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ABSTRACT

INTRODUCTION: Musculoskeletal disorders (MSDs), which are the leading cause of workplace health problems; affect workers, employers, and society as a whole following direct and indirect cost. Bankers are expected to perform at computer workstations for long periods of time. As a result, they are at risk of developing musculoskeletal disorders. Hence, this study intends to assess magnitude of work related musculoskeletal disorders and its predictors among computer user bankers in this study area.

MATERIAL AND METHODS: Institutional based cross-sectional study was conducted from September to December 2021. A total of 422 private and Public own computer user bankers were participated. Simple random sampling technique was used to select the study participants. Binary logistic regression model was used to investigate the relationship between dependent and independent variables. *P* value less than .05 at 95% CI was considered as a significant association between dependent and independent variables.

RESULT: Overall, 245 (58.8%) of computer-user bankers were suffered work-related musculoskeletal disorders in the previous 12 months. Aged 30 and above [AOR:6.5 (1.7-24.6)], no regular physical exercise [AOR: 6.03 (2.2-16.3)], not received ergonomics training [AOR: 5.46 (2.2-13.1)] and working in awkward posture [AOR: 8.76 (2.9-25.9)] were significantly associated to work related musculoskeletal disorders in the previous 12 months.

CONCLUSION: The magnitude of musculoskeletal disorders among computer user bankers was high. Implementing proper working posture, regular physical exercise, avoiding prolonged use of computer and receiving ergonomics training will reduce the burden of musculoskeletal disorders among computer user bankers. The implications of the findings enhance the need for training supervision, cascading tasks taking the age of workers in to account, sustained supply of work station materials and promoting physical exercise by banks to their workers uninterruptedly.

KEYWORDS: Musculoskeletal disorders, computer user, banker, factors, Ethiopia

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Introduction

Musculoskeletal disorders (MSDs) encompass a group of inflammatory and degenerative conditions which affect the muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels causing ache, pain, numbness or discomfort.[1-3] MSDs are usually characterized by musculoskeletal symptoms of pain, paranesthesia, stiffness, swelling, redness, weakness, tingling, and numbness.[4,5] It is one of the leading causes of workplace health issues, with implications for workers, employers, and society.[6,7] Work-related musculoskeletal disorder (WMSD) is a musculoskeletal injury caused by a work-related event.[8] It is an overexertion effect that occurs when workers are repeatedly exposed to forceful and prolonged activities in awkward postures or in environments that are not supportive.[2,9] Work that hinders the upper limb extremities, the lower back, and the lower limbs aggravates WMSDs.[10]

MSDs are the most common, widespread, and expensive work-related problems in modern society, affecting hundreds of millions of people worldwide.[1,11,12] MSDs account for 42% to 58% of all work-related illnesses, and it is the leading cause of all health-related absences from work.[3] In USA, one-third of working days have been lost due to WMSDs.[13]

Office workers have a high prevalence of MSDs due to prolonged sitting, computer work, repetitive tasks, static postures, and uncomfortably working conditions.[13,14] Computer workers are at risk of developing upper extremity musculoskeletal disorders.[1] Poor body posture and prolonged sitting during computer work while managing client bank accounts, including opening and closing accounts, and overseeing transaction can cause musculoskeletal pain due to ergonomic factors of repetitive nature of the work. Bankers are expected to perform at computer workstations for long periods of time.[1,3] They work for 8 hours per day, and 6 days per week. Bankers use computers for data collection, processing, and programing in the banking industry.[13,14] According to reports from Kuwait, India and Nigeria, the prevalence of WRMSDs among bankers was 80%, 83.5%, and 71.68% respectively.[15-17]

Previous researches has found that the prevalence of WMSDs increases with age, smoking habit, gender, lack of physical activity, body mass index BMI (overweight or obesity), alcohol drinking habit, longer workdays, working department, poor working posture, and stress.[1,16,18-24] Despite these mentioned factors, no study has been done in this study area. Continued data collection and research is paramount to further elucidate the causes and prevention of musculoskeletal disorders. Hence, we believe it would be useful for relevant government agencies, and concerned bodies to consider the following program initiatives. Therefore, this study was aimed to generate further evidence by determining the magnitude of work-related musculoskeletal disorders and its associated factors among computer user bankers in South Gondar zone, North west Ethiopia.

Material and Methods

Study area, period, and design

An institution-based cross-sectional study was conducted among computer user bankers working in South Gondar zone banks from September to November 2021. In this study, computer used bankers working at different Public and private banks of south Gondar zone were participated. At the time of data collection, a total of 674 computer user bankers were recruited (500 were from Public bank and 174 were from private banks).

Source and study Population

All computer user bankers working in South Gondar zone banks were considered as the source population, while all computer user bankers worked in the selected branches were the study population.

Eligibility criteria

All computer user bankers with one and above year work experience were included in the study, whereas computer user bankers with a history of MSDs, pregnant women, and critically ill bankers were excluded.

Sample size determination and sampling technique

Single population proportion formula was used to calculate sample size by using 5% margin of error, 95% confidence interval, $P = 50\%$ expected prevalence of WMSD in South Gondar Zone, and the final sample size (n) was 422 after adding a 10% non-response rate. Then, 422 participants were proportionally allocated to 7 private and 1 government-owned banks based on their number of employees. As a result, a total of 313 bankers from government-owned bank and 109 bankers from private banks were selected using lottery method.

Data collection tools and procedures

The data were collected using a structured, pretested questionnaire adapted from the modified Nordic musculoskeletal questionnaire.[25] The questionnaire is composed of sociodemographic, work-related, behavioral, and MSDs-related characteristics. Face to face interview was done and physical measurement of height and weight were also done and recorded to the nearest 0.1 cm and 0.1 g respectively. Body mass index of the participants were calculated. Data collection and supervision was done by 5 trained BSc environmental and occupational health professionals, and 2 MSc environmental health professionals respectively.

Data management and statistical analysis

The data were checked for consistency and completeness before being entered into Epi- info version 7 and exported to SPSS version 23. The data were presented in the form of

frequency, percentage, mean, and standard deviation. Bivariate analysis was used, and variables with a *P* value of ⩽.25 were transferred and analyzed using multivariable logistic regression analysis to handle the effect of confounding variables. Multivariable analysis was used to see the relationship and strength between predictors and the outcome variable. *P* value less than .05 was used as the statistical significance threshold.

Data quality assurance

Standardized Nordic musculoskeletal questionnaire was used and written in English before being translated into the local language and then back into English to ensure consistency. Data collectors and supervisors were received 2 days of training on data collection techniques, confidentiality, and the study's objectives prior to data collection. 5% of the pretest was done in North Gondar banks and tool was modified accordingly.

Operational definition

Computer user bankers: any bank workers who performs their activity using computer

Work-related musculoskeletal disorders: Computer user bankers who have experienced pain, ache, or discomfort in any part of their bodies segment for at least 2 to 3 workdays in the previous week or previous 12 months were considered.[26]

Body Mass Index (BMI): <18.5 is considered as underweight, 18.5 to 24.9 is considered as normal, 25.0 to 29.9 considered as overweight, and ⩾30.0 considered as obese.[27]

Physical exercise: Exercising or participating in any sport activity for at least 150 minutes of moderate-intensity aerobic physical activity per week, or 75 minutes of vigorous-intensity aerobic physical activity per week.[28]

Awkward posture: computer user bank employees working with the neck bent more than 30 degrees without support, working with a bent wrist, working with the back bent without support, squatting and kneeling for 2 or more hours.[29]

Cigarette smoking: an employee who smokes cigarette daily (at least 1 cigarette per day) for at least 1 year was considered as a smoker.

Alcohol consumption: an employee who drinks at least 5 drinks per week for men and 2 drinks per week for women for at least 1 year.

Result

Sociodemographic characteristics of the respondents

Data were collected from 422 computer user bankers. The mean age of the respondents was 29.2, with a standard deviation (SD) of 9.1. Among the total study participants 309 (73.2%) were males, 215 (50.9%) were married, 3 forth of the participants 320 (75.8%) had a bachelor's degree. Regarding on BMI, 308 (73%) of the study participants had ranged from 18.5 to 24.9 kg/m^2 (Table 1).

Table 1. Sociodemographic characteristics of the respondents among computer user bankers in South Gondar zone, Northwest Ethiopia, 2021.

VARIABLE	FREQUENCY	PERCENT (%)
Gender		
Male	309	73.2
Female	113	26.8
Age		
<30	294	69.66
⩾30	128	30.34
Educational status		
Diploma	59	14
Degree	320	75.8
MSc and above	43	10.2
Marital status		
Single	207	49.1
Married	215	50.9
BMI in kg/m^2		
18.5-24.9	308	73.0
25-30	114	27.0
Mean BMI (SD)	23.4 (SD 4.2)	
Designation		
Clerical	311	73.7
Assistant manager	73	17.3
Manager	38	9

Behavioral and work-related characteristics of the respondents

From the total study participants only 121 (28.7%) were doing regular physical exercise at least twice a week, and three-fourth of the participants 312 (73.9%) were worked in a good posture. Majority of the participants had no history of alcohol consumption 351 (83.2%) and cigarette smoking 357 (84.6%). About 255 (60.4%) participants were not received ergonomics training, and 266 (63%) participants had 1 to 5 years of work experience (Table 2).

Magnitude of work-related musculoskeletal disorder by body parts

In this study, among the 422 bankers 258 (61.1%) were suffered WMSDs in the 12 months. Neck and foot/ankle were the most and least WMSD affected body parts (Figure 1).

Table 2. Behavioral and work-related characteristics of the respondents among computer user bankers in South Gondar zone, Northwest Ethiopia, 2021.

VARIABLE	FREQUENCY	PERCENT (%)
Cigarette smoking		
Yes	65	15.4
No	357	84.6
Alcohol drinking		
Yes	71	16.8
No	351	83.2
Physical exercise		
Yes	120	28.4
No	302	71.6
Ergonomics training		
Yes	167	39.6
No	255	60.4
Working duration per day (in hours)		
⩽8	374	88.6
>8	48	11.4
Duration of computer use per day (in hours)		
⩽8	245	58.1
>8	177	41.9
Work experience in year		
1-5	266	63
>5	156	37
Posture		
Normal/Good	312	73.9
Awkward/Poor	110	26.1
Work rest/breaks		
Yes	177	41.9
No	245	58.1
Type of sitting chair		
Fixed	192	45.5
Adjustable	230	54.5
Type of bank		
Public/government-owned	313	74.2
Private	109	25.8

Factors associated with work-related musculoskeletal disorders

In 12 months, WMSDs bivariate analysis result also showed gender, age, working experience, doing regular physical exercise, ergonomics training, duration of computer use/day (in hours), type of sitting posture, rest break, nature of the sitting chair were associated with WMSDs, whereas in multivariate analysis age greater than ⩾30 years, participants who had not received ergonomics training and not doing regular physical exercise and respondents who worked in awkward posture were more likely to suffered WMSDs.

In the previous 12 months, participants aged 30 and above were 6.5 times [AOR: 6.5 (4.76-9.60)] more likely to have WMSD than those aged less than 30, and participants who didn't regular physical exercise were 6 times [AOR: 6.03 (5.25-8.18)] risk to WMSD than those who did. Participants who didn't received ergonomics training were 5.4 times [AOR: 5.46 (4.16-6.78)] more likely to develop WMSDs than those who exercised. Participants who were worked in awkward posture had 8.7 times [AOR: 8.76 (5.9-10.56)] higher risk of WMSD than those worked in good posture (Table 3).

Discussion

The present study showed that 258 (61.1%) computer user bankers were experienced at least 1 episode of WMSDs in the previous 12 months. This finding was comparable with the study reported in Mekle, Ethiopia (65.5%),[30] and Dhaka city, Bangladesh (69.3%),[1] but the current study result was higher than the result reported in Tamil Nadu, Southern India (33.8%).[3] However, higher results were reported in Addis Ababa (77.6), Kuwait (80%), India (83.5%), Nigeria (71.6%), and Bhopal (73.7%) respectively.[2,7,15,16,26] This discrepancy might be due to workload, time and area of study variation between the previous and the present study.

The present study revealed that neck (45.3%), lower back (38.9%), and upper back (32.9%) were the most affected body parts in the previous 12 months. This study finding were consistent with the studies conducted in Addis Ababa (Ethiopia), Jimma (Ethiopia), Mekle (Ethiopia), Maiduguri (Nigeria), Punjab (India), and Bhopal (India).[2,4,6,16,26,30] This might be routine overhead work, work with the neck in chronic flexion position, longer sitting on a chair without lower and upper back support.

In this study WMSDs were significantly associated with age greater than 30, lack of regular physical exercise, lack of ergonomics training, and working in awkward posture in the previous 12 months. As a result, participants aged 30 and above were 6.5 times higher risk of WMSDs than those under 30 in the previous 12 months. It is supported by the results found in Mekle (Ethiopia) and Maiduguri (Nigeria) studies.[2,30] They reported that people who were older had significantly higher risk of developing WMSD than people who were younger.

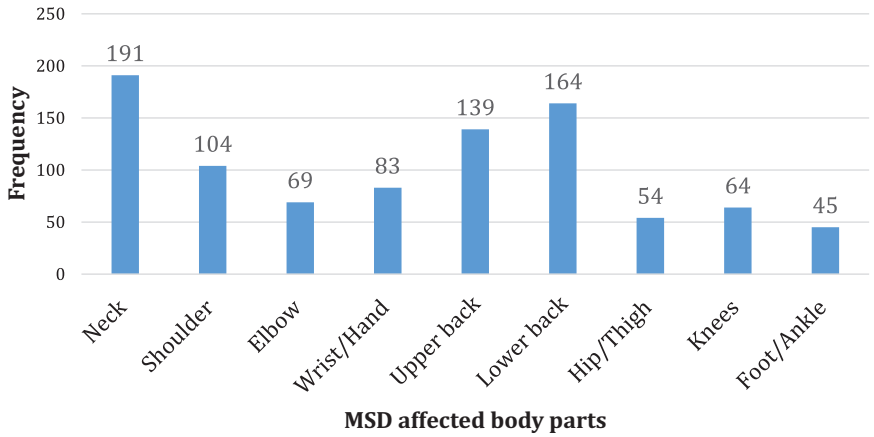

Figure 1. Frequency of musculoskeletal disorders (MSDs) by affected body part among computer user bankers in South Gondar zone, Northwest Ethiopia, 2021 (n = 422).

Table 3. Bivariate and multivariate regression analysis model factors associated with MSDs in the previous 12 months among computer user bankers in South Gondar zone, Northwest Ethiopia, 2021 (n = 422).

VARIABLES (INDEPENDENT)	MSD (DEPENDENT)		OR (95% CI)		*P*-VALUE
	YES	NO	COR	AOR	
Gender					
Female	85	28	2.38 (1.76-3.60)	1.66 (0.6-4.4)	
Male	173	136	1	1	.31
Age					
<30	139	155	1	1	
⩾30	110	18	6.81 (14.63-18.8)	6.5 (4.76-9.60)	.006*
Experience in year					
1-5	128	138	1	1	
>5	129	27	5.15 (3.3-8.7)	3.44 (3.86-8.3)	.062
Doing regular physical exercise					
No	231	71	5.61 (3.15-4.22)	6.03 (5.25-8.18)	.001*
Yes	44	76	1	1	
Ergonomics training					
No	202	53	6.13 (4.47-8.55)	5.46 (4.16-6.78)	.001*
Yes	64	103	1		
Duration of computer use/day (in hours)					
⩽8	123	122	1	1	
>8	140	37	0.34 (0.30-0.41)	0.27 (0.22-0.36)	.27
Type of sitting Posture					
Normal/Good	141	171	1	1	
Awkward/Poor	97	13	9.04 (8.07-10.26)	8.76 (5.9-10.56)	.001*

(Continued)

Table 3. (Continued)

VARIABLES (INDEPENDENT)	MSD (DEPENDENT)		OR (95% CI)		*P*-VALUE
	YES	NO	COR	AOR	
Work rest/break					
No	154	91	1.11 (0.98-1.4)	1.03 (0.91-1.05)	.36
Yes	107	70	1	1	
Nature of the sitting chair					
Fixed	53	139	0.09 (0.08-0.1)	0.07 (0.04-0.09)	.07
Adjustable	207	23	1	1	

NB, The model adequately fit the data at a *P*-value = .361 (Hosmer Lemeshow goodness Chi-square of 7.49), *significant at *P* value <.05.
Abbreviations: AOR, adjusted odds ratio; COR, crude odds ratio.

A study conducted in Mekle found that participants aged 30 to 39 years old had a 5.5-fold more risk for WMSDs and over age 40 had 5.7 times more risk of WMSDs than age less than 30.29 A Maiduguri result also showed that respondents aged 30 and above were 16.9 times more risk to WMSDs than those aged less than 30.[2] Another study in Punjab (India) discovered that the prevalence of WMSDs rises with age and the highest prevalence of WMSDs has been observed in the elder compared to the younger.[16] This could be due to having of more working experience than younger peoples and youngers have superior muscular performance. Biological changes associated with aging, such as degenerative changes to muscles, tendons, ligaments, and joints, have been linked to the pathogenesis of musculoskeletal disorders.[31]

Working in awkward posture increased the risk of WMSD by 8.7 times compared to those who worked in good posture. Similar results were reported in Addis Ababa, Mekle, Jimma, and Punjab (India).[4,16,26,30] A study done in Addis Ababa revealed that participants who were sitting back in a twisted position 3.5 times and sitting back bent 4 times more risk of developing WMSD than those who worked in good posture. Similar studies done in Mekele City and Jimma Town also indicated participants who worked with awkward posture 2.6 times and 4 times more likely to develop MSD than those who worked in good posture respectively.

Participants who had no experience of doing regular physical exercise were 6 times more risk to have WMSDs than those who were doing regularly. This is supported by Mekle study and they found that respondents without physical exercise were 2.8-fold higher risk for WMSDs than those who had experience regular physical exercise.[30] Evidences indicated that involvement in sport or physical activity was significantly associated with MSD. Physical exercise has preventive effects on development of musculoskeletal injuries and pain. Doing physical exercises 3 times a week for 20 minutes can be reduce musculoskeletal pain in different parts of the body like shoulder, neck and lumbar spine.[1,32,33]

Study participants who didn't received ergonomics training were 5.4 times higher risk to WMSDs than those who received. This is similar with a study found in Mekele, Who reported participants who didn't received ergonomics training were 3.8 more risk to suffer WMSDs than those who received.[30] This could be due to untrained individuals may haven't basic knowledge and skills on the precautions of work-related musculoskeletal disorders and as a result they might not be follow the right procedures and practices during their work.

Conclusion

The magnitude of MSDs among computer user bank workers was very high. Neck, lower back and upper back were the most affected body parts, while hip/thigh, elbow and ankles/feet were the least affected body parts. Age greater than 30 years, not received ergonomics training and not doing regular physical exercise and worked in awkward posture were higher risk to develop work related musculoskeletal disorders. Implementing proper working posture, regular physical exercise, avoiding prolonged use of computer and receiving ergonomics training will reduce the magnitude of musculoskeletal disorders among computer user bankers. The implications of the findings enhance the need for training supervision, cascading tasks taking the age of workers in to account, sustained supply of work station materials and promoting physical exercise by banks to their workers uninterruptedly.

Limitation of the study

The study has assessed the magnitude and its associated factors of work-related musculoskeletal disorders among workers of public and private banks. Private and public banks' work tasks and the ergonomic factors may differ due to difference of workstation supply and work load to respective employees, but no comparative assessment has been conducted.

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Author Contributions

Biruk Demissie: Conceptualization (equal), Data curation (equal), Formal analysis (equal), Methodology (equal), Writing original draft (equal). Getachew Yideg, Alebachew Amsalu, Fentaw Teshome Dagnaw, Ermias Sisay, Binyam Minuye, Anemut Tilahun Mulu, Fitalew Tadele, Nega Dagnew Baye, Gashaw Walle, Sintayehu Asnakew, Eniyew Tegegne and Chalachew Yenew: Investigation (equal), supervision (equal), writing review and editing (equal), Validation (equal) and Visualization (equal).

Consent to Publish

Not applicable.

Data Availability Statement

All data gathered and analyzed during this study are available from the corresponding author at reasonable request.

Ethical Approval and Consent for Participation

Ethical clearance was obtained from the institutional review board of Debre Tabor University and official letter submitted to the concerned bodies. Data collection was started after permissions obtained from the bank manager and written consent was taken from the study participants. Confidentiality of the information was assured and the privacy of the respondents was maintained.

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