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Ergonomic Risk Factors and Musculoskeletal System Problems In Healthcare Professionals Working In Central Sterilization Unit

Merkezi Sterilizasyon Ünitesinde Çalışan Sağlık Profesyonellerinde Ergonomik Risk Faktörleri ve Kas İskelet Sistemi Sorunları

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ABSTRACT

This study was conducted to determine ergonomic risk factors and musculoskeletal problems in health professionals working in a central sterilization unit. The study is a descriptive cross-sectional study. The study sample consisted of 87 healthcare professionals working in the central sterilization units of seven hospitals affiliated with a private health group in Istanbul. Data were collected between February and September 2020 using the sociodemographic characteristics form, Ergonomic Risk Factors and Musculoskeletal Disorders Scale (ERFMDS) and Cornell Musculoskeletal Disorders Questionnaire (T-CMDQ). Factor analysis, descriptive statistics, Mann Whitney U test, Kruskal-Wallis H test, post-hoc analysis test and correlation test were used to evaluate the data. Significance level was accepted as $p<0.05$ in all analyzes. According to the data obtained, the mean T-CMDQ scores of the healthcare professionals working in the central sterilization unit were high in the foot region (6.87±9.43) and low in the hand region (1.82±4.38). Healthcare professionals' ERFMDS total dimension scores were high, physical environment, use of appropriate equipment sub-dimension scores were low, and performance efficiency sub-dimension scores were moderate. It was determined that the mean T-CMDQ scores of healthcare professionals were low, and there were significant differences between the mean scores of ERFMDS and T-CMDQ according to some socio-demographic characteristics of healthcare professionals. As a result of the study, it was thought that there was a relationship between musculoskeletal system problems and ergonomic factors that may have a negative effect on the performance level due to the high mean scores of ERFMDS performance efficiency sub-dimension and T-CMDQ foot region.

Keywords: Ergonomics, Central Sterilization Unit, Musculoskeletal System, Occupational Health and Safety.

ÖZ

Bu araştırma merkezi sterilizasyon ünitesinde çalışan sağlık profesyonellerinde ergonomik risk faktörlerini ve kas iskelet sistemi sorunlarını belirlemek amacıyla yapıldı. Çalışma tanımlayıcı kesitsel tiptedir. Araştırmanın örneklemini İstanbul'da özel bir sağlık grubuna bağlı yedi hastanenin merkezi sterilizasyon ünitesinde çalışan 87 sağlık çalışanı oluşturdu. Veriler Şubat-Eylül 2020 tarihleri arasında sosyodemografik özellikler formu, Ergonomik Risk Faktörleri ve Kas İskelet Sistemi Bozuklukları Ölçeği (ERKİSÖ) ve Cornell Kas İskelet Sistemi Bozuklukları Ölçeği (T-CMDQ) kullanılarak toplandı. Verilerin değerlendirilmesinde faktör analizi, tanımlayıcı istatistikler, Mann Whitney U testi, Kruskal-Wallis H testi, post-Hoc analiz testi ve korelasyon testi kullanıldı. Tüm analizlerde anlamlılık düzeyi $p<0,05$ olarak kabul edildi. Elde edilen verilere göre merkezi sterilizasyon ünitesinde çalışan sağlık profesyonellerinin T-CMDQ genel puan ortalamaları ayak bölgesi yüksek (6,87±9,43), el bölgesi ise düşük (1,82±4,38) olarak belirlendi. Sağlık çalışanlarının ERKİSÖ toplam boyut puanları yüksek, fiziksel ortam düzeni, uygun ekipman kullanımı alt boyut puanları düşük, performans etkinliği alt boyut puanları ise orta düzeyde bulundu. Sağlık profesyonellerinin T-CMDQ puan ortalamalarının düşük olduğu, sağlık profesyonellerinin bazı sosyo-demografik özelliklerine göre ERKİSÖ ve T-CMDQ puan ortalamaları arasında anlamlı farklılıklar olduğu tespit edildi. Araştırma sonucunda ERKİSÖ performans etkinliği alt boyut ve T-CMDQ ayak bölgesi ortalamasının yüksek olması, kas iskelet sistemi sorunları ile performans düzeyine olumsuz etki yapabilecek ergonomik faktörler arasında bir ilişki olduğu düşünüldü.

Anahtar Kelimeler: Ergonomi, merkezi sterilizasyon ünitesi, kas-iskelet sistemi, iş sağlığı ve güvenliği.

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INTRODUCTION

Central sterilization units (CSU), which have a great impact on ensuring sterilization safety and preventing infection, are dynamic structures that collect contaminated materials from other units of the hospital for processing and deliver them back to the units and users, provide uninterrupted service 24 hours a day, 365 days a year, and have an important place for the hospital[1]. The central sterilization unit should be designed as dirty, clean, sterile storage and support areas. CSU area should consist of approximately 35% dirty area, 35% clean area, 20% sterile area and 10% support area[2].

Physical risks to health professionals working in the CSU include ventilation, lighting, wet slippery floors, heating, electricity and fire. When working in the CSU, extremely hot environments can cause heatstroke and inadequate lighting can cause visual impairment in CSU staff. The toxic effects of disinfectants and gases used in the CSU have been more clearly observed when ventilation is inadequate[3]. Electric shock and fire can occur due to leakage or misuse of devices in the CSU environment. Slips, bumps, sprains and injuries can occur due to slippery floors in the working environment. Burns may occur in case of contact with high-temperature materials without protective equipment[4]. Ergonomic risks that play a role in the formation of musculoskeletal system diseases in health institutions can be counted as repetitive movements, force application (such as pushing, pulling), sitting in the wrong posture, working in the wrong posture, lifting heavy loads, standing for a long time and making the materials in the working environment suitable for the employee[5,6].

Many psychosocial risks may arise in CSU workers. These include monotonous work, high workload, doing a lot of work in a short time, working in a closed environment, incompatible or untrained work team, overtime and shift system, inadequate wages, exposure to psychological, verbal and physical violence (mobbing)[4].

Individual factors in the occurrence of work-related musculoskeletal disorders include gender, age, overweight, smoking, and lack of exercise (physical exercise)[7,8]. Disinfectants, antiseptics, and gases such as Ethylene oxide, Formaldehyde, Glutaraldehyde are among the chemical risks faced by healthcare workers in the CSU[3]. Considering biological factors, healthcare workers in CSUs may be exposed to undesirable situations such as splashing of contaminated particles into the eyes and mucous membranes, injury with cutting and sharp medical instruments, especially when handling medical supplies contaminated with infected blood and body fluids in contaminated areas, and as a result, they may be infected with important agents such as Hepatitis B, Hepatitis C and Human Immunodeficiency Virus (HIV)[4]. This study was conducted to identify ergonomic risk factors and musculoskeletal problems in healthcare workers in CSU. At the same time, it was observed that general ergonomics scales were used in ergonomics studies conducted with healthcare workers. For this reason, it was determined that it was necessary to develop a measurement tool for a field-specific and ergonomically risky area such as CSU and the ERFMDS scale was developed within the scope of the research.

MATERIAL AND METHOD

This cross-sectional and descriptive study was conducted to determine the ergonomic risk factors and musculoskeletal problems of healthcare professionals working in CSU. The study was planned in two stages; in the first stage, ERFMDS was developed to determine the ergonomic risk factors of healthcare professionals working in CSU, and in the second stage, the developed scale was applied on the sample. The population of the study consisted of 90 healthcare professionals working in the CSUs of seven hospitals belonging to a private healthcare group in Istanbul between February and September 2020. A total of 87 healthcare workers who could be reached between the data collection dates, who met the research criteria and accepted the research were included in the research sample. Socio-demographic characteristics form, Ergonomic Risk Factors and Musculoskeletal Disorders Scale (ERFMDS) and Cornell Musculoskeletal Disorders Questionnaire (T-CMDQ) were used to collect data. Data collection tools were administered to the participants by face-to-face interview method and the completion time of the forms was approximately 15-20 minutes.

Sociodemographic characteristics form: It is a form consisting of 16 multiple-choice and one open-ended question that includes information about individual characteristics, work and occupational characteristics.

Ergonomic Risk Factors and Musculoskeletal Disorders Scale (ERFMDS): The scale developed by the researchers consists of three sub-dimensions and 30 questions. The scale is a five-point Likert-type scale and the highest score given to the statements is 5 and the lowest score is 1. The highest score that can be obtained from the scale is 150 and the lowest score is 30. The sub-dimensions of the scale are: performance effectiveness, physical environment and use of appropriate equipment. A score of 9-45 points can be obtained from the physical environment sub-dimension, 13-65 points from the performance effectiveness sub-dimension and 8-40 points from the use of appropriate equipment sub-dimension. Following the factor analysis, reliability analysis of the scale was conducted, and a 30-item questionnaire was prepared with a Cronbach's alpha value of 0.906. In the analysis for the reliability of the ERFMDS sub-dimensions, the cronbach alpha reliability coefficient was found as physical environment α=0.893, performance efficiency α=0.888, use of appropriate equipment α=0.837 and the sum of the cronbach alpha reliability coefficients of the 30 statements was 0.906.

Cornell Musculoskeletal Disorder Scale (T-CMDQ): It is a data collection tool developed at the Human Factors and Ergonomics Laboratory at Cornell University to assess musculoskeletal symptoms[9]. The questionnaire assesses the incidence, severity and impact on work of musculoskeletal disorders in 20 different body regions. Scoring for pain frequency is never = 0; 1-2 times a week = 1.5; 3-4 times a week = 3.5; 1 time a day = 5; several times a day = 10. Scoring for severity is low = 1, moderate = 2 and high = 3. The work-related score for discomfort is low = 1, moderate = 2 and high = 3. The total discomfort score for the relevant body part is calculated by multiplying the frequency, severity and work-relatedness (frequency x severity x work-relatedness) scores. The Cronbach's Alpha for the three sub-headings of the questionnaire, namely pain frequency, severity and disability, is 0.88, respectively: 0.89 and 0.88.

Research Questions

- What is the ERFMDS total and sub-dimension mean score of healthcare professionals working in the CSU?
- What is the mean T-CMDQ score of healthcare professionals working in the CSU?
- Is there a significant difference between the mean scores of ERFMDS and T-

CMDQ according to the socio-demographic characteristics of health professionals?

- Is ERFMDS developed by the researchers valid and reliable measurement tool?

Data Evaluation: SPSS (Statistical Package for Social Sciences) 25.0 package program was used for statistical analysis while evaluating the data obtained in the study. Factor analysis, descriptive statistics and correlation analysis were used in the evaluation of the data. In addition, Cronbach Alpha or KR-20 reliability coefficients of the scale and its sub-dimensions were calculated. Mann Whitney U test and Kruskal-Wallis H test were applied to determine whether there was a significant difference between the scale sub-dimensions and T-CMDQ scores and the socio-demographic data of the participants. In addition, in cases where a significant difference was detected in the Kruskal-Wallis H test, post-hoc test was used to determine the direction of the difference. Games-Howell test was used because the variances were not distributed homogeneously, and the sample numbers were not equal. The significance level was set as $p<0.05$ in all analyzes.

Ethical Principles of the Study: Ethical approval was obtained from the non-interventional clinical research ethics committee of a university and study permissions were obtained from the directorates of private health groups. Informed written consent was obtained from the managers of the departments where the study would be conducted and volunteer healthcare workers.

Limitations of the Study: Since CSU is one of the important organizational structures that provide 24/7 service in the hospital, it was deemed appropriate to conduct research on this sample. However, the small number of people working in this field is a limitation of the study. The research was conducted in hospitals affiliated with a private health group and the results of the research cannot be generalized to the entire CSU considering the current conditions.

RESULTS AND DISCUSSION

The data obtained from 87 health professionals who constituted the sample of the study are presented and discussed in this section. Considering the distribution of individual characteristics, 51.7% of the health professionals were male and 48.3% were female. It was determined that 34.5% of the healthcare workers were between the ages of 18-25, 59.8% were underweight-normal weight according to body mass indexes, 52.9% were undergraduate graduates, 74% were nurses and 57.5% of the healthcare workers changed shifts (Table 1).

The total ERFMDS score of health professionals was 119.39±18.98, physical environment sub-dimension score was 36.94±7.25, performance efficiency was 50.86±10.52, and use of appropriate equipment was 31.58±6.15.

When the averages of the sub-dimensions of the scale were examined, it was seen that the mean of the performance efficiency sub-dimension (50.86±10.52) had a higher mean than the physical environment and appropriate equipment use sub-dimensions (Table 2).

When the T-CMDQ mean scores of healthcare workers were analyzed, it was observed that the mean score for the foot region was the highest (6.87±9.43) and the mean score for the hand region was the lowest (1.82±4.38) (Table 3).

Table 1. Distribution of data on individual characteristics of health professionals (n=87)

Demographic variables	Number	%
Gender		
Male	45	51,7
Female	42	48,3
Age		
18 -25	30	34,5
26-35	27	31,0
36-44	23	26,4
45 and older	7	8
Body Mass Index (BMI)		
Underweight-normal weight (24.9 and below)	52	59,8
Overweight (25 and over)	35	40,2
Educational Status		
Health vocational high school	11	12,6
Associate degree	21	24,1
License	46	52,9
Graduate	9	10,3
Job		
Nurse	65	74,7
Health Technician	16	18,4
Health Support Personnel	6	6,9
Working shift		
Continuous daytime	30	34,5
Continuously at night	7	8,0
Shift change	50	57,5

When examined according to the mean scores obtained from the T-CMDQ according to their individual characteristics, the hip region scores of the health professionals were found to be higher in the group aged 45 and over ($p<0.05$). It was found that the foot area scores of the participants in terms of gender were higher in women than in men ($p<0.05$). BMI and back area scores were found to be higher in underweight-normal weight groups than in overweight ones ($p<0.05$). When educational status T-CMDQ scores were compared, it was found that foot area scores were higher in associate degree graduates compared to other education groups ($p<0.05$). Neck region scores were found to be higher in health support personnel compared to other occupational groups ($p<0.05$) (Table 4.).

Table 2. Results related to ERFMDS total and sub-dimension mean scores (n=87)

ERFMDS	Min.- Max.	Mean±Sd
ERFMDS Total score	55-145	119,39±1 8,98
Physical Environment	15-45	36,94±7,25
Performance effectiveness	15-65	50,86±10,52
Use of Appropriate Equipment	15-40	31,58±6,15

Sd: Standard deviation

Table 3. Results regarding T-CMDQ general averages Cornell musculoskeletal regions (n=87)

Cornell Musculoskeletal Regions	Min.- Max.	Mean± Sd
T-CMDQ average score	0-452	77,62±89,33
Neck	0-15	4,74±3,71
Shoulder	0-32	6,37±7,56
Back	0-16	5,25±4,77
Waist	0-16	6,10±4,65
Hand	0-25	1,82±4,38
Hip	0-14	2,94±4,11
Knee	0-22	4,78±6,03
Foot	0-32	6,87±9,43

Sd: Standard deviation

When the ERFMDS total score and sub-dimension scores according to the individual characteristics of health professionals, it was found that the 18-25 age group was higher in the physical environment sub-dimension ($p<0.05$). The performance efficiency scores of the participants' job and ERFMDS sub-dimensions were found to be higher in nurses than in other groups ($p<0.05$). A significant difference was found between the working shifts of health professionals and the physical environment scores of the ERFMDS sub-dimensions ($p<0.05$). Physical environmental scores were found to be higher in the group who constantly worked at night ($p<0.05$) (Table 5). In the study, it was determined that the highest pain in health professionals was in the foot, shoulders, waist and back, respectively. In the literature, it has been determined that there are many musculoskeletal disorders encountered by healthcare professionals[10-17] and researches support this research.

Age has a great impact on physical job success in working individuals. Physical work ability is at its highest level between the ages of 25-30, and while it starts to decrease after these ages, decision-making and experience increase, and the adaptation of the individual to the physical environment becomes difficult with the changes that occur in the musculoskeletal system with age[18]. The fact that the physical environment score is higher in health professionals between the ages of 18-25 compared to other age groups suggests that the health professionals in the 18-25 age group are compatible with the physical environment ($p<0.05$) (Table 5).

The fact that performance efficiency scores are higher in nurses than in other occupational groups suggests that they experience more musculoskeletal disorders than other occupational groups. Studies in the literature support this research [19,20]. In the study, when gender and T-CMDQ scores were compared, a significant relationship was found only between foot area scores and gender. Foot pain is more common in women than in men. When we look at the studies in the literature; it has been determined that the risk of pain in women is higher than in men[21,22] and these studies support this research.

In this study, only hip region scores were found to be higher in the group aged 45 years and above compared to other age groups. In the literature, it has been stated that a one-unit increase in age increases the risk of developing pain by 3.2%, and age is a significant factor on pain[20,21] and researches support this research. In a study in the literature, it was found that poor relationships with managers and colleagues, which are among psychological factors, increase the risk of developing new low back pain 1.85 and 2.41 times [22]. In this study, only the hip region scores of health professionals were found to be higher in the group with a little good communication with their colleagues and managers compared to the group with quite good communication and the study support this research.

Table 4. Comparison of T-CMDQ score averages according to individual characteristics (n=87)

	Individual Characterist.	**Numb er**	**Neck**	**Shoulder**	**Back**	**Waist**	**Hand**	**Hip**	**Knee**	**Foot**
			Mean±Sd	**Mean±Sd**	**Mean±Sd**	**Mean±Sd**	**Mean±Sd**	**Mean±Sd**	**Mean±Sd**	**Mean±Sd**
Age	18-25	30	6,90±13,05	18,38±39,72	16,25±30,32	17,18±27,55	0,73±1,98	2,98±7,35	6,32±17,23	15,47±37,98
	26-35	27	6,67±10,28	5,85±7,57	10,72±18,74	10,83±17,63	1,17±2,77	2,54±4,67	8,72±13,47	16,72±27,04
	36-44	23	7,46±11,30	8,70±15,90	15,37±26,00	19,74±22,84	3,11±7,90	7,24±10,84	8,43±15,87	13,35±25,13
	45>	7	11,5±16,37	2,71±3,95	11,86±6,44	16,64±16,55	2,71±4,86	23,57±17,16	2,14±2,85	14,86±17,43
	X^2/ p		1,246/0.742	1,181/0.758	2,311/0.510	2,844/0.416	1,366/0.714	16,644/**0.001***	5,064/0.167	2,050/0.562
Gender	Male	45	6,70±10,54	10,79±30,07	10,26±19,04	12,43±19,56	0,59±1,78	4,37±8,65	7,70±16,58	8,87±19,15
	Female	42	8,04±13,36	10,55±19,79	17,90±28,88	19,50±25,36	2,80±6,39	6,98±11,93	6,85±13,17	22,08±37,21
	Z/ p		-0,108/0.914	-0,889/0.374	-0,988/0.323	-1,286/0.198	-1,867/0.062	-1,440/0.150	-0,195/0.846	-1,976/**0.048***
BMİ	Weak-normal	52	6,59±11,64	14,75±31,3	19,21±29,67/	18,77±25,43	1,38±3,63	5,67±10,17	8,26±16,74	16,38±32,84
	Overweight	35	8,47±12,43	4,61±10,47	6,13±9,31	11,5±17,32	2,06±6,02	5,56±10,83	5,84±11,89	13,57±25,16
	Z/ p		-0,526/0.599	-1,740/0.082	-2,538/**0.011***	-1,223/0,221	-0,173/0.863	-0,468/0.640	-0,170/0.865	-0,603/0.546
Educational Status	High school	11	2,23±2,65	2,05±3,81	14,41±26,75	17,77±27,29	1,82±6,03	4,14±7,14	1,36±3,64	19,18±31,54
	Associate deg	21	5,88±9,20	13,74±25,53	21,88±34,41	18,40±27,33	1,86±4,74	3,79±7,69	5,60±9,12	29,71±45,74
	License	48	7,79±12,59	7,95±14,60	9,45±15,61	12,08±16,34	1,02±2,77	5,07±9,61	9,77±18,40	6,46±14,96
	Graduate	9	14,72±17,72	28,00±60,22	17,89±30,04	26,78±31,61	4,22±9,23	14,61±17,96	5,78±13,43	21,61±28,19
	X^2 / p		3,922/0.270	3,284/0.350	0,527/0.913	0,793/0.851	2,074/0.557	2,661/0.447	5,867/0.118	8,640/**0.034***
Job	Nurse	65	11,93±4,25	24,91±8,52	19,60±4,97	21,04±4,72	3,49±6,15	9,80±4,80	16,47±5,70	20,48±10,52
	Health tech.	16	5,07±2,60	29,36±5,04	34,54±3,30	30,81±3,86	5,27±2,65	6,16±2,68	9,97±4,11	49,32±11,29
	Health sup.	6	17,75±3,54	23,44±7,27	35,64±4,89	15,24±4,78	11,43±2,86	20,02±3,85	2,51±6,37	40,21±8,49
	X^2/ p		4,982/**0.026***	0,293/0.588	0,246/0.620	0,042/0.838	0,031/0.861	0,498/0.480	0,057/0.811	3,145/0.076
Working shift	Continuous daytime	30	11,99±4,25	23,85±8,52	23,56±4,97	20,44±4,72	7,35±6,15	3,49±4,80	14,04±5,70	29,46±10,52
	Continuously at night	7	5,48±2,60	5,53±5,04	10,19±3,30	6,80±3,86	1,13±2,65	2,93±2,68	5,44±4,11	30,70±11,29
	Shift change	50	12,66±3,54	28,07±7,27	26,59±4,89	25,43±4,78	1,80±2,86	8,71±3,85	16,48±6,37	30,30±8,49
	X^2/ p		1,758/0.415	0,919/0.632	1,092/0.579	0,544/0.762	4,877/0.087	0,694/0.707	3,514/0.173	1,542/0,463

Z; Mann Whitney U test, X^2; Kruskall Wallis test, *p<0,05

Table 5. Comparison of ERFMDS total and sub-dimension mean scores according to individual characteristics (n=87)

	Individual Characteristics	Number	Physical Environment Mean.±Sd	Performance Efficiency Mean±Sd	Use of appropriate equipment Mean±Sd	TOTAL Mean±Sd
Age	18-25	30	38,83±7,10	50,93±9,20	32,23±5,62	122±16,67
	26-35	27	34,11±8,13	50,70±9,85	30,59±6,86	115,41±20,39
	36-44	23	37,52±6,47	50,96±12,84	31,52±6,23	120±19,77
	45age and older	7	37,86±3,85	50,86±12,36	32,86±5,90	121,57±21,62
	X^2/p		8,191/**0.042***	0,579/0.901	0,897/0.826	2,444/0.485
Job	Nurse	65	37,2±6,87	53,17±7,94	31,95±5,96	122,32±17,24
	Health Technician	16	36,69±7,88	43,81±13,31	30,5±6,71	111±18,69
	Health Support Personnel	6	34,83±10,46	44,67±17,05	30,5±7,29	110±29,85
	X^2/p		0,017/0.896	7,079/**0.008***	0,492/0.483	6,000/0.051
Working shift	Continuous daytime	30	38,50±7,79	49,27±13,58	31,47±6,20	119,23±21,57
	Continuously at night	7	39,14±4,22	49,43±11,33	32,29±4,39	120,86±7,29
	Shift change	50	35,70±7,11	52,02±8,14	31,56±6,42	119,28±18,69
	X^2/p		7,320/**0.026***	0,374/0.829	0,053/0.974	0,473/0,790
Gender	Male	45	36,22±7,62	49,38±11,06	31,44±6,38	117,04±19,40
	Female	42	37,71±6,86	52,45±9,8	31,74±5,97	121,90±18,38
	Z/ p		-0,976/0.329	-1,493/0.136	-0,128/0.898	-1.305/0.192
BMI	Weak-normal	52	37,29±7,1	51,38±9,77	31,58±5,88	120,25±18,85
	Overweight	35	36,43±7,56	50,09±11,66	31,6±6,62	118,11±19,32
	Z/ p		-0,517/0.605	-0,403/0.687	-0,486/0.627	-0.572/0.568
Educational Status	High school	11	36±8,6	49,36±13,34	31±9,11	116,36±27,26
	Associate deg	21	35,62±8,62	47,33±13,35	31,05±6,57	114±21,21
	License	48	37,09±6,75	52,59±7,96	31,65±5,54	121,33±16,52
	Graduate	9	40,44±3,4	52,11±10,55	33,22±4,27	125,78±11,12
	X^2/p		2,750/0,432	1,532/0,675	0,952/0,813	2,489/0,477

Z; Mann Whitney U test, X^2; Kruskall Wallis test, *p<0,05

CONCLUSION AND RECOMMENDATIONS

According to the data obtained from this study, it can be said that among the problems related to the musculoskeletal system in health professionals working in CSU; foot, shoulder, waist and back pain are seen. It was observed that the total sub-dimension scores of ERFMDS of health professionals working in CSU were at high level, physical environment, use of appropriate equipment sub-dimension scores were at low level, and performance effectiveness sub-dimension scores were at medium level. It was observed that the mean T-CMDQ score of healthcare professionals working in CSU was low and there were significant differences between the mean ERFMDS and T-CMDQ scores of healthcare professionals according to some socio-demographic characteristics.

It can be recommended to create comfort areas by organizing physical environmental conditions in CSU, to determine ergonomic risk factors, to take necessary precautions and to give importance to ergonomic design to prevent musculoskeletal disorders in healthcare professionals.

REFERENCES

1. Karadayı, A, Aydın, K. and Üçüncü, Osman. (2009). "Examination of Hospital Risky Areas (Operating Room, Intensive Care Unit and Sterilization Unit) Planning/Design and Medical Waste Management in Terms of Infection". 6th National Sterilization Disinfection Congress, 1-5 April, DAS, Antalya.
2. DAS Association. Disinfection and Sterilization Guide. (2015). www.das.org.tr/kitaplar.
3. Arslanoğlu, A. ve Urk, M. (2015). "Employee Safety in the Central Sterilization Unit". Journal of Health Academics, 2(4): 194-203.
4. Disinfection, Antisepsis, Sterilization Association. Disinfection Antisepsis Sterilization Guide, (2019).
5. Özcan, E. ve Kesiktaş, N. (2007). "Occupational Musculoskeletal Diseases Prevention and Ergonomics". Journal of Occupational Health and Safety, 34:6-9.
6. Taşçıoğlu, İ. (2007). "Risks Caused by Work and Working Environment in Lüleburgaz State Hospital and Lüleburgaz 82nd Year State Hospitals and Determination of Nurses' Perception Levels of These Risks". Trakya University, Institute of Health Sciences, Department of Public Health, Master's Thesis, Edirne.
7. Şirzai, H, Doğu, B, Erdem, P, Yılmaz, F. ve Kuran, B. (2015). "Work-Related Musculoskeletal Diseases in Hospital Employees: Upper Extremity Problems". Şişli Hamidiye Etfal Training and Research Hospital Medical Bulletin, 49(2): 135-141.
8. Özcan, E, Esmaeilzadeh, S, ve Başat, H. (2011). "Upper extremity work-related musculoskeletal diseases in computer users and the effectiveness of ergonomics intervention". Turkish Physician Medicine Rehab Journal.; 57:236-241.
9. Erdinç, O, Hot, K. ve Özkaya, M. (2011). "Turkish version of the cornell musculoskeletal discomfort questionnaire: Cross cultural adaptation and validation". Work, 39(3),251-60.
10. Tinubu, BMS, Mbada, C.E, Oyeyemi, A.L. ve Fabunni, A,A. (2010). "Work-Related Musculoskeletal Disorders among Nurses in Ibadan, South- west Nigeria: a cross- sectional survey". BMC Musculoskeleltal Disorders, 11(12):1-8.
11. Tezel, A. (2005). "Musculoskeletal complaints among a group of Turkish nurses". Int j Neurosci; 115: 871-880.
12. Hou, J.Y. ve Shiao, JSC. (2006). "Risk factors for musculoskeletal discomfort in nurses". J Nurs Res; 14 (3): 228-236.
13. Smith, D.R, Mihashi, M, Adachi, Y, Koga, H. ve Ishitake, T. (2006). "A detailed analysis of musculoskeletal disorder risk factors among Japanese nurses". J Safety Res; 37: 195-200.
14. Yip, V. Y. B. (2004). "New low back pain in nurses: work activities, work stress and sedentary lifestyle". JAN Informing Practice and Policy Worldwide Through Research and Scholarship, 430-440.
15. Deniz, F, Alçelik, A, Yeşildal, N, Mayda, A. S. ve Ayakta Şerifi, B. (2005). "Health survey and life habits of nurses who work at the medical faculty hospital at AIBU". TAF Preventive Medicine Bulletin, 4(2), 55-65.
16. Yörükoğlu, K, Sayıner, A. ve Akalın, E. (2005). " Occupational health hazards and safety guidelines in histopathology laboratory". Aegean Pathology Journal 2; 98-115.
17. İlçe, A. (2007). "Investigation of Ergonomic Factors in Intensive Care Units". Ege University, Institute of Health Sciences, PhD Thesis, İzmir.
18. Öztürk, H, Babacan, E, Anahar, E. Ö. (2012). "Occupational Safety of Health Personnel Working in the Hospital". Gümüşhane University Journal of Health Sciences /Gümüşhane University Journal of Health Sciences: 2012;1(4) pp:1.
19. Karahan, A, Kav, S, Abbasoglu, A. ve Dogan, N. (2009). "Low back pain: prevalence and associated risk factors among hospital staff". Journal of Advanced Nursing, 65(3), 516-524.
20. Cımbız, A, Uzgören, N, Aras, Ö, Öztürk, S, Elem, E. ve Aksoy, CC. (2007). "Determination of risk factors for pain in the musculoskeletal system by logistic regression analysis: a pilot study". Physiotherapy Rehabilitation 2007;18 (1): 20-27.
21. Duyum, A. (2018). "Determining the factors that cause work-related musculoskeletal disorders in healthcare workers by numerical methods". Mersin University, Institute of Science and Technology, Department of Occupational Health and Safety.
22. Yip, Y.B. (2002). "The association between psychosocial work factors and future low back pain among nurses in Hong Kong: a prospective study". Psychology, Health & Medicine, 7(2),223-233.