6
	Married	172	60.4
	Others*	3	1.1
Educational status	Diploma	2	0.7
	BSc	225	78.9
	MSc	58	20.4
Type of bank	Government	171	60.0
	Private	114	40.0
Job designation	Manger	32	11.2
	Customer caregiver	209	73.3
	Cashier	21	7.4
	Auditor	23	8.1
BMI	<18.5	22	7.7
	18.5–24.9	191	67.0
	25.0–29.9	57	20.0
	≥30	15	5.3
Work-related stress	No	225	78.9
	Yes	60	21.1

Note: \*Divorced, widowed.

Abbreviation: BMI, body mass index.

## Behavioral and Work-Related Characteristics of the Respondents

Nearly all (98.9%) and more than half (54.4%) of the respondents did not smoke a cigarette and drink alcohol respectively. Nearly two-thirds (66.3%) of the participants did not perform a physical exercise in their daily life (Table 2). Almost all (97.9%) of the respondents used a computer. Among computer users, the majority (88.4%) of the participants used a desktop computer and more than half (57.2%) of them used a computer for 1–5 years. Nearly three-fourths (74.7%) of the respondents used movable chairs and 71.6% of the chairs they used had an armrest. Two-thirds (66.0%) of the participants did their work in a sitting position and 61.8% of them used back bent position during their normal sit. More than half (54.4%) of the respondents lift objects and 72.3% of them get a break sometimes during their working time (Table 3).

**Table 2** Behavioral Related Characteristics of Bank Workers in Gondar City, Northwest Ethiopia (N= 285)

Variables	Category	Frequency (n= 285)	Percentage (100%)
Alcohol use	Yes	130	45.6
	No	155	54.4
Cigarette smoking	Yes	3	1.1
	No	282	98.9
Physical activity	Yes	96	33.7
	No	189	66.3

**Table 3** Work-Related Characteristics of Bank Workers in Gondar City, Northwest Ethiopia, (N= 285)

Variables	Category	Frequency (n= 285)	Percentage (100%)
Use a computer	Yes	279	97.9
	No	6	2.1
Type of computer	Desktop	252	88.4
	Laptop	27	11.6
Duration of computer use	1–5 years	163	58.4
	6–10 years	94	33.7
	>10 years	22	7.9
Type of chair	Fixed chair	72	25.3
	Movable chair	213	74.7
Having a chair with an armrest	Yes	81	28.4
	No	204	71.6
Position at work	Sitting position	188	66.0
	Bending	88	30.8
	Standing position	9	3.2
Using a computer per day	< 8 hours	101	36.2
	≥8 hours	178	63.8
Sitting position	Back straight	98	34.4
	Back bent	176	61.8
	Back twisted	11	3.9
Spend sitting per day	≤6	140	50.7
	>6	136	49.3
Lifting objects	Yes	130	45.6
	No	155	54.4
Break	Have no break	73	25.6
	Sometimes	206	72.3
	Have frequent breaks	6	2.1

## Prevalence and Characteristics of Low Back Pain

The prevalence of LBP among bank workers in the last 12 months was 55.4% with a 95% CI (49.5%, 61.1%). Nearly three-fourths (72.8%) of the respondents did not stop working because of their LBP, 44.3% of them reported that prolonged sitting worsened their pain and rest was a reliever of the pain for 74.7% of the participants (Table 4).

### Factors Associated with Low Back Pain

Using bivariable analysis the factors significantly associated with LBP were being female, working in a government bank, work-related stress, lack of physical activity, using a fixed chair, having a chair without an armrest, working in a bending position, sitting in a back twisted position, and lifting heavy objects. In multivariable analysis, being female, work-related stress, lack of physical activity, using a fixed chair, having a chair without an armrest, and lifting heavy objects were factors significantly associated with LBP.

Female bank workers were nearly three times at higher risk of developing LBP than males [AOR= 3.05; 95% CI (1.60, 5.82)]. The odds of LBP were nearly five times higher among bank workers who had work-related stress as compared with those who had no stress [AOR= 4.94; 95% CI (2.29, 10.67)]. Bank workers who did not perform physical activity were nearly three times at higher risk of

developing LBP than bank workers who perform physical activity [AOR= 2.96; 95% CI (1.59, 5.53)]. Bank workers who were sitting on a fixed chair were nearly eleven times at higher risk of developing LBP than bank workers who were sitting on a movable chair [AOR= 11.29; 95% CI (4.73, 27.01)]. The odds of LBP were nearly three times higher among bank workers who had not a chair with an armrest than their counterparts [AOR= 2.65; 95% CI (1.37, 5.12)]. Bank workers who lifted heavy objects were nearly two times at higher risk of developing LBP as compared with their counterparts [AOR= 2.42; 95% CI (1.34, 4.37)] (Table 5).

### Discussion

Low back pain is a common public health problem worldwide especially for sedentary occupations.<sup>31</sup> The prevalence of LBP among bank workers varies depends on the study population and the countries where the study was conducted. The result of the current study revealed that 55.4% of the respondents suffer from LBP. This means that back pain has a high prevalence among bank workers which needs immediate health intervention. The finding of this study is in line with studies conducted in southern India 51.8%,<sup>21</sup> Pakistan 52.4%,<sup>23</sup> Kuwait 51.1%,<sup>14</sup> Province china 49.7%,<sup>32</sup> Ghana 61.7%,<sup>25</sup> and Addis Ababa Ethiopia 54.3%.<sup>17</sup> The prevalence of LBP in this study is higher than studies conducted in Punjab India 40.4%,<sup>19</sup> Hong Kong China 30.6%,<sup>22</sup> and Rwanda 45.8%.<sup>16</sup> The possible reason for this difference might be due to the difference in year of study, sample size, and definition of back pain used in each study. Besides, Ethiopian workers mostly used their backs to perform different activities which made them more prone to LBP. However, it is lower than studies conducted in Bengal India 70%,<sup>20</sup> Nigeria 84.6%,<sup>24</sup> and Mekelle Ethiopia 65.5%.<sup>26</sup> The possible justification for this difference might be that currently, most bank users prefer technology-related services like an automated teller machine (ATM) and mobile banking instead of direct seeking service from bank workers. As a result, it might reduce the work load of bank workers and work related LBP.

Work-related stress, lack of physical activity, using a fixed chair, having a chair without an armrest, and lifting heavy objects were the factors significantly associated with LBP.

Female bank workers were nearly three times at higher risk of developing LBP than males. This finding was supported by studies conducted in Kuwait, Kumas

**Table 4** Low Back Pain-Related Characteristics of Bank Workers in Gondar City, Northwest Ethiopia (N= 158)

Variables	Category	Frequency (n= 158)	Percentage (100%)
Absence from work due to LBP	Yes	43	27.2
	No	115	72.8
Pain worsening factor at work	Prolong sitting	70	43.3
	Prolong standing	23	15.0
	Prolong bending	49	31.0
	Twisting movements	16	10.1
The time when the pain worsens	At work	98	62.0
	At home	51	32.3
	Every time	9	5.7
Pain relieved by	Pain killers	22	14.0
	Rest	118	74.7
	None	18	11.4

**Table 5** Bivariable and Multivariable Logistic Regression Analysis of Factors Associated with LBP Among Bank Workers in Gondar City, Northwest Ethiopia (N= 285)

Variables		LBP		OR with 95% CI		P-value
		Yes	No	Crude	Adjusted	
Sex	Female	62	36	1.63 (1.01, 2.69)	3.05 (1.60, 5.82)*	0.001
	Male	96	91			
Type of bank	Government	103	68	1.63 (1.01, 2.62)	1.75 (0.98, 3.13)	0.058
	Private	55	59			
Stress	Yes	47	13	3.71 (1.91, 7.24)	4.94 (2.29, 10.67)*	< 0.001
	No	111	114			
Physical activity	No	117	72	2.18 (1.32, 3.59)	2.96 (1.59, 5.53)*	0.001
	Yes	41	55			
Type of Chair	Fixed	65	7	11.98 (5.25,27.35)	11.29 (4.73, 27.01)*	< 0.001
	Movable	93	120			
Having a chair with an armrest	No	60	21	3.09 (1.75, 5.45)	2.65 (1.37, 5.12)*	0.004
	Yes	98	106			
Position at work	Sitting	95	93			0.125 0.805
	Standing	6	3	0.51 (0.25, 4.65)	4.13 (0.67, 25.34)	
	Bending	57	31	0.56 (0.33, 0.94)	1.09 (0.56, 2.09)	
Sitting position	Back straight	42	56			0.622 0.433
	Back twisted	9	2	0.17 (0.03, 0.81)	0.57 (0.06, 5.39)	
	Back bent	107	69	0.48 (0.07, 1.64)	0.77 (0.41, 1.47)	
Lifting heavy objects	Yes	82	48	1.78 (1.10, 2.86)	2.42 (1.34, 4.37)*	0.003
	No	76	79			

**Note:** \*Statistically significant at p-value <0.05.

Ghana, Logo, southwest Nigeria, and Addis Ababa.<sup>14,17,24,25</sup> This might be related to conditions specific to women like premenstrual syndrome, premenstrual dysmorphic disorder, dysmenorrhea, and pregnancy.<sup>33</sup> It might also be due to the heightened pain sensitivity among women, menstrual cycle fluctuations, and biological response to pregnancy and childbearing as well as the physical stress of child-rearing that makes them more prone to LBP than men.<sup>34</sup> The odds of LBP were nearly five times higher among bank workers who had work-related stress as compared with their counterparts. This finding was supported by studies conducted in Kigali; Rwanda, Addis Ababa; Ethiopia, and Mekelle Tigray; Ethiopia.<sup>10,16,17</sup> This might be attributed to an increased risk of negative health outcomes resulted from work-related stress.<sup>35</sup> Emotional exhaustion, high emotional demands, and poor psychosocial safety climate are some indicators of stress which significantly intensify the risk of musculoskeletal pain including LBP.<sup>36</sup> Bank workers who did not perform physical activity were nearly three times

at higher risk of developing LBP than bank workers who perform physical activity. This finding was supported by a study conducted in Mekelle Tigray; Ethiopia.<sup>10</sup> This might be because their lack of physical activity leads to inadequate flexibility and weak muscles in the back, pelvis, and thighs, increasing the risks of developing LBP.<sup>37</sup> Lack of physical activity resulting from the sedentary lifestyle leads to the reduction of muscular power and strength as well as the reduced ability of the vertebral disc to maintain a normal concentration of water.<sup>38</sup> Lack of physical activity or prolonged inactivity can increase the risk of developing LBP as the back becomes stiff, weak, and deconditioned.

The type of chair was another factor significantly associated with LBP. Bank workers who sit on a fixed chair and a chair without an armrest had higher odds of developing LBP. This finding was supported by studies conducted in Kigali; Rwanda and Addis Ababa; Ethiopia.<sup>16,17</sup> This might be due to the muscle has no chance to relax and the flow of blood may be restricted when workers work in

a fixed position.<sup>39</sup> Similarly, Bank workers who lifted heavy objects were nearly two times at higher risk of developing LBP as compared with their counterparts. This finding was supported by studies conducted in South Africa and South India.<sup>18,40</sup> This might be due to the holding and moving of heavy loads requires high muscular force which may lead to acute overload and/or fatigue of muscles.<sup>39</sup> Repeated lifting of heavy objects leads to back muscles and spinal ligaments strain. The constant strain of the back resulted from lifting in a poor physical condition can cause painful muscle spasms which increases the risk of developing LBP.<sup>41</sup>

The study has some limitations: The study was based on subjective responses using questionnaires that may be prone to reporting bias because of the respondent's interpretation of the questionnaire or desire to report their feeling.

## Conclusion

The prevalence of LBP among bank workers in Gondar city was high. Being female, bank workers who had work-related stress, lack of physical activity, using a fixed chair and a chair without an armrest, and lift heavy objects had higher odds of developing LBP. It is better to establish a health screening team, avail a movable chair and a chair with an armrest, and give special attention to female workers and bank workers with stress, and do physical activity including walking at least 150 min/week to reduce the risk of developing low back pain.

## Abbreviations

AOR, Adjusted Odds Ratio; BMI, Body Mass Index; CI, Confidence Interval; LBP, Low Back Pain; MSDs, Musculoskeletal Disorders; SPSS, Statistical Package for Social Sciences; WHO, World Health Organization.

## Data Sharing Statement

All data are available upon request. The reader could contact the corresponding author for the underlying data.

## Ethics Approval and Informed Consent

Ethical clearance was obtained from the Institutional Review Board of the University of Gondar. A letter of permission was obtained from the Gondar city administrative trading and development office and each Bank manager. After the purpose and objective of the study have been informed, written consent was obtained from

each study participant. All participants were also informed that participation was voluntary and they can withdraw from the study at any time if they are not comfortable with the questionnaire. To keep the confidentiality of any information provided by study subjects, the data collection procedure was kept anonymously. This study complied with the Declaration of Helsinki.

## Consent for Publication

Not applicable.

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## Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors report no conflicts of interest for this work.

## References

1. Putz-Anderson V, Bernard BP, Burt SE, et al. *Musculoskeletal Disorders, and Workplace Factors*. National Institute for Occupational Safety and Health (NIOSH); 1997:104.
2. Keriri H. Prevalence and risk factors of low back pain among nurses in operating rooms, Taif, Saudi Arabia. *Am J Res Commun*. 2013;1(11):25.
3. Hoy D, Brooks P, Blyth F, Buchbinder R. The epidemiology of low back pain. *Best Pract Res Clin Rheumatol*. 2010;24(6):769–781. doi:10.1016/j.berh.2010.10.002
4. Hoy D, Bain C, Williams G, et al. A systematic review of the global prevalence of low back pain. *Arthritis Rheum*. 2012;64(6):2028–2037. doi:10.1002/art.34347
5. Roffey DM, Wai EK, Bishop P, Kwon BK, Dagenais S. Causal assessment of occupational sitting and low back pain: results of a systematic review. *Spine J*. 2010;10(3):252–261. doi:10.1016/j.spinee.2009.12.005
6. Hoy D, March L, Brooks P, et al. The global burden of low back pain: estimates from the global burden of disease 2010 study. *Ann Rheum Dis*. 2014;73(6):968–974. doi:10.1136/annrheumdis-2013-204428

7. Duthey B. Background paper 6.24 low back pain. *Priority Med Europe World Global Burden Disease*. 2013;1–29.
8. Abbey H. Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: cochrane systematic review and meta-analysis. *Int J Osteopathic Med*. 2015;18(3):239–240. doi:10.1016/j.ijosm.2015.07.008
9. Chaiklienga S, Suggaravetsirib P, Stewart J, editors. Incidence rate and risk factors associated with low back pain among university office workers in Thailand. Proceedings 19th Triennial Congress of the IEA; Thailand University; 2015.
10. Singh K, Gebrekidan HG. Associated factors of low back pain among the workers of commercial bank of Ethiopia: mekelle, North Ethiopia. *Res Rev*. 2019;3(2):17–21.
11. WHO. *Identification and Control of Work-Related Diseases: Report of a WHO Expert Committee [Meeting Held in Geneva from 28 November to 2 December 1983]*. World Health Organization; 1985.
12. Kamper SJ, Apeldoorn A, Chiarotto A, et al. Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: cochrane systematic review and meta-analysis. *BMJ*. 2015;350:350. doi:10.1136/bmj.h444
13. Bernstein IA, Malik Q, Carville S, Ward S. Low back pain and sciatica: summary of NICE guidance. *BMJ*. 2017;356:356. doi:10.1136/bmj.i6748
14. Akrouf Q, Crawford J, Al Shatti A, Kamel M. Musculoskeletal disorders among bank office workers in Kuwait. *EMHJ*. 2010;16(1):94–100. doi:10.26719/2010.16.1.94
15. Louw QA, Morris LD, Grimmer-Somers K. The prevalence of low back pain in Africa: a systematic review. *BMC Musculoskelet Disord*. 2007;8(1):1–14. doi:10.1186/1471-2474-8-105
16. Kanyenyeri L, Asiimwe B, Mochama M, Nyiligira J, Habtu M. Prevalence of back pain and associated factors among bank staff in selected banks in kigali, rwanda: a cross-sectional study. *Health Sci J*. 2017;11:3. doi:10.21767/1791-809X.1000505
17. Dagne D, Abebe SM, Getachew A. Work-related musculoskeletal disorders and associated factors among bank workers in Addis Ababa, Ethiopia: a cross-sectional study. *Environ Health Prev Med*. 2020;25(1):1–8. doi:10.1186/s12199-020-00866-5
18. Nazeer M, Rao S, Soni S, Ravinder M, Ramakranthi T, Bhupati S. Low back pain in South Indians: causative factors and preventive measures. *Sch J App Med Sci*. 2015;3(1D):234–243.
19. Moom RK, Sing LP, Moom N. Prevalence of the musculoskeletal disorder among computer bank office employees in Punjab (India): a case study. *Procedia Manufacturing*. 2015;3:6624–6631. doi:10.1016/j.promfg.2015.11.002
20. Das B. An evaluation of low back pain among female brickfield workers of West Bengal, India. *Environ Health Prev Med*. 2015;20(5):360–368. doi:10.1007/s12199-015-0476-0
21. Sulaiman SK, Kamalanathan P, Ibrahim AA, Nuhu JM. Musculoskeletal disorders and associated disabilities among bank workers. *Int J Res Med Sci*. 2015;3(5):1153–1158. doi:10.5455/2320-6012.ijrms20150523
22. Yu I, Wong T. Musculoskeletal problems among VDU workers in a Hong Kong bank. *Occup Med*. 1996;46(4):275–280. doi:10.1093/occmed/46.4.275
23. Tauqeer S, Amjad F, Ahmed A, Gillani SA. Prevalence of low back pain among bankers of lahore, Pakistan. *Khyber Med Univ J*. 2018;10:2.
24. Akodu AK, Okafor U, Adebayo A. Prevalence of low back pain among filling stations attendants in Lagos, southwest Nigeria. *African J Biomed Res*. 2016;19(2):109–115.
25. Abledu J, Abledu G. Multiple logistic regression analysis of predictors of musculoskeletal disorders and disability among bank workers in Kumasi. *Ghana J Ergonomics*. 2012;2(111):2.
26. Kasaw Kibret A, Fisseha Gebremeskel B, Embaye Gezae K, Solomon Tsegay G. Work-related musculoskeletal disorders and associated factors among bankers in Ethiopia, 2018. *Pain Res Management*. 2020;2020. doi:10.1155/2020/8735169
27. WHO. *WHO Global Recommendations on Physical Activity for Health*. Geneva: World Health Organization; 2011.
28. WHO. *Obesity: Preventing and Managing the Global Epidemic*. World Health Organization; 2000.
29. Kunda R, Frantz J, Karachi F. Prevalence and ergonomic risk factors of work-related musculoskeletal injuries amongst underground mine workers in Zambia. *J Occup Health*. 2013;55(3):211–217. doi:10.1539/joh.11-0175-FS
30. The Marlin Company, North Haven, CT, and the American Institute of Stress, Yonkers, NY. *The Workplace Stress Scale*; 2001. Available from: <https://www.stress.org/wp-content/uploads/2011/08/2001Attitude-in-the-Workplace-Harris.pdf>.
31. Clark S, Horton R. Low back pain: a major global challenge. *Lancet*. 2018;391(10137):2302. doi:10.1016/S0140-6736(18)30725-6
32. Gook O, mirmohammadi T, Mousavi Nasab N. Prevalence of musculoskeletal disorders in melli bank staff in North Khorasan Province in 2019. *Iranian J Ergonomics*. 2020;7(4).
33. Hersh E. What can cause lower back pain in women? Healthline; 2020. Available from: <https://www.healthline.com/health/lower-back-pain-causes-female>.
34. Wáng YXJ, Wáng J-Q, Káplár Z. Increased low back pain prevalence in females than in males after menopause age: evidence based on synthetic literature review. *Quant Imaging Med Surg*. 2016;6(2):199. doi:10.21037/qims.2016.04.06
35. Vinstруп J, Jakobsen MD, Andersen LL. Perceived stress and low-Back pain among healthcare workers: a multi-center prospective cohort study. *Frontiers Public Health*. 2020;8:297. doi:10.3389/fpubh.2020.00297
36. Zadow AJ, Dollard MF, McClinton SS, Lawrence P, Tuckey MR. Psychosocial safety climate, emotional exhaustion, and work injuries in healthcare workplaces. *Stress Health*. 2017;33(5):558–569. doi:10.1002/smi.2740
37. Warnakulasuriya SS, Peiris-John RJ, Coggon D, Ntani G, Sathiakumar N, Wickremasinghe AR. Musculoskeletal pain in four occupational populations in Sri Lanka. *Occup Med*. 2012;62(4):269–272. doi:10.1093/occmed/kqs057
38. Andersen LB, Wedderkopp N, Leboeuf-Yde C. Association between back pain and physical fitness in adolescents. *Spine*. 2006;31(15):1740–1744. doi:10.1097/01.brs.0000224186.68017.e0
39. Luttmann A, Jäger M, Griefahn B, Caffier G, Liebers F. Preventing musculoskeletal disorders in the workplace. WHO; 2003. Available from: <https://apps.who.int/iris/bitstream/handle/10665/42651/924159053X.pdf>.
40. Nyantumbu-Mkhize BM. Musculoskeletal disorders and associated factors in nurses and bank workers in South Africa in 2017. Available from: <http://wiredspace.wits.ac.za/handle/10539/23159>.
41. Kojo Hamilton MD. Causes and diagnosis of lower back strain. SPINE-health; Available from: <https://www.spine-health.com/conditions/lower-back-pain/causes-and-diagnosis-lower-back-strain#:~:text=Many%20lower%20back%20strains%20occur,causes%20of%20low%20back%20strain>.



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