Prevalence of Back Pain and Associated Factors among Bank Staff in Selected Banks in Kigali, Rwanda: A Cross Sectional Study

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Abstract

Background: Banking has made people run and develop their businesses well, use of computers is a revolution in which work is made easier in banks, it has however been revealed to cause musculoskeletal pain. Computer use requires prolonged sitting or improper body alignment which strains the vertebral column causing back pain.

Objectives: The study aimed at determining the prevalence and factors associated with back pain among bank staff in Kigali, Rwanda.

Methods: This was a descriptive cross sectional study employing a quantitative approach. A total of 144 employees from two banks constituted the sample size for the study through random sampling and interviewed using a pre-tested structured questionnaire. Chi-square test (p<0.05) and odds ratio with corresponding 95% confidence interval were computed to establish the association between back pain and independent variables. Binary logistic regression model was used to identify variables independently associated with back pain.

Results: The prevalence of back pain among the bank staff was found to be 45.8%. Multiple logistic regression revealed that having no break off during working time {AOR=3.96; 95% CI=1.71-9.20; p<0.001}, sitting in a back bent position {AOR=9.20; 95% CI=2.41-35.17; p=0.001} and sitting in back twisted position {AOR=25.87; 95% CI=6.71-99.65; p<0.001} were predictors of back pain.

Conclusion: This study shows that there is a high prevalence of back pain among bank staff and factors like sitting in back bent, back twisted, and having no break off during working time are independently associated with back pain among bank staff. Therefore, it is recommended that break offs and proper ergonomics to avoid back twists and back bents are needed to prevent back pain.

Keywords: Bank staff; Back pain; Prevalence

Introduction

Back pain is an important public health problem in developed and developing countries. Globally, it is one of the leading musculoskeletal disorders and it is a worldwide disabling occupational hazard [1]. It was also reported that low back pain not only considered to be the most common reason for functional disability worldwide, but also estimated to have affected 90% of the universal population [2]. Until recently it was largely thought of as a problem confined to western countries but research conducted during the last decade clearly showed that it is also a major problem in low and middle income countries [3].

Working conditions are often presumed to play an important part in aetiology of back pain [4]. It is associated with working postures which included bending heavily with one's trunk, bending and twisting simultaneously with one's trunk, a bent and twisted posture for long periods, and making repetitive movements with the trunk [5-8]. Apart from the working conditions, a wide range of risk factors such as age, gender, lifestyle factors such as smoking, alcohol consumption, previous pain symptoms, psychosocial factors, socioeconomic variables, poor muscle flexibility and strength, physical activity and physical load have been associated with the development and persistence of back pain [9,10].

Banks are the industries where employees are subjected to various physical demands and prolonged sitting or standing

postures which may lead to back pain. It has been reported that back pain is one of the main symptoms causing burnout in bank employees in Pakistan [11]. According to Ortiz-Hernandez et al. [12], computer users who spend many hours become vulnerable to developing musculoskeletal disorders like neck, shoulder and back pain as they spend prolonged sitting in front of computers with awkward postures and repeated movements while typing and using a mouse. Working with computer poses awkward postures that are continually and forcefully maintained and this subsequent changing from normal sitting postures while using a computer has been noticed and influences development of musculoskeletal system pain, back and neck pains being more common [13].

The consequences of back pain were far reaching and lead to a negative economic impact, which includes an increased absence from work and lost productivity [14]. It is presumed that back pain among bank workers in Rwanda is high. However, there is limited data on the prevalence of back pain and the associated factors among bank workers in Rwanda. Establishing the factors associated with back pain is critical to provide adequate prevention.

Materials and Methods

Study design and setting

A descriptive cross-sectional study design using quantitative approach was conducted. The study was conducted at the equity and I&M banks in Kigali, Rwanda. They are located in the city of Kigali in Nyarugenge district which is the most commercial city center in Kigali. The banks are 250 meters apart with big number of customers.

Sample size and sampling procedures

The study included bank staffs who work in two banks. Sample size was calculated using Yamane formula [15] ($n=N/1+Ne^2$). The following assumptions were considered: 95% confidence interval, 5% margin of error. Final sample size was 144 from a population of 226. The study used both purposive and simple random sampling techniques. Purposive sampling was used to select the two banks under study while respondents were selected through simple random sampling. The list from each category was entered into Microsoft excel and random numbers were generated. Based on the generated numbers respondents were selected randomly proportional to the target population in each bank.

Data collection instrument

A pre-tested structured questionnaire was used for data collection. The dependent variable was back pain and the independent variables included were socio-demographic characteristics, life style, sitting positions and type of seat, duration of computer use and presence of chronic diseases. Respondents were asked about back pain after they started working in the bank.

Data analysis

Data captured in questionnaire was entered into a computer using MS Excel application. Data cleaning and validation was performed in order to achieve a clean dataset that was exported into a Statistical Package format (SPSS Version 22.0). Descriptive analysis was done using frequencies and proportions. Pearson's chi-square test was used to establish the association between the dependent variable (back pain) and independent variables in order to determine which ones had significant association. Odds ratio (OR) with corresponding 95% confidence interval (95% CI) were also estimated. The level of statistical significance was set at p-value <0.05. Binary logistic regression analysis was performed to identify predictors of back pain.

Ethical considerations

Approval to carry out the study was sought and obtained from Mount Kenya University Rwanda, equity bank and I&M bank. Written consent was obtained from all study participants after a detailed explanation of the purpose of the study.

Results

Socio-demographic characteristics stratified by back pain

Table 1 illustrates socio-demographic characteristics stratified by back pain. The prevalence of the back pain was found to be 45.8%. The mean age of the respondents was 42.6 years. The highest percentage (40.3%) of the respondents was above 45 years. This was significantly associated with back pain where respondents above 45 years were 2.5 times more likely to have back pain compared to those aged 27 to 35 years {OR=2.51; 95% CI=1.06-5.91; p=0.036}.

The gender distribution indicates that there were 55.6% males and 44.4% females. Majority (68.1%) of the respondents were married and most (83.3%) of them had bachelor degree. About three quarter of the respondents (74.3%) were cashiers. However, these variables were not significantly associated with back pain.

Table 1 Socio-demographic characteristics stratified by back pain.

Variables	Back pain, n (%)	No back pain, n (%)	Total, n (%)	OR	95% CI	χ^2 test p value

					Lower	Upper	
Age in years							
< 35	13(19.7)	23(29.5)	36(25.0)	Reference			
36-45	19(28.8)	31(39.7)	50(34.7)	1.08	0.45	2.64	0.858
< 45	34(51.5)	24(30.8%)	58(40.3)	2.51	1.06	5.91	0.036
Gender							
Male	34(51.5)	46(59.0)	80(55.6)	Reference			
Female	32(48.5)	32(41.0)	64(44.4)	1.35	0.7	2.62	0.37
Marital status							
Single	14(21.2)	9(11.5)	23(16.0)	2.42	0.74	7.91	0.144
Married	43(65.2)	55(70.5)	98(68.1)	1.22	0.48	3.08	0.679
Divorced/separated	9(13.6)	14(17.9)	23(16.0)	Reference			
Level of education							
Completed secondary	3(4.5)	7(9.0)	10(6.9)	Reference			
Bachelor	60(90.9)	60(76.9)	120(83.3)	2.33	0.58	9.45	0.235
Masters	3(4.5)	11(14.1)	14(9.7)	0.64	0.1	4.09	0.634
Job designation							
Manager	5(7.6)	9(11.5)	14(9.7)	Reference			
Customer care giver	9(13.6)	14(17.9)	23(16.0)	1.16	0.29	4.59	0.835
Cashier	52(78.8)	55(70.5)	107(74.3)	1.7	0.54	5.41	0.368
Key: OR = Odds Ratio; CI = Confidence interval							

Lifestyle and selected chronic diseases associated with back pain

Relationship of life style behaviors and chronic diseases with back pain among the bank workers is shown in **Table 2**. Majority (63.2%) of the respondents were non-smokers whereas the remaining 36.8% were smokers. This was significant where back pain was about 2 times more among smokers than non-smokers {OR=1.99; 95% CI=1.01-3.96; p=0.048}. About two thirds (64.6%) of the respondents were non-alcohol consumers while 35.4% indicated otherwise. Most (91%) of the respondents reported that they used to do exercises. However, there was no significant association between back pain and alcohol consumption as well as exercise.

Table 2 Life style and selected chronic diseases stratified by back pain.

Variables	Back pain, n (%)	No back pain, n (%)	Total, n (%)	OR	95% CI		x^2 test p value
					Lower	Upper	
Smoking							
Yes	30(45.5)	23(29.5)	53(36.8)	1.99	1.01	3.96	0.048
No	36(54.5)	55(70.5)	91(63.2)	Reference			
Alcohol consumption							
Yes	26(39.4)	25(32.1)	51(35.4)	1.38	0.69	2.74	0.359
No	40(60.6)	53(67.9)	93(64.6)	Reference			
Doing exercises/sports							

Yes	63(95.5)	67(85.9)	130(90.3)	3.45	0.92	12.93	0.088
No	3(4.5)	11(14.1)	14(9.7)	Reference			
Diabetes mellitus							
Yes	6(9.1)	6(7.7)	12(8.3)	1.2	0.37	3.91	0.762
No	60(90.9)	72(92.3)	132(91.7)	Reference			
Hypertension							
Yes	12(18.2)	9(11.5)	21(14.6)	1.7	0.67	4.34	0.26
No	54(81.8)	69(88.5)	123(85.4)	Reference			
Nutritional status							
Normal weight	30(45.5)	44(56.4)	74(51.4)	Reference			
Over weight/obesity	36(54.5)	34(43.6)	70(48.6)	1.55	0.8	3	0.191
Stress at work							
Never	3(4.5)	17(21.8)	20(13.9)	Reference			
Sometimes	48(72.7)	41(52.6)	89(61.8)	6.63	1.83	24.25	0.004
All the times	15(22.7)	20(25.6)	35(24.3)	4.25	1.05	17.2	0.043
Key: OR = Odds Ratio; CI = Confidence interval							

Of the 144 respondents who participated in the study, 14.6% and 8.3% were suffering from hypertension and diabetes mellitus respectively but they were not significantly associated with back pain. Though considerable percent (48.6%) were classified as overweight/obese based on the body mass index category, it was not statistically significant with back pain.

Respondents were requested whether they had any stress related to work and majority (61.8%) claimed that they had stress sometimes and 24.3% all the times. This was also significantly associated with back pain where respondents with stress of sometimes had 6.6 times more {OR=6.63; 95% CI=1.83-24.25; p=0.004} and with stress of all the times had 4.2 times more {OR=4.25; 95% CI=1.05-17.20; p=0.043} compared to those who never experienced stress at work.

Duration of computer use, type of chairs, sitting positions and break during working time stratified by back pain

Table 3 below summarizes the relationship of duration of computer use, type of chairs, sitting positions and break during working time with back pain among bank workers. The highest percentage (35.4%) used computers for 4 to 7 years followed by 29.2% who used for 8 to 11 years. However, this was not significant in the bivariate analysis.

Considerable percentages (41%) and (40.3%) of the respondents were using computers 7 to 9 hours and 10 to 12 hours respectively. This duration of hours spent for computer use was statistically significant with back pain where respondents who spent 10 to 12 hours per day were 3.5 times

more likely to have back pain than those who used computers for 4 to 6 hours {OR=3.52; 95% CI=1.29-9.60; p=0.014}.

About half (47.9%) of the respondents used fixed chairs and those who used fixed chairs had significantly about 3 times more chances of developing back pain than those who were using movable chairs {OR=2.93; 95% CI=1.49-5.78; p=0.002}. Majority (68.8%) were sitting on chairs with arm rests however, it was significant with back pain.

The sitting position was examined and 39.6% were sitting with their back twisted followed by back bent (34.7%) and back straight (25.7%). The respondents who indicated sitting with back bent were about 10 times more likely to develop back pain {OR=9.65; 95% CI=2.62-35.60; p=0.001} compared to those sitting with back straight. Similarly, respondents who indicated sitting with back twisted were 26.6 times more likely to develop back pain {OR=26.67; 95% CI=7.20-98.81; p<0.001} compared to those who used to sit with back straight.

About two third (65.3%) reported that they had break during working hours whereas the remaining (34.7%) never had break. This was statistically significant where respondents who had no break during working time were 4 times more likely to develop back pain compared to those who had break {OR=4.12; 95% CI=1.98-8.56; p<0.001}.

Multivariate analysis of factors associated with back pain

Logistic regression was applied to identify the variables independently associated with back pain among bankers. Seven (7) variables that showed significant association (p<0.05) during bivariate analysis (age, smoking, stress at work, duration of using a computer, type of sitting position,

type of chair and whether taking break off during work) were considered together in multivariate analysis. Upon fitting the factors using binary logistic regression and specifying 'backward conditional' method with removal at p<0.05, two (2) factors remained the reduced model as shown in **Table 4**.

Table 3 Duration of computer use, type of chairs, sitting positions and break during working time stratified by back pain.

Variables	Back pain, n (%)	No back pain, n (%)	Total, n (%)	OR	95% CI		χ^2 test p value
					Lower	Upper	
Duration of using computer in years							
1-3 years	7(10.6)	7(9.0)	14(9.7)	Reference			
4-7 years	21(31.8)	30(38.5)	51(35.4)	0.7	0.21	2.29	0.556
8-11 years	15(22.7)	27(34.6)	42(29.2)	0.56	0.16	1.89	0.346
12 - 15 years	23(34.8)	14(17.9)	37(25.7)	1.64	0.48	5.68	0.433
Duration of using computer per day							
4-6 hours	7(10.6)	20(25.6)	27(18.8)	Reference			
7-9 hours	27(40.9)	32(41.0)	59(41.0)	2.41	0.89	6.56	0.085
10-12 hours	32(48.5)	26(33.3)	58(40.3)	3.52	1.29	9.6	0.014
Type of chair							
Fixed chair	41(62.1)	28(35.9)	69(47.9)	2.93	1.49	5.78	0.002
Movable chair	25(37.9)	50(64.1)	75(52.1)	Reference			
Whether the chair has arm rests							
Yes	17(25.8)	28(35.9)	45(31.3)	Reference			
No	49(74.2)	50(64.1)	99(68.8)	1.61	0.79	3.32	0.192
Type of sitting position							
Back straight	3(4.5)	34(43.6)	37(25.7)	Reference			
Back bent	23(34.8)	27(34.6)	50(34.7)	9.65	2.62	35.6	0.001
Back twisted	40(60.6)	17(21.8)	57(39.6)	26.67	7.2	98.81	<0.001
Lifting heavy objects							
Yes	6(9.1)	3(3.8)	9(6.3)	2.5	0.6	10.41	0.195
No	60(90.9)	75(96.2)	135(93.8)	Reference			
Whether break off during working time							
Yes	32(48.5)	62(79.5)	94(65.3)	Reference			
No	34(51.5)	16(20.5)	50(34.7)	4.12	1.98	8.56	<0.001
Key: OR = Odds Ratio; CI = Confidence interval							

Respondents who indicated sitting with back bent were 9 times more likely to develop back pain than those who used to sit in back straight {AOR=9.20; 95% CI=2.41-35.17; p=0.001} and those sitting with back twisted were about 26 times {AOR=25.87; 95% CI=6.71-99.65; p<0.001} more likely to develop back pain compared to those who used to sit back straight. Bank staff who had no break off during working time were 4 fold more likely to have back pain compared to those who had break off {AOR=3.96; 95% CI=1.71-9.20; p=0.001}.

Table 4 Multivariable analysis of factors associated with back pain.

Predictors	AOR	95% CI		P value
		Lower	Upper	

Type of sitting position				
Back straight	Reference			
Back bent	9.2	2.41	35.17	0.001
Back twisted	25.87	6.71	99.65	0
Whether having break off during working time				
Yes	Reference			
No	3.96	1.71	9.2	0.001
Key: AOR = Adjusted Odds Ratio; CI = Confidence interval				

Discussion

Back pain is a very common health problem worldwide and a major cause of disability, the 2010 Global Burden of Disease Study estimated that low back pain is among the top 10 diseases and injuries that account for the highest number of disability adjusted life years (DALYs) worldwide [16]. In this study the prevalence of the back pain was high at 45.8%. This is similarly to the prevalence of low back pain (45.2%) among office worker in Lebanese [17] and 51% among information technology professionals in India [18]. This prevalence was slightly higher compared to a study conducted by Mahmud et al. [19], in Malaysia among computer users where the upper and lower back due to improper alignment in front of a computer for long duration was 38.9%. However, it was lower compared to a study conducted in Manisa, Turkey among computer using office workers which revealed 66.3% [20]. Generally in the literature, back pain prevalence ranges from 37.3% [21] to 70-85% [22].

In the multivariable analysis it was found that bank staff who had no breaks during working time was 4 fold more likely to have back pain compared to those who had breaks. Likewise other studies showed that individuals having breaks while working at computers were experiencing less pain [23,24], while the individuals not having breaks were experiencing more pain [25]. This implies that respondents who break off during working time have high chances of relaxing back muscles and reduce risks of back pain. Therefore it is recommended people working at banks to have regular breaks during the working time.

Consistent with other studies [5-8], type of sitting position was predictor of back pain in our study at the multivariable analysis. Bank workers sitting with back bent were 9 times at risk to develop back pain than those who sit in back straight. Similarly, bank workers sitting with back twisted were about 26 times more likely to develop back pain compared to those who used to sit back straight. This poor posture can lead to stiffness and compression in the lower back causing aching. Furthermore, it was also found that individuals with ergonomic knowledge had significantly declining musculoskeletal system complaints [26]. This result reveals the need of ergonomic training at workplaces to decrease the discomforts due to back pain.

Limitations and Strengths of the Study

The main limitation of the study was self-report and reliability of participants' response to back pain. However, the purpose of the study was explained to all respondents. Another limitation of the study was that it was conducted only in two banks with a small sample size. Despite these limitations, this study has significant public health relevance and the data could inform intervention strategies to reduce risk factors for back pain. As to the strengths of this study, the respondents have been selected by random sampling technique; the logistic regression has been done to measure the factors that independently associate with back pain.

Conclusion and Recommendations

The study concludes that factors like sitting with back bent, back twisted as well as lack of breaks during work time were associated with back pain at the reduced model of multivariable analysis. Therefore we recommend that the banks should adopt suitable type of chairs for their employees as a measure of preventing back pain and introduce ergonomic training at workplaces. In addition there should be regular periods for the employees to have a break to avoid back pain.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

Livingstone Kanyenyeri conceptualized the idea for the study, contributed in the design and protocol preparation, involved in acquisition of data and participated in critical review of the subsequent draft of the manuscript

Michael Habtu: contributed in design and protocol preparation, performed analysis and interpretation of data and drafted the first manuscript.

Benon Asiimwe assisted in design and protocol preparation, made a substantial contribution toward analysis and participated in critical review of the subsequent draft of the manuscript.

Monica Mochama provided assistance with the design and participated in critical review of the subsequent draft of the manuscript.

John Nyiligira involved in critical review of the subsequent draft of the manuscript

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