

Assessment of Work Postures and Musculoskeletal Pain among Insurance Office Employees: A Case Study

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Abstract

The office employees in financial service sector like insurance industry face some common problems. They have to work for a longer time and they perform repetitive and excessive hand and arm muscle which keeps their body posture in poor state. This results in musculoskeletal disorder (MSD) which leads to pain and discomfort. The aim of the study is to find the musculoskeletal disorder problems among the insurance office employees and to investigate the association of musculoskeletal pain problems with risk factors like Work Postures using Rapid Upper Limb Assessment (RULA). The study was conducted at different Insurance offices situated at Punjab (India). The questionnaire was completed by interviewing the employees about their pain. Also, Rapid Upper Limb Assessment method was performed by employing video recordings of employee's work posture. Correlation analysis was conducted to analyze the associations between different risk factors and musculoskeletal pain followed by a regression analysis to understand the predictors of pain. The results explored that musculoskeletal disorder occurred at a high rate. The prevalence of musculoskeletal pain 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 (action level of 3&4). Certain risk factors are found to be significantly associated with disorder symptoms in lower back, neck, upper back, shoulders, knees and lower leg. Based on Rapid Upper Limb Assessment observations, most of the workstation scores falls in action level 3 (Grand score 5-6). High musculoskeletal disorder problems are the result of poor postures and unstable workstation. It also shows that working postures have a direct contribution on MSD problems by the office employees.

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

Introduction

Musculoskeletal pain is one of the major reasons for the existence of work related injuries and it is also responsible for the disabilities in both developing and developed countries [1-4]. Musculoskeletal symptoms are commonly found among office employees, and at the same moment the duration of sitting work has increased dramatically. These pain problems also increases economic burden on an individual as well as on the company and the whole society [2].

The office employees are found seated for a longer period of time without moving from their respective seats while performing their duties. Also they are engaged in a number of work activities which increases its hand and arm muscle movements and this also further keeps its body posture in poor state [5]. These factors add to musculoskeletal pain among employees which persist and occur at multiple body points for a longer period [6-7]. However, even when work is performed under suitable conditions; maintaining any position for a longer time without break is not recommended because of the fact that the muscle contraction for longer

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time generates more discomfort or even pain [8]. The awkward sitting posture results in increased intra-disc pressure [5-6, 9]. The problem of pain related to long time sitting work is associated with bad postural habits [10]. These problems are largely responsible for shoulder and back pains which results in uneasiness, and also it creates problems in performing and focusing on work [6, 8, 11]. The various risk factors like repetitive movement, awkward postures, and manual handling tasks are responsible for developing musculoskeletal pain problems among office employees [12].

Office employees in financial service sector like insurance industry experiences some common problems. They have to work for a longer time and also they use some hand and arm muscles extremely and thus, tend to maintain a poor body posture. This results in musculoskeletal disorder (MSD) which contributes to pain and discomfort. This has been broadly agreed that constrained and awkward postures results in musculoskeletal pain on various body portions of seated employees [13] which are considered to be the main factor in the growth of musculoskeletal pain [14-17]. Physical ergonomic factors such as the postural activities [18], awkward postures [19], repetitive movements or monotonous work [20], long working hours per shift [21] are associated with MSDs, 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 necessity for improving work posture has been acknowledged in various studies which have predicted a relation between awkward postures at work and disturbances or discomfort in different regions of the musculoskeletal system [22]. Improvement in work posture will lead to have constructive effect on employee's musculoskeletal system and this will help in improving or increasing the employee's performance and decreasing the work related injuries [23].

The study aimed at ergonomic evaluation of office employees of the insurance industry offices located at Punjab; its main aim was to recognize the most critical points in working posture habits. The aim of the study is to find the existence of musculoskeletal disorder problems among the insurance office employees and to investigate the association of musculoskeletal pain problems with risk factors like Work Postures using Rapid Upper Limb Assessment (RULA). The risk factors responsible for work related musculoskeletal pains (WMSD's) are identified which includes occupational activities such as, awkward working postures and repetitive tasks [12]. It is supposed that this present study of insurance industry can be helpful in improving employee's work related health problems and work quality by implementing a proper frame work of ergonomic intervention plan.

Method

Subject

The present study was performed involving 120 office employees of various insurance industries located in state of Punjab (India); the sample mainly consists of more than 25 years old. The study was performed by taking a random sample from the interested employees (men and women). The insurance offices were visited and the questionnaires were fulfilled by interviewing the employees. These 120 office employees frequently carryout their functions sitting, and work fundamentally with computer, calculator, telephone and paper. The questionnaire was completed by interviewing the employees and the questions were asked about their pain. Also, Rapid Upper Limb Assessment method was performed by employing video recordings of employee's work posture. Employees were given two types of questionnaires: one was to describe the group of individuals as well as the occupational work, and the other was regarding information about musculoskeletal pain in different body portions. This sample was chosen as they frequently work in office for prolonged periods. Data collection included video recording of the real work and the postures adopted by the employees. Employees having past record of diseases or accidents with effect on musculoskeletal system were not included in the study.

RULA

Rapid upper limb assessment (RULA) was applied in order to review physical exposure to work related musculoskeletal risks, [24]. RULA posture analysis is used to examine the exposure of employees to the possibility of upper limb pain. RULA examines various risk factors related to the body posture, load and muscle use and it also compiles these factors into a posture score. In this evaluation, the posture risk scores of the upper arms, back and neck are ranged from 1 to 6, the lower arms and wrist risk scores ranged from 1 to 2. The RULA grand score was calculated by a special combination table of risk scores in upper arms, lower arms, wrists, neck, trunk and legs. The range of grand scores lies from 1 to 7. The high range of grand score indicates that there is a severe ergonomic problem in employee's work posture. The lowest range of grand score is 1 or 2 which indicates that the work posture is acceptable.

A higher range of grand score of 3 or 4 specified that the further investigation is required and changes in work may be required. The higher grand score range of 5 to 6 was taken as a warning that implies that an investigation and changes in work habits were required, and a highest grand score of 7 indicates that there is a immediate requirement of

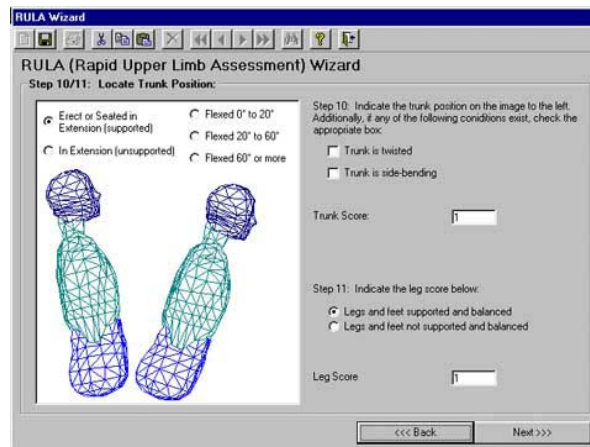


Figure 1. RULA wizard for calculating Trunk score and Leg score using ergo master

changes in work habit. In the present study, all the respondents have identical values for muscle score and force score in office work as their tasks required negligible resistance due to office work.

The ergo master software is used to calculate the RULA score by integrating pictures/images of the job assignment 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. Further the muscle score and force score are also given to calculate the Grand score of the body posture (RULA score). Fig. 1 shows the Trunk

score wizard depicting the details required to enter for calculating the trunk score and leg score. Similarly, all the scores are calculated to give the final Grand score (RULA score) with the help of Ergo master software.

Correlation analysis was conducted to analyze the associations between different risk factors and musculoskeletal pain followed by a regression to understand the predictors of pain.

Results

The sample of 120 office employees was selected in the study on the convenience basis in different insurance

Table 1. Age groups of employees participated in sex groups (n=120)

Sex	Age in years n (%)					n (%)
	25-30	30-35	36-40	41-45	>45	
Male	16(15.6)	28(27.4)	10(9.8)	10(9.8)	38(37.2)	102(85)
Female	9(50)	4(22.2)	1(5.5)	1(5.5)	3(16.7)	18(15)
Total	25 (20.8)	32 (26.8)	11(9.1)	11 (9.1)	41 (34.2)	102 (100)

Table 2. Frequency of pain in different body sites (n=120)

Body regions	No.	%
Neck	48	40
Shoulders	36	30
Upper back	23	19
Upper arm	6	7
lower back	42	35
Forearm	10	8
Waist	15	12
Thighs	10	8
Knees	20	16
Lower leg	27	23

Table 3. Analysis of RULA score with the reported work related musculoskeletal risks

RULA Score	Risk level	%	Action level	Ergonomic intervention
1-2	Low	2.5	1	Not required
3-4	intermediate	21.6	2	May be required
5-6	high	56.6	3	Required soon
7	very high	19.2	4	Required immediately

offices at Punjab. The results revealed that musculoskeletal disorder occurred at a high rate. Based on Rapid Upper Limb Assessment observations, most of scores of workstation are in action level 3 (Grand score 5-6).

Table 1 shows the age of different groups and gender of the employees taken part in the study. The majority of the employees are male 102 and some of them are females 18. The majority of male employees are above 45 years and the majority of females are below 35 years of age. It is shown in table 2, that the most usually affected body sites among the office employees are neck (40%), lower back (35%), shoulders (30%) and upper back (19%). The results explained by statistical analysis shows that there is significant association between the length of service and reported musculoskeletal problems in knees, lower legs, and upper back ($p < 0.05$) such that with the increase in length of service the occurrence rate of pain in these regions also increases. There is no association observed between sex of employees and occurrence of reported pain in different parts of musculoskeletal system ($p < 0.05$).

As shown in Table 3

- In only 2.5% of the employees, action level was 1.
- In 21.6% of the employees studied the range of RULA Grand Score lies between 3 and 4 which indicates that the level of musculoskeletal risks needs consideration. (level of action 2)
- In 56.6 % of the office employees studied, the range of Grand Score lies in between 5 and 6 which indicate that the level of musculoskeletal risks was high and there is essential need to reduce the musculoskeletal risk by introducing ergonomics interventions (level of action 3).
- In 19.2% of the employees studied, it shows that the range of RULA Grand score was 7, which indicate that the level of musculoskeletal risk was very high and in order to control the musculoskeletal risks, there is an immediate need for introducing ergonomics interventions (level of action 4)

Rapid Upper Limb Assessment showed that Grand Score of 76% cases was high and very high (action level of 3&4).

Table 4. The occurrence rate of reported symptoms in different body sites in four levels of risk among employees (n=120)

Body regions	Risk level (RULA Score)				p-value
	Low% (1-2)	intermediate% (3-4)	High% (5-6)	Very high% (7)	
Neck	1.7	9.1	20.8	8.3	0.00
Shoulders	1	8.3	19.1	1.7	0.006
Upper back	0	5.8	8.3	1.7	0.002
Upper arm	0	3.3	1.7	1.7	0.98
lower back	0	6.6	24.1	2.5	0.00
Forearm	0	1.7	5	1	0.314
Waist	0	5	5.8	1	0.797
Thighs	0	1	5.8	1	0.216
Knees	1	4.1	8.3	2.5	0.003
Lower leg	1	6.6	12.5	2.5	0.024

Table 4 shows the four levels of musculoskeletal risks among employees which are analyzed for the occurrence rate of reported pain symptoms in various body sites. It is shown in Table 4; those who experienced very high grand score of RULA have suffered more musculoskeletal problems in their various body sites. Ordinal regression analysis explained that there was a significant association between RULA risk level and occurrence rate of reported musculoskeletal pain in neck, shoulders, upper back, lower back, knees and lower leg ($p < 0.05$).

Discussion

The results of present study revealed that symptoms of pain in the musculoskeletal system were observed commonly among the insurance office employees studied. Neck, low back, shoulders, lower leg and upper back symptoms were found to be the most prevailing problems among the employees. More Shoulder pain problems occurred because of the high tables which are used in the workstations and also elevated rate of back problems could be resulted because of the long awkward posture of this site and less or no implementation 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. This means that for reducing or preventing these musculoskeletal problems among the insurance office employees an interventional program is required which should concentrate on preventing physical exposure to the musculoskeletal risk factors on these body regions.

This is also clear from results, that the age of employee was not a significant factor for musculoskeletal pain in various regions of body. In some earlier studies performed, i.e. in Visual display terminal operators and ship building employees, these same results were obtained [25- 27]. Also there was no association found among sex of an employee and the musculoskeletal pain rate. Some of the previous studies [28-29], are in agreement with these results, but many of the studies conducted earlier, have shown significant association among sex of an employee and their musculoskeletal symptoms [30- 32].

On the basis of results obtained about physical experience of work related musculoskeletal pain, the present study explained its assessment by using RULA, that the level of exposure of musculoskeletal risks were high and very high (level of action 3 and 4) among 75.8% of the office employees which were studied. This shows that the working conditions and insurance office jobs was conducive for developing work related MSDs. So, to decrease musculoskeletal exposure level and to improve working conditions, the ergonomic interventions seemed highly necessary.

The present study also determined the strong and significant

association of RULA risk level with the occurrence rate of self reported musculoskeletal pain symptoms in lower back. This result is also confirmed by the earlier studies which are conducted in the similar field. [16, 33]

The major risk factors of musculoskeletal disorders among employees were found to be static work and awkward postures which is the outcome of RULA analysis. The major reason for postural problems is found to be ill arranged and improperly designed workstation furniture [8]. So, it is highly important and recommended to redesign the workstations by implementing ergonomic principles in order to reduce the RULA grand score. So, to implement this for reducing musculoskeletal risk level and prevent the WMSDs in this company, these few steps are recommended as mentioned below-

- Decreasing the height of tables according to the employee's anthropometric characteristics.
- Using appropriate seats with proper backrest in the workstation.
- To avoid posture fixation, redesign the sitting- standing workstations.
- To give training to employees about working posture.
- Rescheduling the suitable work-rest cycle.

Conclusion

According to the analysis of results, it is concluded that high rate of work related musculoskeletal pain problems occurred in this insurance industry. There is a high risk of exposure to WMSDs among employees. So, it is highly recommended to reduce risk level by taking corrective measures, which seems to be essential. The intervention program should be initiated in this workplace to reduce awkward postures of shoulders, neck, back and lower legs. It is also recommended to redesign the workstations which should be based on ergonomic principles.

High musculoskeletal disorder problems are the result of awkward postures, unstable workstation and lack of information regarding implementation of ergonomics in their area of daily routine work and it concludes that awkward working postures have a direct association with MSD problems by the insurance office employees.

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