

Research Article**The effect of two kinds of training (oral lecture and e-mail) on body postures of bank staffs: a comparative study**Noorani Marzieh¹, Hossein Ansari², Fazli Babak^{3*}, Jafari Sayed Mohammad⁴, Sharifpoor Zahra⁵¹ MSc in Occupational Health and Safety, Faculty of Abarkoh, Yazd University of Medical Sciences, Yazd, Iran² Health Promotion Research Center, Dept. of Epidemiology and Biostatistics, Zahedan University of Medical Sciences, Zahedan, Iran³ Health Promotion Research Center, Dept. of Occupational Health, Zahedan University of Medical Sciences, Zahedan, Iran⁴ MSc in Occupational Health and Safety, Yazd University of Medical Sciences, Yazd, Iran⁵ MSc in Occupational Health and Safety, Shahrekord Yazd University of Medical Sciences, Shahrekord, Iran***Corresponding author**

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Abstract: Musculoskeletal disorders (MSDs) are among the most common occupational diseases. Bankers are exposed to different ergonomic hazards. This study was conducted to assess work posture among bank workers and the effect of two training methods was compared. The 80 bank workers from eleven bank in Yazd, Iran participated in this cross-sectional study. Cluster sampling was used to select the subjects. RULA method was used for posture analysis. Subjects were randomly allocated into two groups. The intervention included a training course presented by oral lecture and e-mail and the efficacy of the methods was compared. Mean RULA score before intervention was 4.10 ± 1.60 and 4.15 ± 1.14 in e-mail and lecture groups, respectively and the difference was not statistically different ($P = 0.86$). RULA score was significantly reduced in both groups after interventions. The study showed that both training methods significantly affected the body posture of bank workers and this effect was larger using lecture for training.**Keywords:** MSDs, RULA, training, oral lecture, e-mail.

INTRODUCTION

Musculoskeletal symptoms (MSS) are defined as pain and stiffness commonly experienced by office staff in the course of their professional career. The musculoskeletal health of bank staff has been a subject of concern and has been studied by the researcher's world over [1]. Repetitive use of arms and hands, static posture during work and sustained standing position exerted excess load to the nervous system and somato-sensory system. These all were attributed to the manifestations of MSDs amongst the workers [2]. The work-related musculoskeletal risk factors most often cited in the literature include repetition, application of excessive force vibration and awkward postures and based on compelling evidence, the research reports clear links between these risk factors and the prevalence of MSDs [3,4]. According to the literature, despite significant mechanization and automation in most occupational settings, work-related musculoskeletal disorders (WMSDs) are yet the most important cause of time loss, increased costs, and human injuries [5-7]. According to World Health Organization about 58% of the world's population over the age of 10 years spend one third of their time at work and about 30 – 50%

of the workers are exposed to significant physical occupational hazards [8]. According to the present statistics WMSDs compromise 46% and 44% of occupational diseases in Finland and the US, respectively [9,10]. Relax body posture and poor workstation may result in many health hazards including work related musculoskeletal disorders (WRMSDs) that can affect shoulder, arms, elbow, wrist, hand, back, leg and feet. Modern technologies, especially, the use of the computers have been linked to the high prevalence of musculoskeletal symptoms in neck, upper extremity and back [11].

Prolonged sitting is of particular concern in certain occupational groups such as office workers [12]. High rates of sedentary behaviors have been demonstrated in particular groups of office workers including managers, professionals, clerical and administrative workers [13].

In many countries the prevention of MSDs among the work force is considered a national priority [14]. It was reported by the National Institute for Occupational Safety and Health (NIOSH) that the

low back pain is mainly induced by the inappropriate workplace [15].

Recent studies have demonstrated that musculoskeletal disorder rates vary substantially between workplaces, occupations, and by job within given workplaces according to facilities [16]. In Patterson study on 170 computer users it have been shown that 65% of participants experienced shoulder and neck pain .this study didn't show any significant relationship between neck and shoulder pain with using computer weekly and hour [17].

Tornqvist studied the prevalence of neck and upper limb pain on 1555 computer user who were worked 3 day or more weekly in governmental and nongovernmental factories. Prevalence result was 51% and 72% for men and women respectively [18]. In Iran WMSDs are also among the most common occupational disorders. We could find limited studies on WMSDs in Iran. According to the reports of social affairs organization MSDs compromise about 14% of causes of disability .Iran Ministry of health have reported that 76% of employees work in awkward postures [10,19]. Bankers work in a workstation with various ergonomic hazards and are exposed to different MSDs [20].

A study on bank workers in Hong Kong found a prevalence of 31.4%, 30.6%, 16.5%, 14.9% and 6.6% for MSDs in neck, back, shoulder, hand and wrist, and arm, respectively. The authors found a significant relationship between repetitive movements and MSDs in neck and shoulder [21]. A recent report of national academy of science shows that workplace ergonomic risks lead to WMSDs but some interventions can prevent its development. Some studies have assessed the effect of different kinds of intervention, i.e. training, workstation redesign or rearrangement, and workplace exercises, on WMSDs in different occupational groups [22]. Tone *et al.* in a study in 2002 experienced the effect of a training program about prevention of MSDs and improvement of musculoskeletal health in the workplace, and found that long-term intervention is required for this purpose [23]. Present study is aimed at evaluating the working postures and Musculoskeletal problems amongst the bank staffs. In addition, we aimed to investigate the effectiveness of two kinds of training on body postures and determine that which one of intervention is more effective than the other in affecting of body posture improvement.

MATERIALS AND METHODS

A quasi-experimental study was conducted on 80 bank staffs in Yazd, a central province in Iran. All the subjects were free from physical abnormalities and did not have suffered any of the life-threatening

or infectious diseases ever. We used cluster sampling to select some branches of Mellat bank in Yazd, and then subjects were randomly selected in these branches. Written informed consent will be obtained from each participant prior to entry into the study. Initially Rapid Upper Limb Assessment method (RULA) were performed to determine the postural stress of the workers [24]. RULA is an observational posture analysis method. This method evaluates repetition, static muscular contraction and force as well as awkward posture [25].

A questionnaire containing demographic data, job title, work experience, and e-mail address were filled for each participant. Subjects were randomly allocated into two groups. The intervention included a training course presented by two methods: oral lecture using a power point presentation and e-mail sending the same power point file to the subjects. The Educational content in two methods were same. The Educational content will contain general information informing

Participants that we are testing simple occupational health interventions and those participants will be provided with an ergonomic device or advice about improving healthy work practices. The Educational content will not contain specific detail about the interventions in order to keep the participants blinded to the interventions that they do not receive. Bank staffs will not be allow to have the study during the study period. In the education intervention groups, participants will receive an education package, one group by participating in the session and teaching them by teacher and other by receiving E-mail package. Two months after the intervention RULA method was used again to assess the effect of the intervention. An inform consent was obtained from each participant. The study was approved by the ethics committee of Shahid Sadoughi University of medical sciences.

Data were entered and analyzed in Statistical Package for Social Sciences (SPSS) Version 18 using chi-square test; Student's T test and paired T-test. The significant level was set as P-values less than 0.05.

RESULTS

The various working phase and working postures of the bank staffs were analyzed by work cycle time (min), range of duration (min), frequency/hour, duration (hour/ day), BPD scale rating and by postural analyses tools (RULA) with their action category, that were presented in the Tables 1, 2 and 3. The average RULA scores and the action categories of those postures indicated that the body parts were more likely to be affected for awkward bending.

Table-1: Demographic Characteristics of the Participants.

Variables		Intervention				P value
		e-mail		lecture		
		Number	Percent	Number	Percent	
Right-handedness		35	87.5	32	80	0.363
Left-handedness		5	12.5	8	20	
Working hours	<8	1	2.5	3	7.5	0.09
	8-10	22	55	22	55	
	10-12	17	42.5	11	27.5	
	>12	-	-	10	4	
Work experience (year)	<10	9	22.5	18	45	0.1
	10-20	20	50	15	37.5	
	>20	11	27.5	7	17.5	

Mean RULA score before intervention was 4.10 ± 1.60 and 4.15 ± 1.14 in e-mail and lecture groups, respectively and the difference was not statistically different ($P = 0.86$). RULA score was significantly reduced in both groups after interventions. Mean RULA score after intervention was 2.92 ± 0.43 and 2.87 ± 0.56 in e-mail and lecture groups, respectively. The difference

between RULA score before and after intervention was significant in both groups ($P = 0.001$ for both groups).

Table 2 shows the frequency of different RULA scores before intervention.

Table 3 shows the frequency of different RULA scores before and after intervention in both groups.

Table 2. Frequency distribution of body posture among bank workers according to RULA method before intervention.

Study group	RULA score							
	1-2		3-4		5-6		≥ 7	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
e-mail	0	0	26	65	11	27.56	1	2.5
Lecture	2	5	22	55	15	37.5	1	2.5

Table 3. Frequency distribution of RULA score before and after intervention.

Study group	RULA score (N, %)							
	1-2		3-4		5-6		≥ 7	
	Before	After	Before	After	Before	After	Before	After
e-mail	0(0)	6(15)	26(65)	34(85)	11(27.56)	0(0)	1(2.5)	0(0)
lecture	2(5)	8(20)	22(55)	31(77.5)	15(37.5)	1(2.5)	1(2.5)	0(0)

DISCUSSION

Training and its various methods is a non-separable and critical part in different societies. Today, the implementation of different methods of training in various scientific fields needs an advanced technology. Historical and new methods of training such as oral lecture, explorative, problem-solving, and discursive that each of them has its specification and efficiency, and the content of the training defines its method.

Medical education, especially lab diagnostic disciplines, need a variety of training methods due to its vast training content including theoretical, practical, and internship. The method of training by lecture in ergonomics is an effective method for improvement of the attitude of bank workers about body postures and prevention of musculoskeletal disorders. This method

may lead to stabilization of the training process in future.

This study was performed to compare the efficacy of two training methods (lecture and e-mail) on maintaining body posture appropriate for bank workers. The study showed that both training methods significantly affected the body posture of bank workers and this effect was larger using lecture for training.

We found a significant reduction in musculoskeletal complaints two month after both interventions consistent with some previous studies, which shows the efficacy of both ergonomic modifications and workplace exercises (26-30). This change was observed in the most important at risk areas of body (i.e. neck, shoulder, hand and wrist and low

back). In this study we assessed only short-term effects of the interventions after one month. Other studies are required to assess long-term effect and durability of the interventions.

Anderson *et al.*, consistent with the results of the current study, showed the positive effect of exercise on neck, although they used specific strengthening but we used some stretching exercises. They also assessed the effect of general fitness training which showed a small acute pain reduction [28]. Amick *et al.* found a clear effect after using ergonomic chair with training [26]. Amick *et al.* assessed this effect after changing the chairs in an office environment and found considerable results [26], they also found that training alone can also reduce the frequency of MSDs although to a level lower than ergonomic change; this result was also observed in the authors' previous study on office workers [31], which is in contrast to the results we found in this study, although ergonomic modifications and workplace exercise programs are various in different studies.

Maher *et al.* in a systematic review of randomized controlled trials showed that workplace exercise is effective, but education is ineffective, and workplace modification plus education is of unknown value in preventing low back pain [32]. Tone *et al.* in a study in 2002 experienced the effect of a training program about prevention of MSDs and improvement of musculoskeletal health in the workplace, and found that long-term intervention is required for this purpose [23].

Maul *et al.* found that supervised physical training can effectively improve functional capacity and reduce low back pain. This study showed a long-term benefit for training as well [33]. Van Poppel *et al.* could not find a beneficial effect for lumbar supports, education, or exercise in the primary prevention of low back pain at the workplace which was against the results of the current study [34]. Maher *et al.* in a systematic review found a beneficial effect for exercise but this result was of unknown value for ergonomic modifications and education [32]. This study had some limitations: Our study suffered from monetary deficiencies, so our ergonomic modification was not complete and we could not change non-ergonomic chairs or desks.

CONCLUSION

In this study, relationship between working posture and discomfort in various body parts was found. The clear view of musculoskeletal disorder due to hazardous working posture was significantly observed and it can be interpreted that inadequate guidelines for working posture is producing occupational health hazards among the bank employer. This type of intervention significantly reduced sitting time and increased standing and light activity during work-hours. More investigations are

needed to get information all about the working status of the bank staffs.

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