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Association of Prolong Sitting with Common Musculoskeletal Disorders among Private and Public Sector Bankers

ABSTRACT

Objective
To compare the frequency of common musculoskeletal disorders due to prolong sitting among private and public sector bankers.
Study Design
This study was a cross-sectional study.
Study Settings & Participants
Participants between 25-50 years of age, working in banks for more than one year were inducted in the study. All bankers were divided into private and public sector groups. Employees were selected from private sector and public sector banks of Karachi.
Data Collection Tool
Self-administered questionnaire was used to collect data from bankers of both sectors.
Results
The study shows that 44.6% government employees were suffering from shoulder pain, while 36.9% private sector bankers having this problem. Among them 18.2% of public sector bankers suffered from neck pain. However, only 9% of public sector bankers perform gym activity regularly.
Conclusion
The result of the study shows that, participants who work for prolong period of time adapted poor posture while sitting have high frequency of musculoskeletal disorders. The study also shows that private sector bankers are more vigilant about their health and posture as compared to the public sector bankers.
Keywords
Musculoskeletal Disorder, Ergonomics, Work Station, Posture, Physical Activity, Physical Work Load

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INTRODUCTION

Musculoskeletal symptoms are common among office workers. Prolonged office sittings accentuated by the duration of computer work in modern occupational settings, which dramatically intensifies the musculoskeletal disorders (MSDs)[1]. Relax body posture and poor workstation may result in many health hazards including work related musculoskeletal disorders (WRMSDs) that can effect shoulder, arms, elbow, wrist, hand, back, leg and feet[2]. The positioning of the body and the type of physical work that must be done to complete a job, may cause persistent pain and lead to deterioration of the affected joints, tissues and muscles[3]. United Kingdom health and safety commission have made prevention of MSDs a priority program as a part of their securing health together agenda. Furthermore, this program aims to reduce health hazards in employees that may occur during work hours. This will eventually be helpful for people to re-gain their previous status; however, allowing them to avail job opportunities who were excluded from work merely because of health related grounds[4]. Prevalence of musculoskeletal disorder is due to prolong sitting which in turn, ranges from cervical and lumber spasm, deltoid bursitis, golfers elbow, carpal tunnel syndrome and postural deformities of spine like lumber lordosis, kyphosis and scoliosis[5]. It has been generally accepted that the risk of developing musculoskeletal problems is due to poor posture and stationary positions of bank workers[6]. Assessing exposure to risk factors for WRMSDs is an essential stage in the management and prevention of WMSDs[7]. Studies shows that individual, social, behavioral and psychological issues are also associated with work related musculoskeletal problems[8]. A study conducted by University of Birmingham revealed that, physical and psychosocial risk factors are associated with neck and shoulder muscle disorders9. Modern technologies, especially, the use of computers have been linked to the high prevalence of musculoskeletal symptoms in neck, upper extremity and back[2]. Ergonomically designed workstation and awareness programs demonstrate effective reduction in MSDs and provide benefits to employees. Benefits include substantial savings in workers compensation costs, increased productivity of workers and decreased absenteeism10. A short follow-up intervention study exhibited that, regular resting intervals and two arm support cause decrease in angle of wrist extension and subjective discomfort[11]. A self-reported survey showed that, the prevalence of musculoskeletal problems in general population of office workers was 42% in head and neck, 28% in upper back and 34% in lower back[9]. Another study by Jensen et al showed that, neck symptoms were most common (around 53%), followed by 42% shoulder symptoms[2]. A study by Punnet et al proposed that, duration of operating computer was more consistently associated with arms than neck or shoulder symptoms and disorders[12]. Two prospective studies reported that an optimal desk height, arm rest and relaxed neck postures were prognostic factors for neck, shoulder, back syndromes and disorder[13]. Other studies found that, ergonomic changes and new work places with forearm support had decreased the pain in shoulder, neck and lumber region as compared to the controlled group[14]. Two interventional studies showed that, musculoskeletal symptoms were reduced in neck, shoulder, elbow, forearm, hand, wrist and low back after setting of new workstation[15]. Another study showed the significant decrease in musculoskeletal disorders when workers were given an adjustable flexible working environment with ergonomic training[16]. Taking ergonomics into account when carrying out a risk assessment of your workplace can help you to minimize the risks of accidents including self-handling injuries, such as slips, trip and falls. Other injuries include repetitive strain, upper limb disorders, eye strain and headache. It also contributes to greater efficiency which can reduce wastage of money, save time, increase productivity and devote to the general well-being of employees[17]. Although, extensive research has been conducted in the world regarding musculoskeletal disorders, but the frequency of musculoskeletal disorders associated with prolong sitting in banks had not been studied previously in Pakistan. The role of ergonomics and its awareness are other key areas which have not been touched upon especially among bankers. Since favorable ergonomic conditions, short rest pauses and good

postural positioning are prognostic factors for bankers with musculoskeletal disorders. Therefore, this study aims to highlight certain issue that is going to be the deciding factor for future postural education program and life style modification awareness programs.

METHODOLOGY

Study Design
Convenience Non-probability Sampling technique was used to collect the data.

Duration of Study
Duration of the study was one year.

Participants
Bankers working in head office of Private and Public sector banks of Pakistan.

Study Setting
Data was collected from Head office of private and public sector banks of Karachi.

Sample Size
The actual sample size was 400 bankers, which is calculated by using the standard formula for calculating sample size on the basis of prevalence. Prevalence is taken at 50% because no relevant data is available. The bound of error is taken at 5% with 95% confidence level. Sample was divided equally between public and private banks.

Sample Selection

Inclusion Criteria
Executive, officers, clerks working in private and public sector banks of Karachi were included in our research.

Exclusion Criteria
Bankers absent at the time of data collection, visiting bank officers, bank interns, new appointees of less than 1 year, having previous history of musculoskeletal problems and bankers who were not willing to participate in the research were excluded from the study.

Data Collection Method
Data collected through self-administer structured questionnaire that is developed in English. It comprises of questions, pertaining to their demographic profile, daily activities, knowledge regarding ergonomics and presence of any musculoskeletal disorders. Prior to administration, pilot study was conducted on ten bankers therefore; changes have been made according to the feedback received.

Data Entry and Analysis
Data is analyzed on SPSS version 20. Frequencies and percentages are taken out for categorical variables. Pearson chi-square was applied to assess association between different variables.

Ethical Consideration
Informed consent was taken prior to the administration of questionnaire by every participant. The objectives of the study have been explained rationally and clarified as well, to the participants for conducting this survey. Permission had been granted from Ethical Review Board wherever it was required.

RESULTS

Total 400 bankers responded to the questionnaire. Among them, 50% bankers were from private sector and 50% bankers were from government sector. Mean age of bankers was 37.72 ± 10.29 years. Majority of the respondents were working as graded officers, executives or public relationship officers. Upon comparing the qualification, it was anticipated that, government sector has more postgraduates than private sector and the percentages of graduates were elevated in private sector. Majority of employees are doing jobs since 15 years or less from both the sectors (as shown in Table 1).

Table 1: Demographic Characteristics

	PRIVATE	GOVERNMENT
Gender		
Male	37.8%	44.2%
Female	12.2%	5.8%
Designation		
Clerical	2.5%	0.2%
Teller	3%	0.5%
Public	14.8%	2.8%
Graded officer	17.2%	22.8%
Executives	8.8%	23.5%
Others	3.8%	0.2%
Qualification		
Intermediate	5.8%	2%
Graduate	29.2%	13.2%
Post graduate	15%	34.8%
Job Duration		
<15 years	41%	26.2%
>15 years	9%	23.8%

Percentage of bankers, perceiving them as healthy or unhealthy is approximately equal in both sectors. Data revealed that, smoking habit is more common in private sector as compare to government sector bankers. Majority bankers of both sectors were working for more than 8 hours in addition to overtime of 1-2 working hours, in private sector bankers while in government bankers 2-3 hours was observed. As shown in table 2, use of back care during working was not common in both sector bankers. It was then inquired about ergonomics-related workshop. The responses recorded were relatively higher in government sector than private sector bankers. Usage of adjustable chair was comparatively more in private bankers than government sector whereas usage of strolling chair is almost same in both the sectors. It is found that, government sector bankers have suffered more from WRMSDs.

Table 2: Information about Health Status, Smoking, Working and WRMSDs.		
	PRIVATE SECTOR	GOVERNMENT SECTOR
Health status		
Healthy	38%	37.2%
Unhealthy	7%	7.5%
Not clear	5%	5%
Smokers		
Yes	35.5	26.0
No	64.5	74.0
Working hours		
< 8 hours	24%	21.8%
> 8 hours	26%	27.8%
Overtime		
1-2 hours	12.5%	11.5%
2-3 hours	10.3%	11.8%
3-4 hours	4.5%	6.3%
None	22.8%	20.3%
Use back care		
Yes	12.5%	14.3%
No	37.6%	35.3%
Workshop on ergonomics		
Yes	7.5%	10.5%
No	42.6%	39.3%
Use adjustable chair		
Yes	37.8%	30.8%
No	12.3%	19%
Adjust height of chair		
Yes No	36.1%	30.1%
No	14%	19.8%
Adjust armrest of chair		
Yes	27.1%	10%
No	23.1%	39.8%
Use strolling chair		
Yes	68%	64.3%
No	16%	17.8%
WRMSDs		
Yes	24.8%	28.2%
No	25.2%	21.8%

In response to the question, that after how much time bankers feel discomfort when they work in a same posture; 45.2% of the government sector bankers feel discomfort after ½ hour as compare to the private sector bankers (21.5%). Furthermore, 25.1% of government sector bankers feel discomfort after 1 hour of continuous working in a same posture as compare to the private sector bankers (22.5%). The p-value was 0.00 (less than 0.05) that shows the significance between the above two variables. Table 3 displays the percentages of bankers having WRMSDs in different body parts. Shoulder is the most effected region in bankers of both sectors, whereas back and neck are also more effected areas noticeably. Only few bankers of both sectors had consulted to doctor.

Table 3: Most Affected Region of WRMSDs		
Region	Private Sector	Government Sector
Shoulder	17.0%	24.1%
Elbow	4.0%	0.4%
Wrist	3.1%	4.5%
Hip	0.4%	0.0%
Knee	3.1%	5.8%
Ankle	1.3%	0.0%
Neck	6.2%	9.8%
Back	10.7%	9.4%

Table 4: Working Postures		
	PRIVATE	GOVERNMENT
Posture		
Forward	16.2%	26.2%
Straight	25.8%	19.2%
Lean	8%	4.5%
Elbow at 90°		
Yes	30.5%	29%
No	19.5%	21%
Wrist in neutral position		
Yes	31.5%	27.5%
No	18.5%	22.5%
Knee at 90°		
Yes	30.5%	31.5%
No	19.5%	18.5%
Monitor at eye level		
Yes	42%	36.7%
No	8.3%	13.1%
Physical Activity		
Gym activity	9%	7.5%
Aerobics	3.5%	2.3%
Walking	14.3%	28.1%
None	23.4%	11.8%

bankers (25.8%) endeavor straight posture during working hours. While, forward bending is more common in government sector bankers (26.2%). Percentages of working postures of different body parts are described in Table 4. In response to question regarding their physical activity, in private sector bankers only 9% carry out gym activity and 3.5% do aerobics. Walking is more common in government sector bankers (28.1%) as compare to private sector bankers (14.3%). Remaining bankers of both sectors do not involve in any kind of physical activity, in which the percentage of private bankers is higher.

DISCUSSION

When the relationship between musculoskeletal symptoms and each individual were analyzed, hence, the common factors were found to be associated with musculoskeletal symptoms are

physical factors, specifically. These include intense, repeated, or sustained exertions and awkward, sustained or extreme postures of the body for prolong period of time with insufficient recovery time. Complaints often arise from the spine, arms, hands and legs. Musculoskeletal symptoms are most often associated with computer jobs requiring constrained working positions for an entire work shift. In a sedentary position, the computer user is subjected to suffer from continuous stress on almost all postural muscles. The amount of stress is dependent upon the position of various parts of human body. Holding the head to the side or forward may lead to neck and shoulder fatigue and pain[17]. Other neck and shoulder complaints result from the use or position of the operators arms. For example, elevation of the arms will add strain to neck and shoulder. Prolonged and constrained postures that are required by the job will worsen this condition. In the long-term, this continuous wear and tear may result in a gradual deterioration of joint tissues. Researches indicated that musculoskeletal symptoms are more frequently reported by computer operators than workers in traditional jobs. Epidemiologic studies of workers have associated with several disorders in many work-places like physical and psychosocial factors. Exposure to these known factors increases the incidence of WRMSDs among bankers. Our study illustrates the effects of ergonomics on problems of musculoskeletal system, focusing on office ergonomics, posture, adjustable chair, working hours, intervals, physical activity and prolong sitting. The authors of reviewed various studies that physical and psychosocial factors of the individual can contribute to the development and persistence of musculoskeletal symptoms[18,19,20]. This study was conducted to compare the frequency of MSDs among private and public sector bankers, as they are more prone to WRMSDs due to prolong sitting on computers. Our study revealed that 56.5% of public sector bankers are complaining musculoskeletal pain as compare to private sector bankers (49.5%). Similar study by Bernard BP showed that, job requiring the use of computers input device and video display terminal (VDT) often expose workers to awkward, sustain postures and repetitive motions of the upper extremities, which demonstrate as the cause of work-related shoulder and neck pain[21]. Another study by Korhonen et al found that, an incident of neck pain among Finnish VDT workers was 34%[22] Similarly, we noticed that bankers using computers frequently shows highest percentages of shoulder, neck and back complaints. A similar study by Hernandez et al stated that, an increased incidence of neck, shoulder and hand WRMSDs in 179 newspapers workers using VDTs, compared with non-VDT users in the same company[23]. A study concluded that musculoskeletal symptoms of Visual Display Unit (VDU) users are believed to have a multi-factorial etiology, such as non-neutral wrist, arm and neck posture, work station design and duration of work as well psychological, social factors such as time pressure and high perceived work load[12,24-27]. The US Occupational Safety and Health Administration (OSHA) and VDT guidelines allow companies to determine the presence of WRMSDs risk factor and provide specific recommendations for safe seating and VDT setups in order to protect the office workers[28]. Cook and Kothiyal demonstrated that, the position of mouse closer to the keyboard and eliminating the numeric keypad, resulted in significantly lower deltoid muscle electromyography activity in VDT users, than when the mouse was placed in a position where the user was required to abduct the upper extremity and reach for the mouse[29]. Authors of different studies concluded that, computer use might be more strongly related to the disorders of hand and arm than the disorders of shoulder and neck[30]. Hence, our study also shows similar results that, 63% of private sector bankers were keeping their wrist in neutral position while using keyboard, and among them only 6.7% shows wrist pain. Results of our study shows that, 52.5% of public sector bankers are working in forward bending posture; while only 32.5% of private sector bankers are working in forward bending positions, which were causing shoulder and neck pain in bankers. A similar study proposed that, prolong sitting at work for more than 95% of the working time seems to be a risk factor for neck pain and there is a trend for a positive relation between neck flexion and neck pain[31]. Our study shows that, 45.2% of government sector bankers feel discomfort after ½ an hour of working in

static posture as compare to the private sector bankers (45.2%). More bankers of government sector (25.1%) feel discomfort after an hour of continuous working in a same posture than private sector bankers (22.5%). P-value of less than 0.05 shows significant results. It also shows strong association of discomfort with prolong sitting posture among bankers of both sectors. A study by van Deursen LL demonstrated that, lack of spinal motion seems to be a risk factor among low back pain patients. 85% of patients have backache due to prolong sitting, 73% due to prolong standing, only 23% by walking and 15% by cycling[32]. Another study shows that, workstation design and faulty postures in sitting for extended periods, lead to poor circulation, stiffness of joints and pain. In computer handling, we should consider span of usage, duration of total work, number of consecutive hours, nature of job, type of computer used and its placement[33]. According to Community Workers of America Occupational Safety and Health Department, there are several common characteristics of computer jobs that have been related to increased musculoskeletal complaints. These include the design of the computer and workstation equipment, work pace, repetitiveness of the job; work and rest break schedules, and personal attributes of the workers[34]. All of these factors must be addressed to reduce postural complaints effectively. Office ergonomics training is beneficial for exhibiting significant increase in knowledge about body postures; ergonomics design features and corporate resources. The current literature also demonstrates that, we can reduce MSDs by introducing ergonomics intervention in working station. This study aims to compare the effects of an office ergonomics on self-reported musculoskeletal discomfort, group performance and business performance efficacy among private and public sector bankers. MSDs are also very costly injuries. Direct costs of MSDs $15 billion to $20 billion per year. Our study shows health and posture as compared to the public sector. Therefore, public sector bankers seem to be more susceptible to WRMSDs as compare to private sector bankers.

CONCLUSION

This study shows evidence of strong association between WRMSDs; prolong sitting and poor workstation among private and public sector bankers. This study is going to be helpful for future research, assessing the prognosis of musculoskeletal disorders among bankers. This study encourages the bankers to consider the savings that they would make rather than looking at the costs only while making decisions about expenditure on measures to reduce MSDs.

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