Orginal Articles
Eurasian Journal of Critical Care

Evaluation of low back pain prevalence in emergency department workers

Dilek Atik[1] , Başar Cander[2], Cesareddin Dikmetas[2], Bensu Bulut[2], Emre Gokcen[1], İbrahim Caltekin[1], Levent Albayrak[1], Hasan Burak Kaya[1]
[1]Department of Emergency, Yozgat Bozok University, Yozgat, Turkey
[2]Department of Emergency, University of Health Sciences, Kanuni Sultan Süleyman Training and Research Hospital, Istanbul, Turkey

Abstract

Introduction: Low back pain is a global health problem that causes impediments in people's lives. The aim of this study was to evaluate the prevalence of low back pain of emergency department workers and to evaluate the risk factors with Oswestry Low Back Pain scale as the lumbar region of emergency department workers are vocationally subjected to straining movements due to heavy lifting and sudden movements.

Method: The population of the study consists of the employees working in the emergency department within the specified date range. Although there were a total of 150 people in the double center, a total of 126 people agreed to participate because some of them were on leave and some did not want to participate in the study. The sample consisted of 27 doctors, 76 nurses, 12 medical secretaries, 11 cleaning personnel and security personnel. The Oswestry Low Back Pain scale was developed to assess functional impairment. Mann Whitney-U test and Kruskal Wallis –H test were used in statistical evaluations depending on the status of being a numerical independent group, since the correlated variables were categorical (nominal or ordinal) and binary or with more variables.

Results: 46.8% (n = 59) of the participants were female and 53.2% (n = 67) were male. When the participants were evaluated according to age groups, 3.2% (n = 4) were between 18-21 years, 49.2% (n = 62) between 22-27 years, 24.6% (n = 31) between 28-33 years, 17.5% (n = 22)) 34-39 years old, 5.6% (n = 7) were over 40 years old. According to the sample size of our study, the annual prevalence of low back pain was 55.6% and the prevalence of lumbar hernia was 15.8% in the emergency service personnel. When the groups were evaluated in terms of the diagnosis of lumbar hernia, the OSA of those diagnosed with hernia was 17.52 ± 6.93 and those without lumbar hernia diagnosis was 8.4 ± 6.8. A statistically significant difference was found between the groups. A statistically significant difference was found in the ostwestry scale score between genders. This difference among the occupational groups was also found to be different statistically.

Conclusion: The prevalence of low back pain in the society among the occupational groups, especially in the health sector, is high. In dynamic work environments such as the emergency department, solutions should be developed to reduce the determined risk factors in order to prevent low back pain symptoms after sudden and straining movement.

Keywords: low back pain, emergency department, Ostwestry low back pain scale

Introduction

Low back pain is a global health problem that causes impediments in people's lives[1]. Low back pain symptoms arise after wrong movement, heavy lifting, or sudden movement[2]. The majority of adult people have experienced low back pain which is an musculoskeletal dysfunction at least once in their lifetime[3]. Öksüz, in their study, have reported that the incidence of low back pain was 44.1% in the Turkish population[4]. Low back pain in general ranks 5th among the reasons of admission to a health institution in all societies[5]. In the studies, age and gender as well as occupations that require working on foot for a long time have been reported Among the risk factors for low back pain[6]. Dönmez et al. stated occupations requiring sitting for a long time, suffering trauma and lifting heavy loads as risk factors for lumbar disc hernia[7]. Lifestyle risk factors such as smoking, excessive weight gain, low physical activity increase low back pain and lumbar disc herniation[8, 9, 10,11].

Occupations with frequent incidence of low back pain were reported as long-distance drivers, heavy workers, dentists, physiotherapists, nurses, policemen and firefighters[12,13,14]. In developed countries low back pain poses an important occupational health problem due to its long duration of treatment and high costs, in addition to the loss of labor force[15,16].

The aim of this study was to evaluate the prevalence of low back pain of emergency department workers and to evaluate the risk factors with Oswestry Low Back Pain scale as the lumbar region of emergency department workers are vocationally subjected to straining movements due to heavy lifting and sudden movements.

Corresponding Author: Dilek Atik **e-mail:** dr.dilekgok82@hotmail.com
Received: 05.12.2019 • **Accepted:** 11.04.2020

METHOD

Study Design:

This descriptive study is bi-centered and was conducted between 01.10.2019 and 15.11.2019, in the emergency medicine department of Yozgat Bozok University and Emergency Medicine Clinic Health Sciences University Sultan Süleyman TRH. Since the entire population of the study was tried to be reached, no further sample selection was made. The population of the study consists of the employees working in the emergency department within the specified date range. Although there were a total of 150 people in the double center, a total of 126 people agreed to participate because some of them were on leave and some did not want to participate in the study. The sample consisted of 27 doctors, 76 nurses, 12 medical secretaries, 11 cleaning personnel and security personnel. Ethics Committee Approval was obtained for the study. A questionnaire on sociodemographic characteristics of healthcare workers and Oswestry Low Back Pain Scale to evaluate the functional disability status were used as data collection tools. In the evaluation of annual prevalence, low back pain part of the Standardized Nordic Musculoskeletal Questionnaire (NMQ) was used. Body mass indexes (BMI) of the participants were calculated by measuring their body weights and height. According to the World Health Organization (WHO) classification, body mass index (kg/m^2) of less than 25.0 is evaluated as normal, 25.0 -29.9 as overweight and ≥30.0 as obese. In the first part of the questionnaire consisting of general questions, demographic characteristics, habits, occupation, duration of professional work, presence of shift work were questioned. Ostwestry low back pain scale was used in the 2nd part of the questionnaire. The mean and standard deviations of the Oswestry Low Back Pain scale were calculated in all groups and statistical analysis was performed. The Ostwestry low back pain scale average was used as the Ostwestry scale average (OSA) in the study.

Population grouping:

Amon the sociodemographical characteristics, gender was grouped into two groups as male and female; age was grouped as Group 1 being 18-21 years old, Group 2 22-27 years old, Group 3 28-34 years old, Group 4 35-39 years old, Group 5 above 40 years old. Marital status was grouped into two as married and single. Number of children was grouped as Group 1 having 0 children, Group 2 having 1 child, Group 3 having of 2 children, and Group 4 having 3 or more children. Occupational groups were divided into four groups as doctor, nurse, medical secretary, and security and cleaning personnel. The weekly working time was divided into 4 groups as 40 hours, 45 hours, 50 hours and 55 hours. The number of years worked was divided into four groups as 0-4 years, 5-9 years, 10-14 years, 15 and over years. Daily working hours was divided into four groups as 8 hours, 12 hours, 16 hours and 24 hours. BMI (body max index) was divided into three groups as normal weight, overweight and obese. Economical status was divided into 3 groups as Group 1 having income higher than expenses, Group 2 having equal income and expense, and Group 3 having income lower than expenses.

Used Scale:

The Oswestry Low Back Pain scale was developed to assess functional impairment[17]. Turkish validity and reliability study was performed by Yakut et al.[18]. In this scale, daily life activities are measured in 10 different aspects (pain severity, personal care, lifting, walking, sitting, standing, sleeping, degree of pain variance, social life, travel). There are 6 options for each section with a score of 0 - 5. 0 - 4 points are considered as no disability, 5 - 14 points as mild, 15 - 24 points as moderate, 25 - 34 points as serious, 35-50 points as complete (severe) functional disability. The minimum score obtained from the scale is 0 and the maximum score is 50[19].

Statistical analysis:

A statistical software package (SPSS 21.0, Chicago,IL) was used to perform all analyses. For Statistical Analyses, compliance with the parametric test criteria was evaluated by performing conformity to normal distribution test and Kolmogorov Smirnov test. The data obtained from the study conducted within the scope of clinical research were statistically nonparametric. Mann Whitney-U test and Kruskal Wallis –H test were used in statistical evaluations depending on the status of being a numerical independent group, since the correlated variables were categorical (nominal or ordinal) and binary or with more variables. Categorical data are reported as mean ± standard deviation and number (percentages), respectively. Statistical significance was set at $p < 0.05$.

RESULTS

A total of 126 health care workers were included in the study. 46.8% (n = 59) of the participants were female and 53.2% (n = 67) were male. When the participants were evaluated according to age groups, 3.2% (n = 4) were between 18-21 years, 49.2% (n = 62) between 22-27 years, 24.6% (n = 31) between 28-33 years, 17.5% (n = 22)) 34-39 years old, 5.6% (n = 7) were over 40 years old. The mean age of the participants was 31.19 ± 7.54. Of the participants, 21.4% (n = 27) were doctors, 60.3% (n = 76) nurses, 9.5% (n = 12) medical secretaries, 8.8% (n = 11) security and cleaning personnel. When the body weights of the participants were evaluated, 73.8% (n = 93) were normal weight, 19% (n = 24) were overweight, and 7.1% (n = 9) were obese. As for the marital status, 44.4% (n = 56) of the participants were married and 55.6% (n = 70) were single. 66.7% (n = 84)

of the participants did not have children, 19% (n = 24) had 1 child, 11.1% (n = 14) had 2 children, and 3.2% (n = 4) had 3 children. As for economical status, 35.7% (n = 45) had higher expense than income, 51.6% (n = 65) had equal expense and income, and 12.7% (n = 16) had higher income than expense. Weekly working hours were over 55 hours in 21.4% (n = 27) of the participants, 50 hours in 35.7% (n = 45), 45 hours in 27.8% (n = 35), and 40 hours in 15.1% (n = 19). 83.3% (n = 105) of the participants had no diagnosis of lumbar hernia and 16.7% (n = 21) had a diagnosis of lumbar hernia (Table 1).

According to the sample size of our study, the annual prevalence of low back pain was 55.6% and the prevalence of lumbar hernia was 15.8% in the emergency service personnel. When the groups were evaluated in terms of the diagnosis of lumbar hernia, the OSA of those diagnosed with hernia was 17.52 ± 6.93 and those without lumbar hernia diagnosis was 8.4 ± 6.8. A statistically significant difference was found between the groups (z: -4.411, p = 0.000).

According to the Oswestry low back pain scale, 32.5% (0 - 4 points) of the ED personnnel had no disability; 33.3% had mild (5-14 points), 31.7% had moderate (15-24 points), and 2.4% had severe low back pain complaints (25-34 points). Nobody was detected to have Full/Severe (35-50 points) scale score (Table 1).

The Ostwestry scale average was 9.9 ± 7.66. The ostwestry scale average of the female gender was 11.49 ± 6.98. The ostwetry scale average of the male gender was 8.53 ± 8.01(Table 3). A statistically significant difference was found in the ostwestry scale score between genders (z: -2.477, p = 0.013)(Table 2).

The ostwestry scale averages according to age groups were 11.25 ± 5.9 for ages of 18-21 years, 9.75 ± 7.64 for 22-27 years, 9.6 ± 6.7 for 28-33 years, 10.09 ± 8.58 for 34-39

Table 1. Demographic Characteristics for Low pain

Demographic Characteristics - Independent Variables (IVs)	Name of Characteristics	Label	Number	Percent (%)	Mean	Sdt. Dev.	Scale
Gender	Female (0)	FEML	59	46.8			
	Male (1)	MALE	67	53.2			
	TOTAL		***126***	***100***			***0-1***
Age	***TOTAL***	***AGE***	***126***		***31.19***	***7.54***	***20-50***
Age Group	Between 18-21 years		***4***	***3.2***			
	Between 22-27 years		***62***	***49.2***			
	Between 28-33 years		***31***	***24.6***			
	Between34-39 years		***22***	***17.5***			
	Over 40 years		***7***	***5.6***			
Marital Status	Single (1)	SG	70	55.6			
	Married (2)	MRD	56	44.4			
Professional Group	Doctor.(1)	DCT	27	21.4			
	Nurse. (2)	NRS	76	60.3			
	Medical Secretery (3)	MS	12	9.5			
	Security And Cleaningpersonnel (4)	SC	11	8.8			
Body Weights	normal weight.(1)	NW	93	73.8			
	overweight(2)	OW	24	19			
	obese (3)	OBS	9	7.1			
	TOTAL		***126***				***1-3***
Economical Status	higher expense than income (1)	HE	45	35.7			
	equal expense and income (2)	EE	65	51.6			
	higher income than expense (3)	HI	16	12.7			
Weekly Working Hours	over 55 hours (1)	OV55	27	21.4			
	50 hours (2)	50H	45	35.7			
	45 hours (3)	45H	35	27.8			
	40 hours (4)	40H	19	15.1			
	TOTAL		***126***	***100***			1-4
Oswestry Low Back Pain Scale	No Disability(0-4)	ND	41	32.5			
	Mild(5-14)	MD	42	33.3			
	Moderate(15-24)	MR	40	31.7			
	Severe(25-34)	SVR	3	2.4			
	Full/Severe(35-50)	FSV	0	0			
	TOTAL		***126***	***100***			

years, 11.28 ± 11.04 for over 40 years (Table 3). There was no statistically significant difference between the ostwestry scale averages among age groups ($x^2$0.233, p = 0.994)(Table 2).

According to marital status, the ostwestry scale average was 10.1 ± 7.71 in the married group and 9.6 ± 7.6 in the single group (Table 3). There was no statistically significant difference between the groups in terms of marital status (z: -0.352, p = 0.725)(Table 2).

When OSAs were evaluated according to the number of children; OSA of those without children was 9.7 ± 7.9, OSA of one child group was 10.3 ± 6.9, OSA of two children group was 10.8 ± 7.8, OSA of three or more children group was 8.5 ± 7.2 (Table 3). There was no statistically significant difference between the groups ($x^2$1.430, p = 0.699)(Table 2).

When the Ostwestry scale averages of the participants were evaluated according to BMI (body max index); it was 9.2 ± 7.4 in the normal weight group was , 10.6 ± 8.2 in the overweight group and 16.1 ± 4.56 in the obese group (Table 3). BMI was found to be statistically significant between groups (x^2:6.249, p = 0.044)(Table 2).

According to occupational groups, OSA was 17 ± 8.9 in the medical secretaries, 11.3 ± 7.76 in the doctors, 8.47 ± 6.98 in the nurses, and 9.3 ± 6.3 in the cleaning and security personnel(Table 3). This difference among the occupational groups was also found to be different statistically (x^2:11.443, p = 0.010)(Table 2).

When ostwestry scale averages (OSA) of the groups was evaluated according to the years worked; it was 8.7 ± 7.36 in those worked 0-4 years, 10.05 ± 7.68 in 5-9 years, 12.25 ± 7.42 in 10-14 years, and 11.7 ± 9.67 in over 15 years (Table 3). When the OSA of the employees were evaluated according to the weekly working hours, the OSA was 9.3 ± 7.82 in the 40-hour employees, 12.1 ± 8.12 in the 45-hour employees, 9.3 ± 7.52 in the 50-hour employees, and 8.4 ± 6.9 in the employees over 55 hours per week (Table 3). No significant difference was found between the groups when the ostwestry scale was evaluated in terms of worked years and weekly working hours (x2: 3.551, p = 0.314; x2: 3.266, p = 0.352)(Table 2).OSAs of the groups according to daily working hours were calculated. OSA was 10.9 ± 8.05 in the employees working 8 hours daily, 7.7 ± 7.47 in the employees working 12 hours , 11.7 ± 5.2 in the employees working 16 hours, 8.6 ± 6.63 in the employees working 24 hours. There was no statistically significant difference between the groups (x^2: 5.573, p = 0.134).

When the groups were evaluated in terms of economical status, ostwestry scale average (OSA) was 11.2 ± 8.3 in the group with more expenses than income , 9.26 ± 7.13 in the equal income and expense group, and 8.8 ± 7.67 in the income higher than expenses group(Table 3). There was no statistically significant difference between the groups economically ($x^2$1.739, p = 0.419).

When OSA was evaluated according to smoking status; OSA was 9.01 ± 7.71 in the smoker group and 10.5 ± 7.62 in the non-smoker group (Table 3). There was no statistically significant difference between the groups (z: -1.329, p = 0.184)(Table 2).

DISCUSSION

Nowadays, we are faced with especially neck and low back pain arising from posture disorders and working conditions. Low back pain is one of the most expensive diseases both in terms of labor loss and treatment cost, and its treatment often requires a multidisciplinary approach[15]. Seen in many lines of work, low back pain symptoms in the hospital personnel arise from physical factors such as heavy lifting, bending forward and staying in a stationary position during work[20].

In our study, one-year low back pain prevalence was found to be 55.6%, and similar results were obtained on the prevalence of low-back pain in hospital staff stated in the literature[20,21,22]. It was determined that 15.8% of the emergency department employees were diagnosed with hernia. The incidence of hernia reported in previous studies on her-

Table 2. Statistical Analysis Results With Ostwesty Scala Average (OSA)

	x^2 or z	p
Gender	-2.477**	0.013
Age Group	0.233*	0.994
Marital Status	-0.352**	0.725
Number of children	1.430*	0.699
BMI	6.249*	0.044
Professional Group	11.443*	0.010
Year Of Work	3.551*	0.314
Weekly Working Hours	3.266*	0.352
Economical Status	1.739*	0.419
Smoking Status	-1.329**	0.184

**Mann Whitney U Test result with z and *Kruskal Wallis –H test result x^2. Statistical significance was set at p <0.05.

Table 3. Ostwesty Scala Mean (OSA) scores in groups

		Ostwesty Scala Mean (OSA)± standard deviation
Gender	Female	11.49 ± 6.98
	Male	8.53 ± 8.01
Age Group	Between 18-21 years	11.25 ± 5.9
	Between 22-27 years	9.75 ± 7.64
	Between 28-33 years	9.6 ± 6.7
	Between34-39 years	10.09 ± 8.58
	Over 40 years	11.28 ± 11.04
Marital Status	Single	9.6 ± 7.6
	Married	10.1 ± 7.71
Professional Group	Doctor	11.3 ± 7.76
	Nurse	8.47 ± 6.98
	Medical Secretery	17 ± 8.9
	Security And Cleaningpersonnel	9.3 ± 6.3
Body Weights	normal weight	9.2 ± 7.4
	overweight	10.6 ± 8.2
	obese	16.1 ± 4.56
Economical Status	higher expense than income	11.2 ± 8.3
	equal expense and income	9.26 ± 7.13
	higher income than expense	8.8 ± 7.67
Weekly Working Hours	over 55 hours	8.4 ± 6.9
	50 hours	9.3 ± 7.52
	45 hours	12.1 ± 8.12
	40 hours	9.3 ± 7.82
Year Of Work	0-4 years	8.7 ± 7.36
	5-9 years	10.05 ± 7.68
	10-14 years	12.25 ± 7.42
	over 15 years	11.7 ± 9.67
Number Of Children	without children	9.7 ± 7.9
	one child group	10.3 ± 6.9
	two children group	10.8 ± 7.8
	three or more children group	8.5 ± 7.2
Smoking Status	smoker group	9.01 ± 7.71
	non-smoker group	10.5 ± 7.62

nia and health care workers was similar to our study[13,23]. In some studies, annual prevalence of low back pain of individuals was reported as 25-40%[24-26]. These results suggest that, the possibility of incidence of herniated disc is higher in health workers than the general population due to heavy working conditions.

When the age groups of the emergency department personnel were compared in terms of Ostwestry scale averages (OSA), it was determined that the Ostwestry scale average was highest in the group above 40 years old, but no significant difference was found between the other age groups. The mean scores of the group over the age of 40 and the group between the ages of 18-21 show similarity. In the literature, the low back pain study conducted by Karadağ and Yıldırım on nurses, showed similar results with our study in nurses with younger age groups, and it was stated that this might result from the insufficient experience and education levels of nurses causing them to be affected more quickly by negative occupational factors[13].

In our study, it was found that, among the sex groups, the ostwestry scale average of women was higher than that of men. Some studies show parallels with our study[20-27]. However, in another study conducted in Saudi Arabia in the literature, it is reported that there is no difference in low back pain between female sex and male sex and that gender is not a risk factor in low back pain symptoms[28]. This leads us to think that there is a regional variation in the risk factors for low back pain, and that the female population in our country has more pain complaints compared to the male gender due to the lack of assistance in the home environment as well as taking on the burden of housework during rest periods.

In our study, marital status of the participants did not cause a statistically significant difference in the Ostwetry scale averages (OSA); but OSA was lower in the married group. There was also no statistically significant difference between the number of children of emergency department

workers; and OSA was lower in those with 3 or more children. Parallel results have been reached in some studies in the literature[23,29]. This suggests that when the number of children increases spouses or domestic assistants are influential in child care, and therefore their presence decreases ostwestry scale average.

When emergency department personnel were divided into groups according to BMI, obese employees had the highest Ostwestry scale average. Similar results have been found with the studies in the literature[20,30]. There was a significant difference in OSA scores between the groups. We think that BMI is an important factor that increases the symptoms of low back pain, given the increasing burden on the lumbar vertebrae with the increase in BMI.

In our study, there was a significant difference between the groups when OSA among the occupations was evaluated and the Ostwestry scale average was found to be the highest in medical secretaries. Simsek et al and Tezel et al. in their study on health care workers found similar results to our study[27,30].We think that working in the same position and sitting for a long time and therefore staying inactive increase the back pain symptom.

In our study, when the economic situation was evaluated in terms of the effect of low back pain; while OSA was higher in the group with expenses lower than income, there was no significant difference between the groups. In contrast to our study, it was reported in a previous study that those with low-income had higher back pain[31]. Regarding the OSA value being higher in low income group in our study, we think that economic situation affects low back pain as this group work at domestic works outside the working environment in daily work.

In the literature, it has been reported that the incidence of low back pain increases with increasing number of working weeks in a year and years worked[13,29]. In our study, unlike the literature, the averages of the Ostwestry scale results were not different between the groups. In a study conducted according to daily working hours, it was reported that there was a risk factor for low back pain[32], and in another study it was reported that it did not affect low back pain[33]. In our study, it was not found to be a risk factor in daily working hours like weekly working hours. We think that the disparity between the studies in terms of daily working hours being a risk factor result from the differences in countries and that the working conditions vary throughout the working life in each country.

It is stated that the use of nicotine disrupts nutrition of the spine discs and makes the disc more susceptible to external factors and increases the risk of low back pain by causing contractions in the vessels and thereby decreasing blood flow in the vertebrae and muscles[34]. Altınel and Dilbaz reported that smoking increases low back pain[33,34]. According to the results of our study, unlike these studies, there was no increase in low back pain symptoms in smokers compared to non-smokers. Verkek et al. reported that smoking does not affect low back pain[35].

Our study was limited in terms of the low number of participants in the groups of patient caregivers, referral staff and security personnel; therefore, there was a limitation of evaluation in these groups of emergency department workers.

CONCLUSION

The prevalence of low back pain in the society among the occupational groups, especially in the health sector, is high. In dynamic work environments such as the emergency department, solutions should be developed to reduce the determined risk factors in order to prevent low back pain symptoms after sudden and straining movement. Especially in terms of occupational health, medical secretaries have a high risk of low back pain because they remain stationary in the same position. We think that by raising awareness of the health personnel on the issue through training, the loss of labor and, accordingly, treatment costs can be reduced.

REFERENCES

1. GBD 2016 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet .2017;390:1211–59.
2. Musculoskeletal disorders and the workplace: low back and upper extremities. Institute of Medicine. Washington (DC): National Academy Pres, 2001.
3. Sarıkaya S. Kömür madeni çalışanlarında bel ağrısı. Türkiye 13. Kömür Kongresi Bildiriler Kitabi, 29-31 Mayıs 2002, Zonguldak, Türkiye
4. Öksüz, E. Prevalence, risk factors, and preference-based health states of low back pain in a turkish population**.** *Spine*.2006 ;31: 968–972.
5. Kuru Ö. Bel ağrılarının nedenleri ve sınıflandırma. Clin Med 2007;1:3–10.
6. Govindu NK, Babski-Reeves K: Effects of personal, psychosocial and occupational factors on low back pain severity in workers. Int J Ind Ergon, 2014;44:335–41.
7. Dönmez, Y. C., Dolgun, E., Kabataş, M., & Özbayır, T. Lomber disk hernili hastalarda risk faktörlerinin incelenmesi. *Fırat Üniversitesi Sağlık Bilimleri Tıp Dergisi*.2010; 24(2): 89-92.
8. Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between obesity and low back pain: a metaanalysis. Am J Epidemiol 2010;171:135–54.
9. Shiri R, Falah-Hassani K. The effect of smoking on the risk of sciatica: a meta-analysis. Am J Med 2016;129:64–73.
10. Shiri R, Euro U, Heliovaara M, Hirvensalo M, Husgafvel-Pursiainen K, Karppinen J, et al. Lifestyle risk factors increase the

risk of hospitalization for sciatica: findings of four prospective cohort studies. Am J Med 2017;130:1408–14.

11. Shiri R, Lallukka T, Karppinen J, Viikari-Juntura E. Obesity as a risk factor for sciatica: a meta-analysis. Am J Epidemiol 2014;179:929– 37.

12. Smedley J, Inskip H, Buckle P, Cooper C, Coggon D. Epidemiological differences between back pain of sudden and gradual onset. J Rheumatol 2005;32(3):528–32.

13. Karadağ M, Yıldırım N. Hemşirelerde çalışma koşullarından kaynaklanan bel ağrıları ve risk faktörleri. Hemşirelik Forumu, 2004; 7(2):48-54.

14. Yılmaz E, Özkan S. Bir ilçede çalışan hemşirelerin sağlık sorunları ve yaşam alışkanlıklarının değerlendirilmesi. Fırat Sağlık Hizmetleri Dergisi, 2006;1(3): 81-98.

15. Karkucak M, Tuncer İ, Güler M, ve ark. Kronik bel ağrılı hastalarda demoğrafik özellikler ve bel okulunun etkinliği. Türk Romotoloji Dergisi 2006; 21: 87-90.

16. Koyuncu H, Bozak N,Ulusoy H ve ark. Mekanik Bel Ağrısı Şiddeti İle Kas Kuvveti İlişkisinin Değerlendirilmesi. Dirim Tıp Dergisi 2008; 83: 117-123.

17. Fritz JM, Irrgang JJ. A comparison of a modified Oswestry low back pain disability questionnaire and the quebec back pain disability scale. Physical Therapy 2001; 81: 776-788.

18. Yakut E, Duger T, Öksüz C, ve ark. Validation of the Turkish version of the oswestry disability index for patients with low back pain. Spine 2004; 29: 581-585.

19. Fairbank, J. C. T., Couper, J., & Davies, J. B. (1980). The Oswestry low Back Pain Questionnaire. *Physiotherapy*, 66: 271-273.

20. Karahan A, Kav S, Abbasoglu A, Dogan N. Low back pain: prevalence and associated risk factors among hospital staff. J Adv Nurs 2009;65(3):516–24

21. Omokhodion FO, Umar US, Ogunnowo BE. Prevalence of low back pain among staff in a rural hospital in Nigeria. Occup Med (Lond) 2000;50(2):107–10.

22. Terzi R, Altın F. The prevalence of low back pain in hospital staff and its relationship with chronic fatigue syndrome and occupational factors. Pain 2015;27(3):149–154.

23. Kabatas MS, Kocuk M, Küçükler O Sağlık Çalışanlarında Bel Ağrısı Görülme Sıklığı ve Etkileyen Fktörlerin İncelenmesi. F.Ü.Sağ.Bil.Tıp Derg.2012; 26 (2): 65 – 72.

24. Shiri R, Solovieva S, Husgafvel-Pursiainen K, Taimela S, Saarikoski LA, Huupponen R, et al. The association between obesity and the prevalence of low back pain in young adults: the Cardiovascular Risk in Young Finns Study. Am J Epidemiol 2008;167:1110–9.

25. Andersen JH, Haahr JP, Frost P. Risk factors for more severe regional musculoskeletal symptoms: a two-year prospective study of a general working population. Arthritis Rheum 2007;56:1355–64.

26. Picavet HS, Schuit AJ. Physical inactivity: a risk factor for low back pain in the general population? J Epidemiol Community Health 2003;57:517–8.

27. Sımsek S, Yagcı N, Senol H. Prevalence of and risk factors for low back pain among healthcare workers in Denizli. Agri 2017;29(2):71–78**.**

28. Keriri HM. Prevalence and risk factors of low back pain among nurses in operating rooms, Taif, Saudi Arabia. American Journal of Research Communication 2013;1(11):45-70.

29. Yılmaz E. Özkan S. Hastanede Çalışan Hemşirelerde Bel Ağrısı Sıklığının Saptanması. Türk Fiz. Tıp Rehab. Derg. 2008; 54: 8-12.

30. Tezel A. Musculoskeletal complaints among a group of Turkish nurses. Int J Neurosci 2005;115(6):871–80.

31. Öngel K. Birinci basamakta bel ağrısı olan hastalara yaklaşım. Aile Hekimliği Dergisi 2007; 1: 4.

32. Bejia I, Younes M, Jamila HB, Khalfallah T, Ben Salem K, Touzi M, et al. Prevalence and factors associated to low back pain among hospital staff. Joint Bone Spine 2005;72(3):254–9.

33. Altınel L, Köse KÇ, Altınel EC. Profesyonel hastane çalışanlarında bel ağrısı prevelansı ve bel ağrısını etkileyen faktörler. Tıp Arastırmaları Dergisi 2007: 5 (3): 115 – 120.

34. Dilbaz N, Apaydın L. Bir eğitim ve araştırma hastanesinde çalışan hemşireler arasındaki sigara içme, bırakma sıklığı ve sigara içme davranışının özellikleri, Bağımlılık Derg 2002; 3:73-83.

35. Verkerk, K., Luijsterburg, P. A. J., Miedema, H. S., Poll-Goudzwaard, A., & Koes, B. W. Prognostic factors for recovery in chronic nonspecific low back pain: a systematic review. Physical Therapy.2012.92(9):1093-1108.