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RESEARCH ARTICLE OPEN ACCESS

Prevalence of Upper Extremity Musculoskeletal Complaints and Its Relationship with Risk Factors for Bank Employees Working with Computer

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Aim: To determine the frequency and risk factors of upper extremity musculoskeletal complaints (UE-WMSCs) of the bank employees working with computer.

Material and Method: Thiscross-sectional observational study was conducted among 221 bank employees between July and September 2013 in Aydın, Turkey. For data collection socio-demographic characteristics and working environment form, evaluation of upper extremity musculoskeletal symptoms with visual analogue scale (VAS) form, MSC (Musculoskeletal complaints) preventive behaviors and Karasek jobs train scale was used.

Results: The rate of existence of a symptom anywhere in upper body area is 61.1%, and the average VAS pain intensity is 1.8±2.8. The most common complaint is reported in the left neck (66.5%) and left shoulder (28.5%) areas. The least existence of symptoms is found out in left elbow region (13.1%). Average scale points for psycho-social elements of workload, control over the work and social support are determined as 72.3±19.4, 69.1±19.6 and 74.7±19.8 respectively. The average score for work stress is determined to be 1±0.26 (0.61-2). There has been found out a close relationship between the risk for musculoskeletal complaints on one hand and age, the number of children, working time and work control on the other hand.

Conclusion: Neck and shoulders are most affected areas in the bodies of bank employees working with acomputer. It is found out that socio-demographic characteristics, working conditions, and work control are closely connected with UE-WMSC.

Keywords: Bank employees, upper extremity, work-relatedmusculoskeletal complaints

Introduction

It is reported that work-related musculo skeletal complaints (WMSCs) make up 42-58% of all occupational diseases (1). More than 25% of working population in Europe have musculoskeletal symptoms (2). It is also reported that WMCs constitute 40% of the injuries for which work compensation paid in USA (3). The studies show that age and gender as socio-demographic factors and as vocational factors, repetitive movements, static physical posture, daily time spent using computer, heavy workload and poor working conditions are risk factors for WMCs (1,4,5).Employees in the banking sectors are subject to long hours of static work, bad posture and activities of

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repetitive computer use. Therefore, the duties of bank employees make them prone to WMSCs (6, 7). Working in the same posture for long periods of time, repetitive movements and agronomical inadequacies in work environments bring about several health problems, in particular,musculoskeletal complaints. These health problems result in serious loss of time, economic value and workforce, and increase the importance of the subject. The purpose of this study is to determine upper extremity musculoskeletal complaints of bank employees working with computer and to evaluate its relationship with psychosocial factors in the work environment and other risk factors.

Methodology

Study design

This cross-sectional and observational study was carried out in the Center of Aydın Province between July and September 2013. Study workgroup covers bank employees working with thecomputer (WWCs) in Aydın Provincial Center, who agreed to attend the study.

Setting and sample

The bank employees who use acomputer at least 10 hours in a week are included in the group while pregnant women and those who had motor vehicle accidents during last one year were excluded. 221 WWCs attended the study.56.1% of the participants in the study are male, the average age is 33.9±7.1 and %91.1 of the participants areuniversity graduates.

Measurement/Instruments

In this study "Visual Analogue Scale" (VAS) is used to find out upper body MS complaints. It measures the intensity of pain of the symptom (complaint, pain, numbness, tingling, weakness, incompetence, etc.). This scale, whose validity and reliability is already tested(8), is 10 cm long and graded over a vertical or horizontal line (0=no pain and 10=most severe pain). The person attending the study is asked to mark the point over this line, which corresponds to the level of his/her pain. The distance between the point which is marked and the lowest point of this line (0=no pain) is measured in cm, and the numerical value represents the intensity of pain of the patient's pain (9). The existence of the symptom is accepted in cases where the patient declares the intensity of pain of his/her pain over 5.

Psycho-social elements are measured by using Karasek's workload-control-social support model. For this purpose, a psycho-social information form is used (10). Psycho-social factors information form is composed of 17 questions with an answer format of four-point Likert scale. The validity of the scale is tested by Demiral et al (11,12). According to this model,the interaction between psychosocial workload and work control determines work stress level. Workload describes the demand for necessary power and the density of the work which also covers speed of work. Work control shows the employee's skill level, the possibilities of using this skill and involvement in the decision-making procedures in the execution of the work. Comparing the workload with work control results in the calculation of a value called "work tension" or "work stress."

For workload, control and social support subsections of the scale, Cronbach's alpha coefficients vary between 0.51-0.72.Total score for work control is calculated by adding up scores obtained for use of skills and decision freedom. High scores mean high workload, work control, and high social support. Work tension is valued as the ratio of workload over work control.Socio-demographic attributes of the participants, working conditions and their activities/behaviors aimed at preventing upper

body musculoskeletal complaints are also evaluated through a questionnaire.

Data Collection/ Procedure

Data were collected using face to face and anonymous questionnaire. Written approvals are obtained from participants and from The Turkish Ministry of Health, Public Hospitals Institution, Tepecik Education and Research Hospital's Ethics Committee which is numbered 51/11.

Statistical analysis

Data is analyzed with SPSS v15. Numbers and percentages of the participants are calculated according to socio-demographic variables.Chi-square test, studentst-test, and logistics regression are used in the analysis; averages are given together with standard deviations. For statistical significance, it is assumed that $p<0.05$.

Results

Distribution of bank employees, who participated in the study, in terms ofcertain socio-demographical attributes is given in Table-1. It is reported that 56.1% of bank employees are male,65.6% married,81.1% university graduate and 50.2% of the participants do not have children. Bank employees report that 38.9% of them smoke while 19.9% do physical exercise.

According to evaluation of body mass index, 61.5% of participants are of medium weight. 93.2% of the participants have not had any training related to office ergonomics.The existence of a symptom in any part of the participating bank employees is 61.1%, and the average for the body is 1.8±2.8; the highest existence is in the left neck region with 66.5% and in the left shoulder region with 28.5%. The lowest existence of symptom is in left elbow region with 13.1%. The general rate of symptom existence is 47.5% for the left side of body and 49.3% for right part of body (Table-2).

Table-1. Sociodemographic characteristics of participants

Variables	n	%
Gender		
Male	124	(56.1)
Female	97	43.9
Age Avg.± sd.	33.9±7.1	
Education		
High School	18	8.1
University	203	91.1
Marital Status		
Single	76	34.4
Married	145	65.6
Number of kids		
0	111	50.2
1	64	29.0
2 and more	46	20.8
Smoking		
Yes	86	38.9
Quitted	33	14.9
No	102	46.2
Regular Exercise		
Yes	44	19.9
No	177	80.1
Body-Mass Indices (BMI)		
Slim (16-18.4)	7	3.2
Normal (18.5-25.0)	136	61.5
Fat (25.1-30.0)	69	31.2
Overweight (between 30.1-35)	9	4.1
Working Status		
Manager	30	13.6
Non-manager	191	86.4
Dominant hand		
Right	185	83.7
Left	26	11.8
Both	10	4.5
Training on ergonomics		
Yes	15	6.8
No	206	93.2
Total work time(years)		
1-10	131	59.3
11-20	70	31.7
21+	20	9.0
Use of Medicine		
Yes	46	20.8
No	175	79.2

Four different types of scores are obtained for psychosocial elements: work-load, control over the work score, social support score and work stress score (Table-3).

When MSC preventive behaviors are evaluated, the average score for doing exercise is found as 2.3±1.52.3 while these numbers are 3.1±1.7 and 2.6±1.5 for the frequency of giving short breaks and for paying attention to posture. Distribution of the symptoms according to certain attributes of the participants are shown in table-4.

The existence of the symptoms is observed to be more in women, older people, married people, people with kids and people working longer hours. When the existence of upper body musculoskeletal symptoms and psychosocial elements are considered together, there exists a meaningful relationship between skill scores and scores for control over the work (Table-5).

Table-3. Psychosocial factors in work life of participants

Variables	X±SD*	Median	Min-Max
Psychosocial factors			
Workload	72.3±19.4	77	22.2-100
Score on control over the work	69.1±19.6	69.1	22-100
Social support score	74.7±19.8	77.7	0-100
Work Stress score	1±0.26	1	0.61-2

Table-2. Distribution of upper body symptoms for participants

Upper Body	Symptom existence in left part		X±SD	Symptom existence in right part		X±SD
	Number	%		Number	%	
Neck	74	66.5	3.0 ±3.2	88	39.8	3.2±3.2
Shoulders	63	28.5	2.3±2.8	62	28.1	2.5±3.0
Arms	44	19.9	1.9±2.5	43	19.5	1.8±2.5
Elbow	29	13.1	1.6±2.2	30	13.6	1.3±2.1
Forearm	33	14.9	1.5±2.1	30	13.6	1.3±2.1
Wrist-hand	57	25.8	1.0±2.5	52	23.5	1.9±2.6
Body region (parts)	105	47.5	1.4±1.5 0.4±0.5	109	49.3	1.4±1.5 0.4±0.5
Body region (general)	135	61.1	1.8±2.8			

***X ± SD:** Mean ± standard deviation

Table-4. Distribution of symptom existence according to certain characteristics of the participants

Variables	Existence of upper body symptoms				X^2	P value
	No		Yes			
Age groups	Number	%	Number	%	19.658	<0.001
20-29	39	60.9	25	39.1		
30-39	34	33	69	67		
40+	13	24.1	41	75.9		
Gender					1.085	0.29
Male	52	41.9	72	58.1		
Female	34	35.1	63	64.9		
Marital Status					2.483	0.11
Single	35	46.1	41	53.9		
Married	51	35.2	94	64.8		
Education					1.022	0.31
High School	5	27.8	13	72.2		
University	81	39.9	122	60.1		
Body-Mass Indices(BMI)					0.196	0.11
Slim (16-18.4); Normal (18.5-25)	60	42	82	58		
Fat (25.1-30); Overweight (30.1-35)	26	33.3	53	66.7		
Having a child					13.173	<0.0001
No	55	49.5	56	50.5		
Yes	28	21.9	79	78.1		
Dominant hand					1.294	0.524
Right	69	37.3	11	62.7		
left	12	46.2	14	53.8		
Both	5	50	5	50.5		
Smoking					0.520	0.77
Yes	31	36	55	64		
Quitted	13	39.4	20	60.6		
No	42	41.2	60	58.8		
Regular exercise						0.28
Yes	14	31.8	30	68.2		
No	72	40.7	105	59.3		
Working time					13.373	0.00
1-10	64	48.9	67	51.1		
11-21+	22	24.4	68	75.6		
Frequency of short breaks	Number	%	number	%	0.594	0.74
Never	11	34.4	21	65.6		
Rarely, sometimes	32	37.6	53	62.4		
Once or more in a day	43	41.3	61	58.7		
Controlling body posture while working					0.056	0.97
Never	18	38.3	29	61.7		
Rarely, sometimes	38	38.4	61	61.6		
Once or more in a day	30	40	45	60		
Regular stretching exercises					10.58	0.06
Never	31	43.1	41	56.9		
Rarely, sometimes	41	31.7	88	68.3		
Once or more in a day	14	46.6	16	53.4		

Table-5. Distribution of symptom existence in accordance with participants' psychosocial elements

Variables	Existence of musculoskeletal symptoms	Number	A. X±SD*	p	T-value
Psychosocial elements					
Work load (22-100)	Non-existent	86	70.54±20.22	0.25	-1.13
	Existent	135	73.58±18.85		
Skill (0-100)	Non-existent	86	71.96±22.97	0.02	-2.21
	Existent	135	78.6±19.7		
Freedom of decision (0-100)	Non-existent	86	59.49±64.19	0.22	-1.21
	Existent	135	64.19±28.39		
Control over the work (0-100)	Non-existent	86	65.73±20.77	0.03	-2.05
	Existent	135	71.39±18.71		
Stress (workload / control over the work) (0.61-2.00)	Non-existent	86	1.08±0.26	0.42	0.8
	Existent	135	1.05±0.26		
Social support (0-100)	Non-existent	86	75.90±20.01	0.48	0.69
	Existent	135	73.99±19.83		

Discussion

Prevalence of upper body musculoskeletal symptoms for bank employees working with computer and risk factors affecting this situation are determined. In this study, therate of symptom existence in any part of theupper body is found to be 61.1%. This result is in line with previous research by which the prevalence is reported between 27% and 63% (13). In a study carried by Abledu et al., the density of upper body area symptoms within last 12 months is found to be 83.5% (14,15), while Bhanderi reported frequency as 72.2% (6,14). As a result of a study over the density of upper body region symptoms within last 12 months, it is observed that neck and shoulder symptoms are more prevalent. It is understood that symptom prevalence is higher in the left region of the body than in the right region and that the lowest prevalence is observed in the left elbow region. UE-WMSC prevalence in elbow region is found to be lower than what is repor-ted in previous studies, between 6.0%-30% (16). This situation could be explained by the joint structure of elbows, by use of hand-arm support and by the fact that degenerative diseases are less observed in this region.In a cross-sectional study carried out in Kuwait to determine existence of UE-WMSC for bank employees, prevalence of MSC is found to be 80% while the most affected parts of the body are neck (53.5%), waists (51,1%), shoulders (49.2%) and back (38.4%) (17). In Balcı's dissertation study covering the bank employees in Gaziantep Province, the prevalence of musculoskeletal complaints is determined as

58.5%, while the most common complaints are reported as waist pains (29.0%), back pain (28,8%) and neck pain (27.9%)(18). Jensen et al. showed that the most common symptoms for women working in call centers are observed in neck (53%), which is followed by shoulders (42%) and hand-wrist area (30%) (19).

In his study Wood reports that participants had musculoskeletal complaints at least once in a year; 56% of the participants experienced musculoskeletal disorders within last week, and 20% of the participants experienced musculoskeletal disorders that had hindered working (20). Çalık et al. found out that white-collar workers have most common musculoskeletal complaints in theback of the body (69.9%), in the waist (68%), neck (67.1%) and 50.6% in right shoulder (21).In a study carried out by Klussmann et al., it is shown that the symptoms of last one year are reported in theneck (55%), shoulders (38%), hand-wrist (21%) and elbow and forearm (15%) (22). In this study, it is found out that individual factors such as age, thenumber of children, working time and scores of psychosocial factors such as skill and control over the work are related with UE-WMSC. Viikari et al. determined that the risk of WMSC in the neck and upper extremity increases with advancing age (23).

In some studies, it is reported that complaints in arms, wrist and hand increase after theage of 40 (24, 25). Torqvist et al. reported that neck and shoulder symptoms slightly increase between ages of 40 and 48 while after the age of 50, an increase in shoulder symptoms are observed (26). Holmström et al. studied the relationship between age and musculoskeletal complaints and observed that they increase with advancing age (27).

Mostly in literature it is reported that MSC is more common for women than men (7,21,25, 28,29,30). The possibility of development of a musculoskeletal problem is higher for women working in thebank compared to men. Being a woman is reported as a risk factor for the progress of MSC (31). However, no statistical significance is determined ($p>0.05$). In some studies, it is reported that women had more symptoms given their domestic workload and child care (30,31).

In this study, no significant statistical relationship is found out between working with the computer (WWC) and musculoskeletal complaints ($p<0.11$). In a similar way, in some studies carried out, no relationship is observed between WWC and UE-WMSC (33,34). Viester et al. in a study carried out in Holland, found out the relationship between musculoskeletal complaints and body-mass index (35). In this study, no relationship was found between UE-WMSC and smoking, regular sports and stretching exercises. However, physical activity has many positive effects such as protection of muscular force, protection of body shape and posture, reducing fatigue, protection against muscle contraction, maintenance of bone mineral density, body protection against injuries and accidents, etc.(36). In this study, a relationship was observed between working time and existence of musculoskeletal symptoms. In a similar study, (statistical) significance was observed between working time and UE-WMSC (22,37). In many studies, smoking is evaluated as an individual risk factor affecting the development of musculoskeletal diseases. However, no relationship has been reported in this study. No relationship has been established between musculoskeletal symptom development and the frequency of having short breaks and controlling body posture.

In previous epidemiologic studies, it was reported that short resting breaks have positive effects (7, 38, 37). Use of screen is diminished together with short breaks, muscle load due to

poor ergonomic conditions is decreased. Short breaks provide muscular relief and recovery (4, 39,45). In this study, statistical significance is determined between UE-WMSC and control over the work. Especially imbalance between the workload and control for the employees results in work stress. Bot et al. found out that sickness absenteeism increases for employees with high workload and low work control (40). In previous studies, psychosocial factors are evaluated as determinant factors for WMSC (22,39,4142,43,44).

Conclusion

It is found out that frequency of neck and shoulder musculoskeletal symptoms are most commonly observed in bank employees working with acomputer. The presence of upper body musculoskeletal symptoms are observed more with advancing age, for women, married, people with children, people with more working hours. It is also understood that skill and control over the work are among the workplace psychosocial elements that constitute risk factors for upper body musculoskeletal symptoms. It is necessary that preventive programs for musculoskeletal symptoms of bank employees should concentrate primarily on neck and shoulder disorders. It is also important to get rid of psychosocial factors that are negatively affecting the health of bank employees.

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