Self-reported musculoskeletal disorders among office workers in a private hospital in South Africa:

prevalence and relation to physical demands of the work

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Abstract

Few studies have investigated musculoskeletal disorders among office workers in South Africa. The aim of this quantitative cross-sectional descriptive survey was to determine the prevalence of self-reported musculoskeletal disorders among office workers in a private hospital and to assess the association between the physical demands of their work and musculoskeletal disorders. Of the participants, 76.1% had at one point in time been absent from work due to backache or other musculoskeletal problems. The most commonly affected regions were the back followed by the neck, wrists and shoulders. Furthermore, the prevalence of MSDS was associated with the physical work demands of the work, particularly between repetitive motions of upper limbs, and wrist extension when using the keyboard and forceful movements. No significant association between musculoskeletal disorders and gender, period of employment and age among the participants was observed.

Key words: musculoskeletal disorders, prevalence, office workers, self-report, ergonomics

Introduction

Musculoskeletal disorders (MSDs) are a major source of disability and lost time from work.[1] The global increase in computer work is coinciding with an increased prevalence of work-related MSDs.[2,3] Assessing the exposure of workers to known risk factors for MSDs is essential for the introduction of primary interventions, including the application of ergonomic knowledge and principles to understanding MSDs amongst those using computer technologies.[2,3]

Many international studies have investigated risk factors for MSDs amongst computer workers. Juul-Kristensen & Jensen conducted a prospective survey among office workers involved in repetitive computer work in order to determine the frequency of self-reported musculoskeletal symptoms during the previous 12 months.[4] Less men than women reported musculoskeletal symptoms, and areas most affected were the neck/shoulder (39%), elbow/hand (51%) and the lower back (47%).[4] Participants who spent 75% and more of their work time on the computer were at risk of experiencing musculoskeletal symptoms in the neck/shoulder and elbow/hand. Furthermore, the speed of work was related to the lower back symptoms.[4]

Female computer users appear more at risk for MSDs than males.[5] Other ergonomic factors such as static work posture, hand positioning, lower arm support, repetitive work movements, and the use of a keyboard were associated with the risk of MSDs.[5] In another study, females reported a reduced productivity due to musculoskeletal symptoms, and the reduction was weakly associated with computer mouse position and task and symptom persistence for both men and women.[6] For women, work demands, computer problems, and being divorced/separated were also associated with reduced productivity.[6]

A South African study of hospital workers on factors associated with low back pain reported a point prevalence of 47.46% and revealed that gender, age and stress perceived at work were significantly associated with low back pain among these workers.[7] Another South African study confirmed that lower back pain was associated with an increased absence from work coupled with a decline in productivity.[8]

Sick leave due to MSDs among manual and office workers in a French company, showed that women had a higher risk of developing MSDs and the incidence increased with

age, as older workers took more sick leave due to MSDs of the upper limbs.[9]

During the course of his work, the researcher observed an increasing number of office workers in a private hospital reporting musculoskeletal problems and seeking physiotherapy. This, coupled with the paucity of data on MSDs among employees in the private sector in South Africa, motivated the researchers to conduct a survey among this group of workers to investigate the possible link with the nature of their work. The aim of the study was to determine the prevalence of self-reported musculoskeletal disorders among office workers and to assess the association between the physical demands of their work and MSDs.

Methodology

A quantitative cross-sectional descriptive survey was conducted using self-administered questionnaires. The study population was 85 employees who were involved in administrative duties in various departments/units at the targeted private hospital. The group comprised all 81 administrative workers, i.e. receptionists, and their four supervisors. The prevalence of MDSs was determined by asking participants if they were absent from work due to backache or any other musculoskeletal related problem at any time during their employment in this job. In addition to demographics, they were also questioned about the most commonly affected region and the frequency of absenteeism due to MSDs, as well as the physical demands of their work. Ethical approval was obtained from Medunsa Research and Ethics Committee (Clearance no: MREC/PH/73/2008). Permission to conduct the study was obtained from the senior management of the study site and all participants gave informed written consent. Anonymity was ensured by not using identifying details such as the participants' names so that data could not be linked to the participants.

The SPSS version 14 was used for descriptive and inferential statistical analysis. For the latter, Pearson chi-square and Fisher's exact tests were applied to test associations and a p-value of less than 0.05 was considered statistically significant.

Results

A response rate of 85.9% (N = 71) was achieved. Data was omitted for some variables and anonymity prevented follow-up to obtain it. Table 1 shows the participants' socio-demographic characteristics. The majority (82%) were female and 'Black' (97.3%). Ages ranged from 21 to 58 years and the mean age was 33.93 years (SD = 7.91). The average number of years of employment was 8.87 with a range from four months to 27 years (SD 8.37).

The majority of participants (54) reported being absent from work due to backache or any other MSDs at some time during their employment in this job. Therefore, there was a 76.1% prevalence of MSDs. Of these, the back was the most commonly affected region (51 or 71.8%) as opposed to the neck, shoulder and wrists (20 or 28.2%).

Associations between socio-demographic characteristics and absenteeism due to MDSs are summarised in Table 2.

Table 1. Participants' socio-demographic characteristics (N = 71)

Characteristic	n	%
Gender		
Male	12	16.9
Female	59	83.1
Total	**71**	**100.0**
Age		
20 – 29 yrs	21	29.6
30 – 39 yrs	32	45.1
40 yrs and above	16	22.5
Missing	2	2.8
Total	**71**	**100.0**
Race		
Black	69	97.2
Indian	0	0.0
White	0	0.0
Coloured	1	1.4
Missing	1	1.4
Total	**71**	**100.0**
Marital status		
Married/living together	37	52.1
Divorced/separated	3	4.2
Widowed	0	0.0
Single/no relationship	28	39.4
Missing	3	4.2
Total	**71**	**100.0**
Religion		
Christianity	65	91.5
Hindu	0	0.0
Islam	0	0.0
Traditional	5	7.0
Other	1	1.4
Total	**71**	**100.0**

Characteristic	n	%
Occupational Role		
Receptionists	69	97.2
Supervisors	2	2.8
Total	**71**	**100.0**
Department		
Admin	2	2.8
Doctors' rooms	40	56.3
ICU	2	2.8
Maternity Ward	2	2.8
Medical Ward	1	1.4
OPD	11	15.5
Paediatric Ward	3	4.2
Pharmacy	2	2.8
Reception	3	4.2
Surgical Ward	4	5.6
X-ray	1	1.4
Total	**71**	**100.0**
Period of employment		
≤1.00 yr	7	9.9
1.01 – 6.00 yrs	46	64.8
6.01 – 11.00 yrs	10	14.1
11.01+ yrs	7	9.9
Missing	1	1.4
Total	**71**	**100.0**
Education/qualification		
Primary education	1	1.4
Matric	33	46.5
Diploma	36	50.7
Degree	0	0.0
Missing	1	1.4
Total	**71**	**100.0**

Females reported a higher frequency of absence from work due to backache or any musculoskeletal problem than males (62.0% vs. 14.1%, p = 0.72). Sickness absence was higher among participants with an employment period of '≤6 years' than those who have worked for '>6 years' (57.1% vs. 18.6%, p = 1.00). Absence was higher among workers ≤33 years (40.1%) compared to workers ≥34 years (34.8%, p = 0.72). Only 44.1% of the participants who were 'married/living together' reported absence from work compared to 32.4% of the 'other' participants (p = 0.33). There was a small difference in absence percentage for the participants working in the 'doctors room/suite' as opposed to those working in 'other' departments/sections (39.4% vs. 36.6%, p = 0.17). Similarly, the percentage of reported absence from work due to MSDs of participants in the 'matric or less' and 'diploma and above' qualification categories were 35.7% and 41.4%, respectively (p = 0.48).

In terms of the number of sick leave days and intervals taken, the frequency of taking 1–2 days sick leave was higher than more than 2 days for all variables (see Table 3). Although there was no statistically significant association between participants' socio-demographic characteristics and the number of sick leave days taken, a pattern among female office workers who reported a slightly higher frequency of taking sick leave of between '1–2 days' was noted in comparison to male participants (49.0% vs. 15.7%, p = 0.46).

Participants of 33 years and over more often reported taking '1–2 days' sick leave as compared to those under 33 years old (42.2% vs. 34.4%, p = 0.62). Those who were married or living together reported a higher frequency of taking '1–2 days' sick leave than those who are not married or living together (38.8% vs. 24.5%, p = 0.69). There was no clear pattern of sick leave days taken in relation to departments or sections in which participants were employed (doctors' room/suite = 31.4% vs. other = 33.3%, p = 0.39). Participants who had worked for less than 6 years, reported a higher '1–2 days' sick leave than those with more than

". . . there was a 76.1% prevalence of MSDs."

Table 2. Association between selected socio-demographic characteristics and absenteeism due to MDSs

	Absent from work						
	Yes		No				
Characteristic	**n**	**%**	**n**	**%**	χ^2	**Df.**	**p-value[a]**
Gender							0.72[a]
Male	10	14.1	2	2.8			
Female	44	62.0	15	21.1			
Total	**54**	**76.1**	**17**	**23.9**			
Age*					0.128	1	0.72
≤ 33 yrs	28	40.6	10	14.5			
≥ 34 yrs	24	34.8	7	10.1			
Total	**52**	**75.4**	**17**	**24.6**			
Marital status*					0.959	1	0.33
Married/living together	30	44.1	7	10.3			
Other	22	32.4	9	13.2			
Total	**52**	**76.5**	**16**	**23.5**			
Department					1.845	1	0.17
Doctor's room/suite	28	39.4	12	16.9			
Other	26	36.6	5	7.0			
Total	**54**	**76.0**	**17**	**23.9**			
Period of employment*							1.00[a]
≤ 6.00 yrs	40	57.1	13	18.6			
> 6.00 yrs	13	18.6	4	5.7			
Total	**53**	**75.7**	**17**	**24.3**			
Education/qualification*					0.490	1	0.48
Matric or less	25	35.7	9	12.9			
Diploma and above	29	41.4	7	10.0			
Total	**54**	**77.1**	**16**	**22.9**			

[a] Fisher's Exact test

* Data missing therefore N is less than 71

6 years of working experience as office workers (54.0% vs. 12.0%, p = 0.48). Finally, participants whose qualification was a 'diploma and above' were more likely to report '1–2 days' sick leave than participants in the 'matric or less' category (37.3% vs. 27.5%, p = 0.60).

Musculoskeletal demands

Significant associations between exposures to certain repetitive administrative work related to musculoskeletal demands and MSDs were identified (see Table 4). Most carried out manual tasks requiring frequent, repetitive motions (80.3%, p = 0.001) and tasks requiring frequent bending of neck, shoulder, elbow, and wrist or finger joints (85.9%, p = 0.005). It was also common for participants to make forceful, quick, or sudden movements (66.2%, p = 0.003), engage in work that involved whole-hand grasping with straight elbows (63.4%), and assume a posture that involves sustained muscle contraction of any limb for periods of more than 30 minutes (59.2%). Quite a few (21.1%) of the participants were required to stand continuously for periods of more than 30 minutes.

Computer usage

Computer usage is presented in Table 5. Two participants did not provide data on this aspect, therefore the results are given for 69 participants. Over two thirds (73.2%) used a computer for at least '2–4 hours per day'. For 46.5% of the participants, their tasks included working continuously without a break for '30–60 minutes'.

Only one participant reported working continuously for more than 2 hours. A similar trend was observed with regard to cycle time. Over 50% exerted minimal force in their work, while in 31% of them, force was not applicable. For the majority (90.1%), the speed of performing a task involved 'fast highly repetitive movements' and their posture was close to neutral (88.7%).

Chi-square analysis of repetitive tasks and MSDs showed a strong association between the frequent use of a computer or keyboard including tasks involving repetitive movements and MSDs ($\chi^2 = 40.967$; $p<0.001$) and other administrative tasks involving upper extremities ($\chi^2 = 14.743$; $p = 0.005$). A significant relationship between participants' performance of forceful repetitive tasks and MSDs ($\chi^2 = 16.964$; $p = 0.003$) was found, but not between prolonged standing and MSDs ($\chi^2 = 0.447$; $p = 0.01$).

Discussion

The majority of participants had at one point in time reported being absent from work due to backache or other musculoskeletal related problems, and the prevalence was 76.1%. A similar United Kingdom study reported low back pain among office workers as the largest single cause of absence from work, as it was responsible for about 12.5% of all sick days.[10] This was comparable to data from Sweden since 1961, where 11 to 19% of all annual sickness absence days were taken by office employees with a diagnosis of back pain.[10,11] South African statistics on reported backache among office employees in various sectors were found to be limited.[12]

Table 3. Association between the participants' characteristics and number of sick leave days due to MSDs

	Sick leave days						
	1 – 2 days		> 2 days				
Characteristic	**n**	**%**	**n**	**%**	χ^2	**Df.**	**p-value**
Gender							0.46[a]
Male	8	15.7	2	3.9			
Female	25	49.0	16	31.4			
Total	**33**	**64.7**	**18**	**35.3**			
Age					0.250	1	0.62
≤ 33 yrs	19	38.8	8	16.3			
≥ 34 yrs	14	28.6	8	16.3			
Total	**33**	**67.4**	**16**	**32.6**			
Marital status					0.155	1	0.69
Married/living together	19	38.8	10	20.4			
Other	12	24.5	8	16.3			
Total	**31**	**63.3**	**18**	**36.7**			
Department					0.745	1	0.39
Doctor's room/suite	16	31.4	11	21.6			
Other	17	33.3	7	13.7			
Total	**33**	**64.7**	**18**	**35.3**			
Period of employment							0.48[a]
≤ 6.00 yrs	27	54.0	12	24.0			
6.01+ yrs	6	12.0	5	10.0			
Total	**33**	**66.0**	**17**	**34.0**			
Education/qualification					0.270	1	0.60
Matric or less	14	27.5	9	17.6			
Diploma and above	19	37.3	9	17.6			
Total	**33**	**64.8**	**18**	**35.2**			

[a] Fisher's Exact test

Table 4. Musculoskeletal demands

Question	N	p-value[a]	Yes (%)	No (%)
Do manual tasks require frequent, repetitive motions?	68	0.001	80.3	15.5
Does your work posture require frequent bending of neck, shoulder, elbow, wrist or finger joints?	71	0.005	85.9	14.1
Do you have to kneel (on one or both knees) frequently or sometimes?	70	0.60	54.9	43.7
Are you unable to change body position often?	70	0.39	45.1	53.5
Are you involved in any forceful, quick, or sudden movements frequently?	71	0.003	66.2	33.8
Do you engage in the work that involves whole-hand grasping with straight elbows?	70	0.48	63.4	35.2
Does the job posture involve sustained muscle contraction of any limb for periods of more than 30 minutes?	70	0.72	59.2	39.4
Do you stand continuously for periods of more than 30 minutes?	71	0.1	21.1	78.9

[a] Fisher's Exact test

". . . the back was the most commonly affected region as opposed to the neck, shoulder and wrists . . ."

Table 5. Computer usage

Characteristic	N	%
Total time		
2 – 4 hrs/day	52	73.2
4 – 8 hrs/day	17	23.9
Total	**69**	**100.00**
Continuous performance		
10 – 30 min	26	37.7
30 – 60 min	33	47.8
1 – 2 hrs	9	13.0
> 2 hrs	1	1.5
Total	**69**	**100.0**
Cycle time		
10 – 30 min	29	42.0
30 – 60 min	35	50.7
1 – 2 hrs	5	7.2
> 2 hrs	0	0.0
Total	**69**	**100.0**

Characteristic	N	%
Force		
Minimal	41	59.4
Moderate	6	8.7
Not applicable	22	31.9
Total	**69**	**100.0**
Speed		
Fast movements	64	92.8
Moderately paced	4	5.8
Static posture	1	1.5
Slow movement	0	0.0
Total	**69**	**100.0**
Awkwardness		
All postures close to neutral	63	91.3
Moderate deviations in one direction	1	1.5
Near end range in more than one direction	5	7.2
Total	**69**	**100.0**

No statistically significant association between participants' reporting absence from work due to backache and other MSDs, with regard to gender, age, marital status, period of employment and education was found. However, a higher proportion of female than male participants reported MSDs, similar to findings of other studies. Female office workers in Taiwan and Thailand were more likely to report musculoskeletal symptoms than their male counterparts ($p < 0.05$),[4,6] females take more sick leave than their male counterparts,[6,9] and the incidence of MSDs was higher for women than for men (6.5 and 5.7 per 1000 person-years respectively, $p < 0.01$).[13]

A higher proportion of sickness absence due to back pain and other forms of MSDs among participants with less than six years of employment and under 33 years of age. However, when the length of sick leave in relation to age was considered, older workers took more time off (36.4% of those ≥34 yrs compared to 29.6% for those ≤33 yrs). This concurs with other studies which have found that sick leave for MSDs of the upper limbs increased with age.[9,13] In this study most participants were females and they are more vulnerable to musculoskeletal changes that occur with age.[14]

The back was the most affected region compared to other body regions like the neck, wrists and shoulders, unlike other studies which found the converse.[3] However, a large proportion of them (28.2%) reported that their neck, shoulder and wrists were the most affected body regions. The most significant finding among studies on office workers has been the relationship between MSDs and computer usage.[10,11,15] Among the MSDs in computer users, tension neck syndrome[16] and symptoms in the hand and wrist area were commonly found.[13] The risk estimates were in general stronger for the hand/arm region than for the neck/shoulder region, and stronger for mouse use than for total computer use and keyboard use.[4] Similarly, musculoskeletal symptoms have been found to be more prevalent for the arm or hand operating the mouse than for the other hand or arm or any other body region.[5] This might be because computer usage involves typing which creates an increased load on the hands and fingers.[6] Therefore, although the

nature of administrative work is not too physically demanding, invariant tasks such as typing coupled with repetition could result in increased physiological and psychological stress with subsequent risk for musculoskeletal symptoms. In support of this, systematic reviews have shown a positive association between the duration of computer use and hand/arm symptoms.[10,17,18] In this study, over two thirds of the participants reported using a computer for at least '2–4 hours per day', which could explain the high proportion of them reporting their neck, shoulder and wrists as the most commonly affected body regions.

Significant associations between the physical work demands of these office workers and the MDSs were found. These involved associations between repetitive motions of upper limbs, and wrist extension when using the keyboard and forceful movements, echoing the findings of other studies. Association between the multiple (awkward) work postures and tasks performed by office workers, involving neck and upper back flexion while using the computer and supporting the receiver of the telephone with the shoulder, and the development of repetitive strain injuries, cumulative trauma disorders and pain and discomfort in numerous body parts have been demonstrated.[5,11,13,19,20,21]

This study focused on office workers, mainly the receptionists and their supervisors, who belonged to one healthcare organisation. It did not investigate the prevalence of MSDs in other employees involved in similar kinds of tasks, nor did it investigate the role of psychosocial factors in these MSDs. Observations and physical assessments were not done due to resource constraints, which may have compromised the accuracy of the information gathered via self report. Accuracy of recall could also have affected the findings.

Lessons learned

1. Backache is common among computer workers due to the nature of their work which involves continuous repetitive movements.
2. MSDs can increase worker absenteeism with adverse impairment on productivity.
3. Factors such as gender, age, frequency and duration of doing computer work are risk factors for MSDs.
4. Monitoring the magnitude and pattern of MSDs among office workers is crucial for the implementation of effective occupational health programmes to prevent the occurrence of MSDs among these workers.

Conclusions and recommendations

Self-reported musculoskeletal problems were prevalent among office workers in this setting with the most commonly affected regions being the back followed by the neck, wrists and shoulders. Furthermore, the prevalence of MSDS was associated with the physical work demands of the work. The implementation of ergonomically sound interventions in the workplace has the potential of reducing backache and other related MSDs. Therefore, office-specific ergonomic programmes should be considered as a method of choice to prevent the occurrence of work-related musculoskeletal problems among office workers at this healthcare industry. Onsite curative and ongoing support services using a multidisciplinary approach should be provided for affected employees in order to reduce absenteeism from ill-health caused by work-related factors. Further research on this problem is needed. Specifically, studies to examine the effectiveness of interventions to prevent MSDs in this setting.

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