Assessment of work postures and musculoske-letal disorders among insurance office employees: a case study

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Abstract: Introduction: The office employees in financial service sector like in-surance have to work for a long time and they use certain arm & hand muscles excessively and thus, tend to keep a poor body posture which leads to musculoskeletal disorder (MSD). Objective: The aim of the study is to find the musculoskeletal disorder problems among the insurance office employees and to investigate their association risk factors like Work Postures using Rapid Upper Limb Assessment (RULA). Method: The study was conducted at different Insurance offices situated at Punjab (India). A questionnaire based interview, pain - self report form, video based analysis of working postures using Rapid Upper Limb Assessment method was employed. Correlation and regression analysis performed to understand the predictors of pain. Results: The prevalence of musculoskeletal disorders was reported in Back (54%), Neck (40%) and Shoulder (30%). Rapid Upper Limb Assessment showed that Grand Score of 76% cases was high and very high .Significant association found between risk factor and musculoskeletal disorder symptoms in lower back, neck, upper back, shoulders, knees and lower leg. Conclusion: High musculoskeletal disorder problems are the result of awkward postures, unstable workstation, lack of knowledge related to the areas to apply in daily routine work and it shows that working postures have a direct contribution on MSD problems by the office employees.

Keywords: Working postures, Musculoskeletal disorders, Rapid Upper Limb Assessment, Office employees.

1 Introduction

Musculoskeletal disorders represent one of the leading causes of occupational injury and disability in the developed and industrially developing countries [10, 13, 18, 29]. The office employees are engaged in routine work: they get seated for a long time without moving, engage a number of specific muscles of the arm and hands, and maintain a poor body posture [9]. These factors account for MSD re-lated to work, with occurrence and persistence of musculoskeletal pain at multiple body sites [22, 24] .However, even when work occurs under appropriate condi-tions; it is not recommended to maintain any position for long periods without a break- considering that a muscle contraction for long hours produces discomfort or even pain [33]. The awkward sitting posture leads to an increase in intra-disc pressure [9, 15, 22].The problem of discomfort associated with sitting work for long time is associated with bad postural habits [27]. These problems are overall responsible for back and shoulder pains that cause discomfort, and thus it creates difficulty in concentrating on and performing work [22, 32, 33].It has been widely accepted that awkward and constrained postures result in musculoskeletal stress on different body regions of seated employees [16]

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and are a major factor in the development of musculoskeletal disorders [7,8,23,31]. Physical ergonomic factors such as the postural activities [26], awkward postures [28] , repetitive movements or monotonous work [12] , long working hours per shift [25] are asso-ciated with MSD s, especially low back pain. The recent study is focused on assessing the work posture of office employees engaged in different activities of insurance offices. The need to improve working posture has been documented in a number of studies which have shown a relation between stressful postures at work and disturbances or pain in various parts of the musculoskeletal system [1].More suitable working postures may have a positive effect on worker's musculoskeletal systems and may allow for more effective control of work performance and reduction in the number of occupational injuries [17].

The study aimed at ergonomic assessment of office employees of the insurance industry offices located at Punjab; its major goal was to identify the most critical points in working posture habits. Objective: The aim of the study is to i) find the prevalence of musculoskeletal disorder problems among the insurance office employees and 2)to investigate the association of musculoskeletal disorders problems with risk factors like Work Postures using Rapid Upper Limb Assessment (RULA). Risk factors of work related musculoskeletal disorders (WMSD's) are known to include workplace activities such as, repetitive tasks and awkward working postures [4].

2 Method

The present study was conducted involving random sample of 120 office employees from different insurance industries located in state of Punjab (India). Da-ta collection included questionnaire and video recording of the actual work and the postures adopted by the employees. In order to assess physical exposure to work- related musculoskeletal risks, rapid upper limb assessment (RULA) was applied [19].The ergo master software is used to calculate the RULA score by incorporating pictures or images of the job task being analyzed or redesigned. The details including angular positions from the captured image are entered in the ergo master wizard for the upper arms, lower arm, wrist, wrist twist, neck, trunk and legs to calculate RULA Grand Score. Correlation analysis was conducted to ana-lyze the associations between different risk factors and musculoskeletal disorders followed by a regression to understand the predictors of pain.

3 Results

Table 3.1 Product components of shovel

Sr no	Part name	Material in con-ventional shovel	Material in BMB shovel	Weight of parts in BMB shovel(gm)
1	D shaped handle with socket	Mild steel	Mild steel	150
2	Shaft	Wood	Wood	750
3	Shoulder	Mild steel	Mild steel	450

Table 2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Esti-mate
1	.445[a]	.198	.101	41.569

Table 3: ANALYSIS OF VARIANCE

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	56675.025	16	3542.189	2.050	.014
	Residual	229822.448	133	1727.988		
	Total	286497.473	149			

Table 1 shows the age of different groups and gender of the employees partici-pated in the study. Table 2 shows, the most commonly affected regions among the office employees are neck (40%), lower back (35%), shoulders (30%) and upper back (19%). In Table 3, Rapid Upper Limb Assessment showed that Grand Score of 76% cases was high and very high (action level of 3&4).

Table 3 Economics of return on investment for rubber roller DR Gin

Particulars	Value
Cost of one pair leather roller (Rs.)	4000
Cost of one pair rubber roller (Rs.)	50000
Additional investment required (Rs.)	46000
Lint productivity of leather roller gin (kg/h)	70
Lint productivity of leather roller gin (kg/h)	84
Increase in productivity by using rubber rollers (kg/h)	14
Extra productivity of lint due to saving in down time of 1 h per day (kg)	84
Increase in productivity for one day of 20 h run (kg)	364
Profits due to increased productivity per day (Rs. 120/100 kg ginning charges	437

As shown in Table 4, those who had very high RULA risk level of exposure, re-ported more musculoskeletal problems in different body regions. Ordinal regres-sion analysis revealed that there was a significant association between RULA risk level and prevalence rate of reported musculoskeletal problems in neck , shoul-ders, upper back, lower back , knees and lower leg ($p<0.05$).

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Variables	Parameter estimates	Std. Error	T	Sig.
(Constant)	317.495	154.609	2.054	.042
Village	-12.550	4.377	-2.867	**.005**
Age	.190	.530	.359	.720
Weight	7.527	2.314	3.253	**.001**
Stature cm	-2.359	1.424	-1.656	.100
Eye height	-.012	.035	-.329	.743
LBM kg	1.009	1.699	.594	.554
MBF kg	-2.193	2.502	-.876	.382
SLM kg	1.218	4.003	.304	.761
MINERAL kg	1.977	27.758	.071	.943
PROTEIN kg	-2.407	32.841	-.073	.942
TBW kg	.604	3.317	.182	.856
PBF	1.221	2.292	.533	.595
BMI	-2.653	2.923	-.908	.366
FATNESS	-3.471	1.380	-2.514	**.013**

4 Discussions

Neck, low back, shoulders, lower leg and upper back symptoms were found to be the most prevalent problems among the employees. High rate of shoulders prob-lem could be attributable to awkward posture due to high table used in the work-stations and high rate of back problems could be related to the long awkward pos-ture of this region and lack of use of backrest while working. The high rate of low leg pain attributes to the lack of foot rest support at workstation. Similarly, the high rate of neck pain could be due to long working hours on computer work. In some other studies, i.e. ship building employees and VDT operators, the same re-sult has been reported [2, 5, 34]. No association was found between sex and MSDs prevalence rate. Although it is in agreement with the results of other studies, [20, 21], but many studies have showed association between sex and muscu-loskeletal symptoms [3, 6, 11]. Based on the results of physical exposure to work related musculoskeletal risks assessment by RULA, in 75.8% of the employees studied the level of exposure to musculoskeletal risks was high and very high (action level 3 and 4). The results also determined that there was a direct association between RULA risk level and prevalence rate of the reported symptoms in lower back with the significant asso-ciation. This is in line with the findings of similar studies. [23, 30]

Since the postural problems have been found to be largely caused by im-properly designed and ill- arranged workstation furniture [33] reducing the RULA Grand Score by redesigning workstations was strongly recommended.

5 Conclusion

Based on the findings, it was concluded that WMSDs occurred at high rate ,are the result of awkward postures in this company Any ergonomics intervention program in this workplace should be focused on eliminating awkward postures of neck, shoulders, back and lower legs. Redesigning workstations based on ergonomics principles were recommended.

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