

Research Article

Musculoskeletal disorders and associated disabilities among bank workers

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ABSTRACT

Background: Musculoskeletal disorders (MSDs) are among the most common health problems encountered in the workplace around the globe leading to disabling conditions there by reducing human performance and subsequently quality of life. The aim of this study was to determine the prevalence of MSDs and associated disabilities and also to identify the risk factors responsible for their occurrence among bank workers in Kancheepuram district, Tamil Nadu, India.

Methods: Annual prevalence of MSD was determined through a cross sectional survey from a sample of 300 bank workers. A pre-validated questionnaire adopted from modified Nordic musculoskeletal questionnaire and 12 Item General Health Questionnaire was used to obtain information about participant's demographic characteristics, job characteristics, psychosocial stress, musculoskeletal impairments and the resulting disability in different body regions. Data was obtained from the participant's at their respective working places in Kancheepuram for a period of 1 month.

Results: Annual prevalence of 33.8% was observed for the MSD, with a disability rate of 8.5%. The body region mostly affected was the lower back (51.8%) followed by the neck (48.2%), shoulder (40.2%) and upper back (39.6%). In terms of disability, the same pattern was noted with rates for the lower back, neck, shoulder and upper back being 18.9%, 13.4%, 11.6% and 9.1% respectively. The risk factors identified as being responsible for MSD were job tenure, psychosocial stress, and female sex while those responsible for the disabilities were job tenure and psychosocial stress.

Conclusion: Low prevalence of MSDs and associated disabilities was observed.

Keywords: Musculoskeletal disorders, Disabilities, Risk factors, Bank workers

INTRODUCTION

Musculoskeletal disorders (MSDs) refers to an amalgam of inflammatory and degenerative conditions which affects muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels presenting with ache, pain, numbness or discomfort.¹⁻² According to

European Agency for Safety and Health at Work, work-related musculoskeletal disorders are impairments of bodily structures such as muscles, joints, tendons, ligaments, nerves, bones and localized blood circulation system, that are caused or aggravated primarily by work and by the effects of the immediate environment in which work is performed.³ Musculoskeletal disorders affect all persons irrespective of age and sex, and are mostly

prevalent across a wide range of occupations. Available data has shown that musculoskeletal disorders accounted between 42% and 58% of all work-related illnesses and are the most frequent cause of all health-related absence from work. Thus, MSDs cause not only individual suffering but also pose a considerable financial cost to the individual, industry and society at large.⁴

Advancement in technology especially the use of electronic data and appliances has affected both workers and their working environment. Modernization of offices has led to the inclusion of information technology devices in the place of work. More people are using visual display terminals such as computer and related equipments to complete their work. Computer usage has been linked to increased risk of musculoskeletal disorders.⁵ Electronic data are mainly displayed on visual display terminals, improper body posture and prolonged sitting in front of these terminals can lead to many health hazards, including eye strain, muscle fatigue, and other musculoskeletal discomforts.^{3,6} Akrouf et al. reported that MSDs are the most common occupational health problems.⁶ Around 42.5% of workers in UK suffered from MSDs caused by or made worst by work in the year 2013 and MSDs accounts for about 8.3 million working days lost in same year amounting to an average of 15.9 days per case of MSD.⁷ In the United States, MSDs accounted for about 41.4% of all adult disabilities (41.2 million) in the last two decades. Bao, Winkel and Shahnavaz⁸ reported a very high prevalence of MSD among workers in China especially in the low back, shoulder and neck region. MSDs contribute about 37% of disease burden globally, which might be attributed to occupational risk factors resulting in substantial disability.^{6,9,10}

A number of factors have been associated with the development of MSDs including awkward posture, inappropriate manual handling, heavy lifting, strenuous task, repetitive actions and psychological stress.^[11] Demographic variables, workload and psychosocial factors are also known to play important roles in the development of MSD.⁸ Bank workers in operations section are involved in long periods of static work, awkward posture, prolonged sitting and repetitive computer activities. Thus, these tasks may predispose them to MSDs. Previous studies have reported high prevalence of MSDs among bank workers, with a prevalence ranging between 80% and 83.5%.^{4,6}

Despite technological advancement and mechanical modification of working place, the incidence of MSDs is ever increasing, which has an adverse impact on the individual and the society. Little information on the prevalence of MSDs and associated disability is available in southern India.¹² Many studies were conducted on prevalence of MSDs, but yet there is no single identifiable study done on prevalence of musculoskeletal disorders and associated disabilities among bank workers in, Tamil Nadu. This study investigated the prevalence of

MSDs and associated disabilities among bank workers in Kancheepuram district, TamilNadu and also identified the risk factors responsible for MSDs and the resulting disabling conditions. The information provided by this study can be used to stress the need for primary prevention thereby promoting health in the banking industry. The aims of this study was (a) to find out the prevalence of MSDs and associated disabilities among bank workers (b) to investigate the relationship between job characteristics and MSDs (c) to investigate the relationship between psychosocial stress and MSDs and (d) to investigate the relationship between demographic characteristics and MSDs.

METHODS

A cross sectional analytical survey was conducted among bank workers in 17 different banks with their branches spread within Kancheepuram district, Tamil Nadu, Southern India. The study was approved by the ethical committee of college of physiotherapy, SRM University India. A sample of 300 individuals was used, which was pre-determined using the prevalence obtained from a pilot survey conducted to determine the feasibility of the study and establish the presumptive prevalence.

Participants were recruited into the study purposively based on the following inclusion criteria; currently serving in a bank, working with operations section, using a visual display terminal, between 20 and 55 years, and having work in the bank for a minimum of 1 year. Pregnant women and individuals that were physically disabled as well as those with any underlying condition affecting the musculoskeletal system were not included. The procedure involved the distribution of self-administered questionnaire to the individual participants across the 17 banks enlisted for the study. Consent of the participants and their respective working places were sought verbally and using a consent form to obtain written undertaken of the participants. A letter of introduction was also used to obtain formal permission from the managements of the respective banks.

Questionnaire description and administration

A pre-validated questionnaire adopted from modified Nordic Musculoskeletal Questionnaire and Goldberg 12 Item General Health Questionnaire was used to obtain the required information from the participants. The questionnaire consists of three portions, the first part assesses individual's demographic and job characteristics [(age, sex, height, weight, Body Mass Index (BMI)], level of activity, job tenure and amount of time spent at work per week), the second part assesses the annual and weekly prevalence of self-reported MSD in the following body regions; neck, shoulder, elbow, wrist, hand, upper back, lower back, hip, knee, and ankle as well as the associated disability incurred and the third part assesses psychosocial stress based on the GHQ12 score which is graded as normal, moderate and high psychosocial stress.

A total number of 300 questionnaires were distributed to the enlisted banks staff. The banks included City Union Bank, State Bank of India, State Bank of Hyderabad, State Bank of Travancore, Indian Bank, Axis Bank, Bank of Deni, Tamilnad Mercantile Bank, Canara Bank, Karur Vysya Bank, Bank of Andhra, Syndicate Bank, HFDC Bank, Indian Overseas Bank, UCO Bank, Bank of India, and State Bank of Mysore. Instructions on how to answer the questionnaire was adequately explained to the respective participants. Further instruction was contained in the questionnaire which included body chart describing the different body region so as to guide the respondents. Participants were also told to fill up the questionnaire properly and to answer all questions to their best of knowledge. Incomplete questionnaires were not included in the study. A response rate of 62.3% was observed out of which 54.6% were duly filled and therefore considered as final response from the study respondents.

Statistical analysis

Descriptive statistics of mean, standard deviations, percentages and frequencies were used to describe demographic characteristics, job characteristics and psychosocial stress. Pearson correlation coefficient was used to investigate the relationship between job characteristics and MSDs. Pearson Chi-square analysis and multiple linear regressions were used to determine the relationship between psychosocial stress, demographic characteristics and MSDs. All statistical analyses were performed on an IBM compatible microcomputer using the Statistical Package for Social Sciences (SPSS Windows version 20.0 Chicago IL., USA). Significance was set at $\alpha=0.05$ level (two tailed).

RESULTS

This study revealed the physical characteristics of the participants which were shown in Table 1. The mean age was 33.6 ± 10.5 years, the mean height and weight were 164.2 ± 9.8 cm and 67.2 ± 12.2 kg respectively. The mean BMI was 24.9 ± 4.1 kg/m² and the mean hours spent per week was 50.3 ± 9.8 . The proportion of males to females was 59.8% and 40.2% respectively. Also, 29.35% were physically active while 70.7% were sedentary. The GHQ12 score proportions were 81.1%, 13.4%, and 5.5% for normal, moderate and high psychosocial stress respectively. Finally, 18% have worked for a minimum of one year while 72% have worked for more than one year (2-36 years). Also, 33.8% of the participants reported to have suffered at least one MSD during the proceeding year, while 8.5% reported to have encountered disability as a result of MSD, this was shown in Figure 1. Regional prevalence of MSDs and associated disabilities were also shown in Figure 2. Lower back MSD and associated disability were the most prevalent conditions with a rate of 51.8% and 18.9% respectively, while ankle MSD and knee associated disability were the least prevalent conditions with a rate of 18.3% and 2.4% respectively. Female respondents

reported suffering more from MSDs than their male counterparts while the reverse was the case regarding MSD associated disability this were shown in Figure 3.

Table 1: Individual variables.

Individual variables	
Characteristics	Mean \pm SD
Age (years)	33.6 \pm 10.5
Height (cm)	164.2 \pm 9.8
Weight (kg)	67.2 \pm 12.2
BMI	24.9 \pm 4.1
Hours spent per week	50.3 \pm 9.8
Characteristics	Percentage (%)
Sex	
Male	59.8
Female	40.2
Life style	
Active	29.3
Sedentary	70.7
GHQ12 score	
Normal (0-15)	81.1
Moderate (16-20)	13.4
High (21-36)	5.5
Job tenure	
One year (12 m)	18
Above one year (>12 m)	72

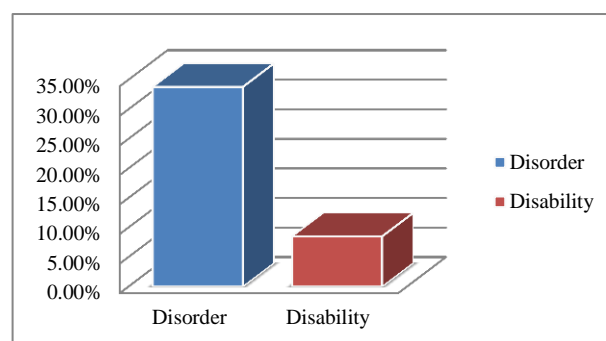


Figure 1: Overall prevalence.

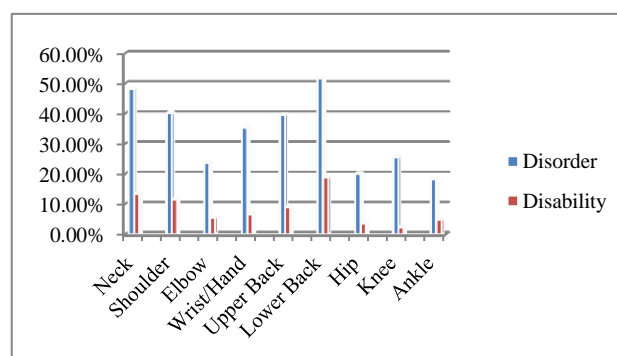


Figure 2: Regional prevalence of musculoskeletal disorders and associated disabilities.

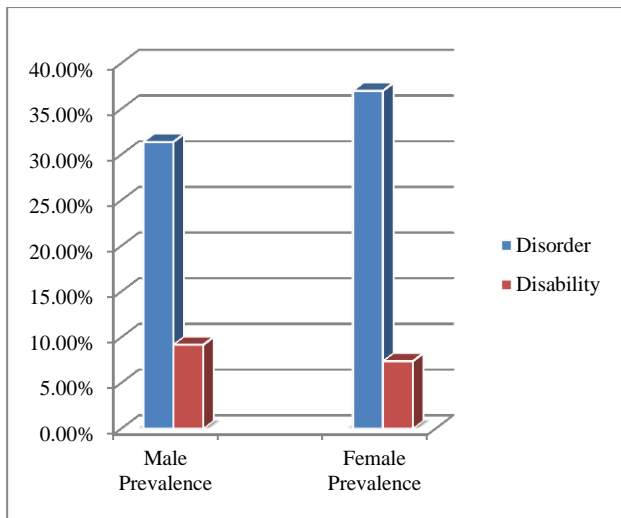


Figure 3: Gender differences in terms of prevalence of MSDs and resulting disabilities.

There was a high and significant correlation between annual and weekly prevalence of MSDs ($r = 0.896$, $P < 0.01$). Also, MSD was found to significant with associated disability ($r = 0.384$, $P < 0.01$). There was a significant correlation between MSD and job tenure. But there was no significant correlation between the occurrence of MSD and hours spent per week at work (Table 2).

Table 2: Relationship between job characteristics and MSD.

Job characteristics	MSD
Job tenure	
r	0.220
P value	0.005
Hours spent per week	
r	0.75
P value	0.342

*Significant at $P < 0.05$

Results of multiple linear regression analysis indicated that the three predictors explained 34% of the variance ($R^2 = 0.114$, $F(14.567, 5.070) = 2.873$, $P < 0.05$). It was found that sex significantly predicted MSDs ($\beta = 0.173$, $P < 0.05$), as did GHQ12 Score ($\beta = 0.179$, $P < 0.05$) and job tenure ($\beta = 0.382$, $P < 0.05$), while age ($P > 0.05$), lifestyle ($P > 0.05$), BMI ($P > 0.05$) and hours spent per week ($P > 0.05$) did not significantly predict MSDs (Table 3). GHQ12 score ($P < 0.05$, $\beta = 0.466$) and job tenure ($P < 0.05$, $\beta = 0.021$) were also shown to significantly predict MSD associated disability ($R^2 = 0.315$, $a = -1.6$).

Also, female gender was significantly associated with shoulder MSDs ($P < 0.05$) than the male counterpart (Table 4).

Table 3: Relationship between MSD and risk factors.

Predictor variable	β coefficient	P value
Age	-0.041	0.328
Sex*	0.824	0.032*
BMI	0.020	0.665
Job tenure*	0.087	0.042*
Hours spent per week	0.018	0.348
GHQ12 Score*	0.770	0.025*
Life style	-0.043	0.915

Constant (a) = 0.134

Table 4: Relationship between shoulder MSD and sex.

	MSD		P value
	No	Yes	
Male [n (%)]	66 (67.3)	32 (32.7)	0.012
Female [n (%)]	32 (48.5)	34 (51.5)	

*Significant at $P < 0.05$

DISCUSSION

This study determined the prevalence of MSDs and associated disabilities among bank workers in Kancheepuram district. The reported annual prevalence of the MSD was 33.8% while that of the associated disability was 8.5%. These findings were in consistence but relatively higher than previously reported from another population study in southern India,¹² but much lesser than findings of most scholars.^{4,6,13-16} The prevalence of regional MSDs was highest in the lower back for both the disorders and the associated disabilities, which was commonly reported in previous studies with higher prevalence.^{4,10,17} The regional MSD prevalence was lowest in the ankle but that of the associated disability in the knee which was contrary to the findings of Akrouf et al. and Abledu & Abledu.^{4,6} Females reported to have suffered most from the MSDs while their male counterpart suffered most of the associated disability.^{6,16,17} The commonest regional MSDs and associated disabilities were observed in the lower back, neck, shoulder, upper back, wrist and hand.^{4,6,18} Also annual prevalence was strongly correlated with the weekly prevalence of MSDs. This indicates either persistence of the MSD symptoms or recurrence of MSDs episode which might explain why the presence of associated disability as observed in some of the respondents.

Job characteristics were found to correlate significantly with MSDs and associated disability, particularly job tenure,^{1,4,6,19} but there was no significant correlation between MSDs and the number of hours spent per week at work which contradicts the findings of Talwar et al.²⁰ who reported gradual increase in MSD symptoms as the number of hours spent at work increases. Findings of this study implies that shorter or longer hours spent at work

did not influence the occurrence of MSDs but longer job tenure influence the occurrence of MSD in the studied population.

Psychosocial stress was found to strongly correlate with MSD and associated disability, which might probably culminate to more occurrence of MSDs. Musculoskeletal disorders have been found to manifest in individuals with higher psychosocial stress as psychosomatic disorder, as well as in individuals with excessive job stress.⁹

Demographic characteristics and psychosocial stress have been reported as predictive factors in the occurrence of MSDs and associated disabilities.^{6,10} It was found that sex, psychosocial stress, and job tenure were significant predictors of MSD, while psychosocial stress and job tenure were significant predictors of the resulting disability. In previous studies^{1,4,6} it was reported that sex, psychosocial stress, and job tenure were significant predictors of MSD whereas sedentary life style, and psychosocial stress were significant predictors of MSD associated disability. This study did not find age, BMI, life style, or hours spent per week significant in predicting the occurrence of MSDs and associated disabilities but, Souza et al.²¹ reported significant association between life style and MSDs.

Findings of this study, suggested that sedentary or active lifestyle, age difference, variation in BMI, and longer or shorter amount of time spent at work did not determine the occurrence of musculoskeletal disorders or the resulting disabilities. Females were associated with shoulder MSDs unlike their male counterpart; also females were at more risk of developing MSDs which may leads to the occurrence of disability. This may be due to physiological, morphological or socio-cultural variations between male and female gender.

Summarily, findings of this study revealed much lesser prevalence of MSD and associated disability (33.8% & 8.5% respectively) compared to reports of most studies conducted in same or related population as reviewed in the literature.^{4,6,14} This lower prevalence may be attributed to socio-cultural factors, lesser job stress, or understated feedback.²² Job characteristics (job tenure) were associated with MSDs and the resulting disabilities likewise psychosocial stress. Also demographic characteristics (sex), job characteristic (job tenure) and psychosocial stress were significant predictors of MSDs; while job tenure and psychosocial stress were significant predictors of MSD associated disabilities.

Limitations and recommendation

This study was limited in certain context due to non-randomization bias as well as its generalization due to fair response obtained from the participants. This might be due to poor cooperation from the participants recruited, work overload or insufficient time as explained by some respondents. Also, information was sought

subjectively, ergonomic evaluation such as job analysis and job site analysis were also not performed.

Future studies should involve larger sample size drawn through process of randomization to minimize bias and encourage generalization of findings, objective assessment of participants should be considered to minimize feedback bias and obtain accurate data. Further studies should also incorporate job analysis and job site analysis to identify and determine the exact ergonomic risk factors responsible for the occurrence of MSDs and the resulting disability.

CONCLUSION

Low prevalence of musculoskeletal disorders and associated disability was reported by bank workers in Kancheepuram district. Females suffered most of the disorders while males suffered most of the disabilities. The significant risk factors responsible for the occurrence of musculoskeletal disorders includes, longer job tenure, higher psychosocial stress and female sex while those leading to associated disabilities were longer job tenure and higher psychosocial stress.

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Conflict of interest: None declared

Ethical approval: The study was approved by the ethics committee of college of physiotherapy, SRM University, India

REFERENCES

1. Tinubu BMS, Chidozie EM, Adewale LO, Ayodele AF. Work-related musculoskeletal disorders among nurses in Ibadan, South-west Nigeria: a cross-sectional survey. *BMC Musculoskel Disord.* 2010;11:12.
2. Hamid Sharif Nia, Yiong Huak Chan, Soheyla Kalantari, Mitra Hekmat Afshar, Behzad Taghipour, Hoda Kaveh, et al. Evaluation of ergonomic factors associated with musculoskeletal disorders in nurses. *Adv Environ Biol.* 2014;8(6):3125-9.
3. European Agency for Safety and Health. Work related musculoskeletal disorder. In: EASH, eds. EASH Work Report. Spain: EASH; 2007: 4-9.
4. Abledu JK, Abledu GK. Multiple logistic regression analysis of predictors of musculoskeletal disorder and disability among bank workers in Kumasi, Ghana. *J Ergon.* 2012;2:111-5.
5. Janwantanakul P, Pensri P, Jiamjarasrangsri V, & Sinsongsook T. Prevalence of self-reported

- musculoskeletal symptoms among office workers. *Occup Med (Lond)*. 2008;58:436-8.
6. Akrouf QAS, Crawford JO, Al-Shatti AS, Kamel MI. Musculoskeletal disorders among bank office workers in Kuwait. *East Mediterr Health J*. 2010;16(1):94-100.
7. UK/Statistics. Musculoskeletal disorders in Great Britain, 2014. Available at: www.hse.gov.uk/statistics. Accessed January 2015.
8. Bao S, Winkel J, Shahnavaz H. Prevalence of musculoskeletal disorder at work place in the people's Republic of China. *Int J Occup Saf Ergon*. 2000;6(4):557-74.
9. Zafir MM, Syed SA, Shaza MA, Norliza AT. Ergonomics and work stress issues in banking sector. *Austr J Basic Appl Sci*. 2011;5(9):1301-9.
10. Alireza C, Sayed HT. Musculoskeletal problem among workers of an Iranian sugar producing factory. *Int J Occup Saf Ergon*. 2009;15(4):419-24.
11. Corona G, Amedei F, Miselli F, Padalino MP, Tibaldi S. Association between relational and organizational factors and occurrence of musculoskeletal disease in health personnel. *G Ital Med Lav Ergon*. 2005;27:208-12.
12. Johnson WMS, Bertha A, Johnson P. Prevalence of upper extremity musculoskeletal disorders among workers in an industrial town in Tamil Nadu. *J Clin Diagn Res*. 2011;5(2):187-90.
13. Arun VS. Work-related musculoskeletal health disorders among the information technology professionals in India: a prevalence study. *Int J Manage Res Busin Strat*. 2013;2(2):118-21.
14. Labeodan TA, Olaseha IO, Olaleye AO. Computer ergonomic practices and musculoskeletal complaints among computer users in a Nigerian University community. *Niger J Med Rehabili*. 2013;16(1):1-9.
15. Sharan D, Parijat P, Sasidharan AP, Ranganathan R, Mohandoss M, Jose J. Work style risk factors for work related musculoskeletal symptoms among computer professionals in India. *J Occup Rehabili*. 2011 Dec;21(4):520-5.
16. Srilatha G, Maiya A, Bhat V, Sathiakumar N. Prevalence of work-related wrist and hand musculoskeletal disorders (WMSD) among computer Users, Karnataka State, India. *J Clin Diagn Res*. 2011;5(3):605-7.
17. Banibrata D, Tirthankar G. Assessment of ergonomical and occupational health related problems among VDT workers of West Bengal, India. *Asian J Med Sci*. 2010;1:26-31.
18. Laura P, David HW. Work-related musculoskeletal disorders: The epidemiologic evidence and the debate. *J Electromyogr Kinesiol*. 2004;14:13-23.
19. Egwuonwu VA, Abidemi TB, Aiyejunsunle CB, Ezeukwu OA, Auwal A, Okoye CE. A cross-sectional survey of work related musculoskeletal disorders prevalence and associated risk factors among quarry workers in a South Eastern Nigerian community: *Int J Epidemiol*. 2013;(11)2.
20. Talwar R, Kapoor R, Puri K, Bansal K, Singh S. A study of visual and musculoskeletal health disorders among computer professionals in NCR Delhi. *Indian J Community Med*. 2009;34(4):326-8.
21. Souza DA, Fraga L, Sousa GA, Sampaio RF. Prevalence of work-related musculoskeletal disorders among physiotherapists in the public hospital system of Belo Horizonte. *Brazil J Phys Ther*. 2005;9(2):219-25.
22. Madan I, Reading I, Palmer KT, Coggon D. Cultural differences in musculoskeletal symptoms and disability. *Int J Epidemiol*. 2008;37(5):1181-9.

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