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THE RELATIONSHIP BETWEEN OCCUPATIONAL HEALTH AND SAFETY CULTURE AND LOW BACK PAIN, NECK PAIN AND WORK LIMITATIONS IN HEALTHCARE PROFESSIONALS

ORIGINAL ARTICLE

ABSTRACT

Purpose: This study was carried out to investigate the relationship between occupational health and safety culture, low back pain, neck pain and work limitations in healthcare professionals.

Methods: This descriptive cross-sectional study was conducted on 145 healthcare professionals working at Muş State Hospital between March 2022 and June 2022. The data was collected through Personal Information Form, Occupational Safety Culture Scale, Functional Low Back Pain Scale, Neck Bournemouth Questionnaire, and Work Limitations Questionnaire.

Results: While a statistically positive correlation was found between the occupational safety culture scores of health workers and functional activities due to the reduction low back pain, a statistically negative correlation was determined between the occupational safety culture scores and neck pain and work limitation ($p<0.05$).

Conclusion: While functional activities due to the reduction of low back pain increase with the increase in occupational safety culture of health workers, neck pain and work limitation decrease. Both employees and managers should be made more aware of the occupational health and safety culture in order to minimize musculoskeletal pain caused by inappropriate health behaviors among healthcare professionals and to determine the factors that contribute to job loss.

Keywords: Health Workers, Low Back Pain, Neck Pain, Safety Culture, Work Limitation

SAĞLIK ÇALIŞANLARINDA İŞ SAĞLIĞI VE GÜVENLİĞİ KÜLTÜRÜ İLE BEL AĞRISI, BOYUN AĞRISI VE İŞ LİMİTASYONU ARASINDAKİ İLİŞKİ

ARAŞTIRMA MAKALESİ

ÖZ

Amaç: Bu araştırma, sağlık çalışanlarında iş sağlığı ve güvenliği kültürünün bel ağrısı, boyun ağrısı ve iş limitasyonu arasındaki ilişkiyi araştırmak amacıyla gerçekleştirildi.

Yöntem: Tanımlayıcı-kesitsel türde planlanan araştırma Mart 2022–Haziran 2022 tarihleri arasında Muş Devlet Hastanesi'nde görev yapan 145 sağlık personeli üzerinde yapıldı. Araştırmanın verileri; Kişisel Bilgi Formu, İş Güvenliği Kültür Ölçeği, Fonksiyonel Bel Ağrısı Ölçeği, Bournemouth Boyun Ağrısı Anketi, İş Limitasyon Ölçeği ile toplandı.

Sonuçlar: Sağlık çalışanlarının iş güvenliği kültürü skorlarıyla bel ağrısının azalmasına bağlı fonksiyonel aktiviteleri arasında istatistiksel olarak pozitif yönde ilişki bulunurken, iş güvenliği kültürü skorlarıyla boyun ağrısı ve iş limitasyonu arasında istatistiksel olarak negatif yönde ilişki bulunmuştur ($p<0,05$).

Tartışma: Sağlık çalışanlarının iş güvenliği kültürü arttıkça bel ağrısının azalmasına bağlı fonksiyonel aktiviteleri artarken, boyun ağrısı ve iş limitasyonu azalmaktadır. Sağlık çalışanlarında uygun olmayan sağlık davranışları sonucunda meydana gelen kas iskelet ağrıların önlenmesinde ve iş kaybına neden olan faktörlerin belirlenmesinde hem çalışanların hem de yöneticilerin iş sağlığı ve güvenliği kültürü ile ilgili farkındalığın artırılması için uygun stratejilerin geliştirilmesi gerekmektedir.

Anahtar Kelimeler: Sağlık Çalışanları, Bel Ağrısı, Boyun Ağrısı, Güvenlik Kültürü, İş Limitasyonu

INTRODUCTION

Safety culture is defined as the product of individual and group values, attitudes, perceptions, competencies and behavioral patterns that determine the health and safety management of an organization (1). The term “safety culture” was originally introduced in the 1986 Chernobyl nuclear accident and subsequently gained prominence by being given a larger role in the published reports after several disasters (2). It is stated that weak safety culture is the primary cause of major accidents, disasters, near misses, and other safety-related issues in today’s workplaces (3).

The basic element of safe medical practice in healthcare is to have a strong safety culture (4). Developing a safety culture in healthcare workers is critical because it is associated with both patient safety (5,6) and positive perceptions of a safe cultural climate, and less injury and disease rates. People working in health sector are constantly exposed to a physical and psychological burden that can affect the safety culture, as they frequently encounter negative situations such as excessive workload, insufficient personnel, shift work, and inadequate rewarding (7). Thus, it is recommended to promote a sound safety environment for both patients and healthcare professionals in order to prevent injuries caused by occupational accidents in healthcare workers (8,9).

In comparison to other occupational groups, healthcare professionals are at a higher risk for musculoskeletal problems, and symptoms such as low back and neck pains are more prevalent among them (10,11). Mostly, transportation of medical tools and equipment, exposure to excessive load during patient transfer, getting the patient on and off the stretcher, working in a bent position and standing for a long time, and working under intense stress cause discomfort such as low back and neck pain (12,13). Due to these disorders, health workers experience problems such as not being able to go to work, mental problems, loss of cost in the health system, and decrease in work performance and quality of life (10, 14-15). It is emphasized that high back-neck disorders in healthcare workers are caused by inadequate institutional safety practices and safety culture in occupational practices (16).

It is crucial for both employee and patient health to be aware of the situations that result in a loss of productivity in the professional area of workers (17). The intense and shift work schedule, work stress, and exposure to musculoskeletal diseases set restrictions on the employment of healthcare professionals (18,19). Due to a lack of knowledge, it is difficult to identify the limitations that contribute to a decrease in employee performance, distraction, and making serious mistakes. Work limitations questionnaires are used to evaluate the loss of efficiency in employees (20).

No study has been found in the relevant literature examining the relationship between occupational safety culture, functional activities related to low back pain, neck pain and work limitations. So, the research questions below guided this study:

- i) Is there a relationship between occupational health and safety culture and functional activities related to low back pain and neck pain in healthcare workers?
- ii) Is there a relationship between occupational health and safety culture and work limitations in healthcare workers?

METHODS

This study was carried out on health professionals working in Muş State Hospital. Ethics committee approval was obtained on 18.02.2022 from Muş Alparslan University, Non-Interventional Clinical Research Ethics Committee with the decision numbered 41236 and numbered 14.

Participants

The study was carried out with 145 health personnel working in X State Hospital. The 3.1.9.4 version of the G*Power program (Heinrich-Heine-Universität Düsseldorf, Germany) was used to determine the sample size of the study. Based on similar articles (21) a total of 145 healthcare professionals were included, with the power ratio of the sample calculated as $\beta = 80\%$ and $\alpha=0.05$. The criteria for inclusion in the study were being a healthcare worker, volunteering to participate in the research, and not having a mental or physical disability that would prevent communication. Participants who

did not meet the inclusion criteria were excluded from the study.

Data Collection Tools

Healthcare professionals, whose written and verbal consents were obtained and who met the inclusion criteria, answered questions regarding their socio-demographic characteristics (age, gender, height, weight, occupation, marital status, education level, working year, weekly working hours, chronic illness status, occupational accident status). Occupational Safety Culture Scale, Bournemouth Neck Pain Questionnaire, Functional Low Back Pain Scale, and Work Limitations Scale were used to collect data.

Occupational Safety Culture Scale

The validity and reliability study of the survey was conducted by Dursun (2013) consists of 35 items and 7 sub-dimensions. Managers' commitment consists of 8 questions, safety priority 4 questions, safety communication 5 questions, safety training 4 questions, safety awareness 5 questions, employee participation 4 questions, and reporting culture 5 questions. Each question was scored between "I totally disagree and I totally agree". High scores obtained from the scale indicate a positive safety culture structure of each sub-dimension (2).

Functional Low Back Pain Scale

Turkish validity and reliability study of this scale was carried out by Koç and Bahar (2017). The scale aims to evaluate how much low back pain affects the functions of patients. Functions that are thought to be affected on the scale can be listed as work, school, home activities, habits, bending forward, wearing shoes or socks, lifting an object from the ground, sleeping, sitting, standing, walking, climbing stairs and driving. For patients who do not drive, the last question can be answered as traveling. Each item has a score between 0 and 5. Scoring is as follows: (0) not possible to do the activity, (1) extremely difficult, (2) quite difficult, (3) moderately difficult, (4) somewhat difficult, and (5) not difficult. The minimum score is "0" points, the maximum score is "60" points. A score of 60 indicates that any performance activity is not difficult (22).

Neck Bournemouth Questionnaire

The scale was developed by Bolton et al., and the Turkish validity and reliability study of the scale was performed by Özel Aslıyüce (2018). The questionnaire form consists of 7 questions in total. Each question scores between 0 and 10. The highest score is 70, and a higher score indicates a higher level of disability. The content of the questionnaire consists of variables that must be questioned for individuals with neck pain, such as pain severity, the effect of pain on activities of daily living and social life, anxiety-depression level, kinesiophobia and coping with pain (23).

Work Limitations Questionnaire (WLQ)

The Turkish validity and reliability study of this scale was carried out by Şahin (2019). It consists of 2 sub-dimensions and 8 questions. It is a test used to evaluate the impact of the physical and emotional health conditions of the employees on their work and also to detect the loss of work productivity of the employees. Questions 1 to 8 in the test are about time management task, physical task, mental-interpersonal task and productivity task. The 1st, 2nd, 5th, 6th, 7th and 8th questions are scored as 1: 'always difficult', 5: 'never difficult', arranged in a 5-point Likert form under the workload and concentration limitation sub-dimension. High scores obtained in this section indicate that more difficulties are encountered in the work performed. The 3rd and 4th questions in the test are scored as 1: 'always possible', 5: 'never possible', arranged in a 5-point Likert form under the physical limitation of the working environment sub-dimension. High scores obtained from this section indicate that the feasibility of the work has increased (24).

Employee productivity loss is also calculated from the formula given below from the work limitation scale (WLQ):

$$= (\beta_1 * \text{WLQ Time Scale} + \beta_2 * \text{WLQ Physical Scale} + \beta_3 * \text{WLQ Mental-Interpersonal Scale} + \beta_4 * \text{WLQ Output Scale}). (\beta_1 = 0.00048, \beta_2 = 0.00036, \beta_3 = 0.00096 \text{ ve } \beta_4 = 0.00106).$$

$$= (1 - \exp(-\text{WLQ Coefficient})) (24).$$

Statistical Analysis

Statistical analyzes were performed using "IBM®

SPSS© 24 software.” The conformity of numerical variables to the normal distribution was performed using visual (histogram and probability plots) and analytical methods (Kolmogorov-Smirnov). Descriptive statistics for numerical variables with normal distribution were given with mean and standard deviation, while descriptive statistics for categorical variables were given using numbers and percentages. The relations between the variables were calculated by Pearson correlation test for normally distributed data, and the correlation coefficients and statistical significance were calculated by Spearman test if at least one of the variables was not normally distributed or ordinal. The correlation coefficient was interpreted as low correlation. Statistical significance level was accepted as $p < 0.05$.

RESULTS

The data on the sociodemographic characteristics of the participant health workers are given in Table 1. This table shows that the average age of the health workers included in the study is 30.4 years,

their average height is 164.8 cm, their average weight is 67.1 kg, their average working year is 7.7 years, and their weekly working hours are 48.2. According to the table, 72.4% of the participants are women, 76.6% are nurses/midwives, 61.4% have a bachelor's degree, 55.9% are married, 17.9% have a chronic illness and 17.2% have an occupational accident (Table 1).

The relationship between the occupational safety culture of the health workers included in the study and functional low back pain and neck pain is given in Table 2. A positive and low-level statistical correlation was found between the scores of health workers regarding managers commitment ($r=0.168$; $p=0.044$), safety awareness and competence ($r=0.160$; $p=0.045$), and reporting culture ($r=0.176$; $p=0.034$) which are the sub-parameters of occupational safety culture, and their scores of functional low back pain ($p < 0.05$). A negative and low-level statistical relationship was found between the scores of health care workers regarding the sub-parameters of occupational safety culture,

Table 1. Data on Sociodemographic Characteristics of Participating Health Professional

		X	SD	Min	Max
Age		30.4	7.1	21	52
Height		164.8	14.5	156	192
Weight		67.1	12.9	44	115
Year of work		7.7	6.9	1	34
Weekly working hours		48.2	15.4	2	100
			n		%
Gender	Female		105		72.4
	Male		40		27.6
Occupation	Doctor		2		1.4
	Nurse/Obstetrician		111		76.6
	Other		32		22.1
Education	High School		17		11.7
	Undergraduate (2 years)		32		22.1
	Undergraduate		89		61.4
	Graduate		7		4.8
Marital Status	Married		81		55.9
	Single		64		44.1
Chronical Disease	Yes		26		17.9
	No		119		82.1
Occupational Accident	Yes		25		17.2
	No		120		82.8

X: Average, SD: Standard Deviation.

Table 2. The Relationship between Occupational Safety Culture of Health Workers and Functional Low Back Pain and Neck Pain

		Neck Pain			Functional low back pain	
		Pain	Anxiety/Depression	Total		
Occupational Safety Culture	Managers' commitment	r	-0.076	-0.248	-0.144	0.168
		p	0.365	0.003*	-0.238	0.044*
	Safety priority	r	-0.023	-0.061	-0.037	0.025
		p	0.787	0.467	0.656	0.765
	Safety communication	r	-0.056	-0.193	-0.107	0.140
		p	0.500	0.020*	0.201	0.093
	Safety training	r	-0.109	-0.184	-0.143	0.155
		p	0.192	0.027*	0.086	0.063
	Safety awareness and competence	r	-0.064	-0.070	-0.071	0.160
		p	0.446	0.405	0.395	0.045*
	Employee participation	r	0.033	-0.138	-0.021	0.072
		p	0.695	0.098	0.798	0.391
	Reporting culture	r	-0.005	-0.052	-0.021	0.176
		p	0.948	0.537	0.799	0.034*

r; Pearson Correlation Test, *p<0.05.

the commitment of managers ($r=-0.248$; $p=0.003$), safety communication ($r=-0.193$; $p=0.020$) and safety training ($r=-0.184$; $p=0.027$) and the sub-parameter of neck pain, "anxiety/depression" ($p<0.05$).

The relationship between the occupational safety culture of the participant health workers and the

work limitation is given in Table 3. A negative ($r=-0.227$; $p=0.006$) and low level statistical relationship was found between the "management commitment" scores of health professionals, one of the sub-parameters of the occupational safety culture, and their scores of "workload and concentration

Table 3. The Relationship between Occupational Safety Culture of Health Workers and Work Limitations

		Work Limitations		
		Physical Limitation of the Workplace	Workload and Concentration Limitation	
Occupational Safety Culture	Managers' commitment	r	0.093	-0.227
		p	0.267	0.006*
	Safety priority	r	0.031	-0.026
		p	0.707	0.752
	Safety communication	r	0.160	-0.098
		p	0.054	0.239
	Safety training	r	0.203	-0.236
		p	0.014*	0.004*
	Safety awareness and competence	r	0.081	-0.254
		p	0.335	0.002*
	Employee participation	r	0.114	-0.182
		p	0.174	0.029*
	Reporting culture	r	0.137	-0.313
		p	0.100	0.000*

r; Pearson Correlation Test, *p<0.05.

limitation”, which are the sub-parameters of work limitation ($p < 0.05$). A positive ($r = 0.203$; $p = 0.014$) and low-level statistical relationship was found between the scores of health workers regarding “safety training”, one of the sub-parameters of occupational safety culture, and “physical limitation of the working environment”, which is one of the sub-parameters of work limitation ($p < 0.05$). A negative ($r = -0.236$; $p = 0.004$) and low level statistical correlation was found between the participating health professionals’ “safety training” scores, which are the sub-parameters of the occupational safety culture, and their scores of “workload and concentration limitation”, which are the sub-parameters of the work limitation ($p < 0.05$). A negative ($r = -0.254$; $p = 0.002$) and low level statistical correlation was found between the “safety awareness and competence” scores, one of the sub-parameters of the participants’ occupational safety culture, and their scores of “workload and concentration limitation”, which are the sub-parameters of work limitation ($p < 0.05$). A negative ($r = -0.182$; $p = 0.029$) and low level statistical correlation was found between the “employee participation” scores, one of the sub-parameters of the participants’ occupational safety culture, and their scores of “workload and concentration limitation”, which are the sub-parameters of work limitation ($p < 0.05$). A negative ($r = -0.313$; $p = 0.000$) and low level statistical correlation was found between the “reporting culture” scores, one of the sub-parameters of the participants’ occupational safety culture, and their scores of “workload and concentration limitation”, which are the sub-parameters of work limitation ($p < 0.05$) (Table 3). The productivity loss of healthcare workers was found to be;

1- $(446,5 * 0.00048 + 418,5 * 0.00036 + 496,5 * 0.00096 + 477,5 * 0.00106) = \%34,774$

DISCUSSION

The present study, which was planned to examine the relationship between occupational safety culture and low back pain, neck pain and work limitation in health care workers, revealed that with the increase of occupational safety culture, functional activities of health care workers increased due to the decrease in low back pain, while neck pain and work limitation decreased. In our study, it was ob-

served that 17.2% of the participants had an occupational accident. Aygün et al. (25) reported that 10% of employees had occupational accidents.

Our study has shown that occupational safety culture is associated with the functional activity level of health workers with low back pain, and with the increase of occupational safety culture, the functional activities of health workers increase due to the reduction of low back pain. A study by Caspi, et al. (26) reported that 47.5% of healthcare workers had deficiencies in their functional activity levels and that trainings including safe patient handling, ergonomics, and safety practices, and intervention strategies implemented by administrators, are effective in preventing low functional activity levels caused by low back and other pains in healthcare workers. Jakobsen et al. (27) determined that the training given at the workplace reduces pain in health care workers with low back pain and increases the functional activity capacity of the workers. Aljohani et al. (28) emphasized that unsafe behaviors in nurses during patient transport cause low back pain, changes in physical activity level are associated with low back pain at a high rate, and it is necessary to focus on environmental and organizational strategies in order to reduce this situation in order to create a safety culture for managers in health institutions. In the study of Oakman et al. (29) it was reported that the cause of low back pain, which is one of the musculoskeletal diseases in health workers, is the deficiencies of managers in applying the procedures and policies related to occupational health and safety, and this can be corrected with a strong culture about occupational health and safety. No study has been found in the literature that directly examines the relationship between occupational safety culture and functional low back pain in healthcare workers. In the studies mentioned above, suggestions and inferences were made that low back pain is common in healthcare workers in general and there is a decrease in the level of functional activity associated with this condition, and that a culture of occupational safety is vital in reducing or preventing them. Based on these suggestions and inferences, our study revealed that occupational safety culture in health workers is related to the functional activity level of workers with low back pain. Our study showed

that with the increase of occupational safety culture, the functional activity levels of health workers increased due to the decrease in low back pain, by confirming with statistical analyzes.

Studies have reported that due to organizational culture deficiencies of managers, employees experience symptoms such as work-related pain and depression (30). Elyıldırım (31) found that neck pain was associated with anxiety and depression in nurses, and that more than half of the participants did not receive any training about protecting the spine in the correct position. Another study reports that musculoskeletal disorders are very common in employees and that the education level of employees about workplace ergonomics and safety is associated with depression (32). Önder et al. (33) stated that neck pain, anxiety and depression are common among healthcare workers, and this may be due to insufficient training on occupational health and safety. In the same study, the importance of organizing regular training programs and informing about occupational diseases, risks in the hospital environment, and ways of protection were emphasized. In our study, in accordance with the recommendations of some studies in the literature and the findings of some studies, it was observed that as the safety communication and safety training scores, which are the sub-dimensions of occupational safety culture, increased, anxiety and depression, which are the sub-dimensions of neck pain, decreased.

Due to occupational diseases and work accidents, there is a risk of personnel loss, absenteeism, and job loss. It is stated that it is possible to reduce these losses and negativities by effectively creating an occupational health and safety culture in all enterprises (34). In the study conducted by Tucker et al. (35) it was reported that training, stress management and exercise training programs for health workers within the scope of occupational health and safety were effective in improving the physical fitness and working ability of the employees, and there were improvements in job loss. The current study, in line with the literature, showed that as the safety training scores of the employees, one of the sub-dimensions of the occupational safety culture, increased, the capacity of doing the work due to the physical environment limitation, which

is the sub-dimension of the work limitation scale, increased.

It was revealed in the current study that as the scores of managers' commitment, safety training, safety awareness and competence, employee participation and reporting culture, which are sub-dimensions of the occupational safety culture, increase, the workload and concentration limitation scores, which are the sub-dimensions of the work limitation scale, decrease. Saleem et al. (36) stated that the COVID-19 pandemic causes a high level of stress in employees, and that a safety culture is necessary to prevent this situation where employees experience concentration problems while doing their jobs and their work performance decreases. Yang, C et al. (14) reported that assessment of managerial attitudes, training of healthcare professionals, and a safe reporting system affect employee safety culture and performance. Yıldız (37) found that the occupational safety performance due to lack of attention is low in health personnel working in shifts and working too many hours. Yıldız (37) also found that there is a positive and significant relationship between the occupational health and safety practices of the hospital management regarding occupational safety, employee safety training, safe communication and feedback, safety rules and safety procedures, and the occupational safety performance of the employees. In the study of Lee et al. (38) it was reported that nurses' high perceptions of institutional safety practices (safety climate, ergonomic practices, culture) were associated with lower physical workload and higher job satisfaction. McCaughey et al. (39) reported that health workers' perceptions of workplace safety climate are associated with work-related injury and illness, absenteeism, job satisfaction, and job stress that leads to impaired concentration. It is seen that the results obtained in our study are compatible with the results in the literature.

Zanon et al. (40) determined that the productivity loss of the employees was 13.7% and that the employees evaluated the general safety culture negatively due to various health problems. This study found that the productivity loss of health workers at work was 34.7%. When the general literature is compared, it is seen that this rate is quite high. The reason for this may be the difficulty of work-

ing conditions in our country, the low awareness of occupational safety culture and the inadequacy of productivity-enhancing practices.

As a result of our study, it was determined that occupational safety culture increased functional activities by reducing low back pain in health workers, and caused a decrease in neck pain and work limitation. To raise the understanding of occupational health and safety culture among managers in the workplace, it is necessary to devise suitable measures. Healthcare professionals should receive in-service training to promote workplace safety culture and knowledge in order to reduce musculoskeletal pain caused by inappropriate health behaviors. In addition, we believe that identifying the reasons causing productivity loss via the use of dependable questionnaires in the assessment of work efficiency, which is connected to the safety culture, and taking the appropriate precautions may be crucial for both employee and patient safety.

There are some limitations of our study. The first is that the data were collected only from a single province in the east of the country due to impossibilities and other regions could not be reached. Second, the scales we use as outcome measures are based on subjectively reported information. Third, our study included only the population in the young adult group in terms of mean age. It is suggested to conduct studies in which research data are collected from more than one center, the results are compared by considering the centers from which the data were obtained, objective measurement tools are used as outcome measurement, and older adult healthcare workers are included.

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REFERENCES

1. Choudhry RM, Fang D, Mohamed S. The nature of safety culture: a survey of the state-of-the-art. *Safety Science*. 2007; 45(10): 993-1012.
2. Dursun S. İş güvenliği kültürünün çalışanların güvenli davranışları üzerine etkisi. *SGD-Sosyal Güvenlik Dergisi*. 2013; 3(2): 61-75.
3. Tetzlaff EJ, Goggins KA, Pegoraro AL, Dorman SC, Pakalnis V, Eger TR. Safety Culture: a retrospective analysis of occupational health and safety mining reports. *Saf Health Work*. 2021; 12(2): 201-208.
4. Hagopian B, Singer ME, Curry-Smith AC, Nottingham K, Hickner J. Better medical office safety culture is not associated with better scores on quality measures. *J Patient Saf*. 2012; 8(1): 15-21.
5. Pousette A, Larsman P, Eklöf M, Törner M. The relationship between patient safety climate and occupational safety climate in healthcare—A multi-level investigation. *J Saf Res*. 2017; 61:187-198.
6. Agnew C, Flin R, Mearns K. Patient safety climate and worker safety behaviours in acute hospitals in Scotland. *J Saf Res*. 2013; 45: 95-101.
7. McVicar A. Workplace stress in nursing: A literature review. *Adv Nurs*. 2003; 44 (6): 633-642.
8. Cook JM, Slade MD, Cantley LF, Sakr CJ. Evaluation of safety climate and employee injury rates in healthcare. *Occup Environ Med*. 2016; 73 (9): 595-599.
9. Akgün S. Work accidents in health sector. *Journal of Health Academics*. 2015; 2(2): 67-75.
10. Azizpour Y, Delpisheh A, Montazeri Z, Sayehmiri K. Prevalence of low back pain in Iranian nurses: a systematic review and meta-analysis. *BMC Nursing*. 2017; 16(1):1-10.
11. Hamid A, Ahmad AS, Dar S, Sohail S, Akram F, Qureshi MI. Ergonomics hazards and musculoskeletal disorders among workers of health care facilities. *Curr. World Environ*. 2018; 13(2): 251-258.
12. Akçapınar M, İnceboz T. Doğumhanede meslek hastalıkları ve nedenleri: İzmir Örneği. *Dokuz Eylül Üniversitesi Tıp Fakültesi Dergisi*. 2016; 30(1): 1-8.
13. Ayanniyi O, Nudamajo OS, Mbada CE. Pattern of work-related musculoskeletal disorder among Nigerian hospital workers. *J Environ Occup Sci*. 2016; 5(1): 18-24.
14. Yang CC, Wang YS, Chang ST, Guo SE, Huang MF. A study on the leadership behavior, safety culture, and safety performance of the healthcare industry. *International Journal of Humanities and Social Sciences*. 2009; 3(5): 546-553.
15. Chung YC, Hung CT, Li SF, Lee HM, Wang SG, Chang SC, et al. Risk of musculoskeletal disorder among Taiwanese nurses cohort: a nationwide population-based study. *BMC Musculoskeletal Disorders*. 2013; 14(1): 144.
16. Gilchrist A, Pokorná A. Prevalence of musculoskeletal low back pain among registered nurses: Results of an online survey. *Journal of Clinical Nursing*. 2021; 30(11-12):1675-1683.
17. Umann J, Marques da Silva R, Akiko Kimura C, Cauê Lopes V, Bellezi Guilhem D. validation of the work limitations questionnaire in brazilian army military personnel. *Invest Educ Enferm*. 2018; 36(3): e06.
18. Buxton OM, Karen Hopcia NP, Sembajwe G, Porter JH, Dennerlein JT, Kenwood C, et al. Relationship of sleep deficiency to perceived pain and functional limitations in hospital patient care workers. *J Occup Environ Med*. 2012; 54(7): 851-858.
19. Khammar A, Amjad R, Rohani M, Yari A, Noroozi M, Poursadeghian A, et al. Survey of shift work disorders and occupational

- stress among nurses: a cross-sectional study. *Ann Trop Med Public Health*. 2017;10(4): 978-984.
20. Furuichi W, Shimura A, Miyama H, Seki T, Ono K, Masuya J, et al. Effects of job stressors, stress response, and sleep disturbance on presenteeism in office workers. *Neuropsychiatric Dis Treat*. 2020; 16:1827-1833.
 21. Ku B, Phillips KE, Fitzpatrick JJ. The relationship of body mass index (BMI) to job performance, absenteeism and risk of eating disorder among hospital-based nurses. *Applied Nursing Research*. 2019; 49: 77-79.
 22. Koç M, Bayar K. Turkish version of the back pain functional scale: validity and reliability study, *J Exerc Ther Rehabil*. 2017; 4(2):82-89.
 23. Özel AY. Bournemouth Boyun Ağrısı Anketi: Türkçe Versiyon, Geçerlilik ve Güvenirlik Çalışması. Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi. Yüksek Lisans Tezi. Fizik Tedavi ve Rehabilitasyon Programı. 2018. Ankara.
 24. Sahin R, Ozkan S, Ilhan MN. Cross-cultural adaptation, reliability and validity of the Turkish version of the work limitations questionnaire-short form. *Bezmialem Science*. 2021; 9(3): 283-290.
 25. Aygün G, Ozvurmaz S. Sağlık çalışanlarının yaşadığı iş kazaları ve ilişkili faktörler. *Medical Sciences*. 2020; 15(4): 123-132.
 26. Caspi CE, Dennerlein JT, Kenwood C, Stoddard AM, Hopcia K, Hashimoto D, et al. Results of a pilot intervention to improve health and safety for healthcare workers. *J Occup Environ Med*. 2013; 55(12): 1449-1455.
 27. Jakobsen MD, Sundstrup E, Brandt M, Kristensen AZ, Jay K, Stelter R, et al. Effect of workplace-versus home-based physical exercise on pain in healthcare workers: study protocol for a single blinded cluster randomized controlled trial. *BMC Musculoskeletal Disorders*. 2014; 15(1): 1-9.
 28. Aljohani WA, Pascua GP. Impacts of manual handling training and lifting devices on risks of back pain among nurses: an integrative literature review. *Nurse Media Journal of Nursing*. 2019; 9(2): 210-230.
 29. Oakman J, Bartram T. Occupational health and safety management practices and musculoskeletal disorders in aged care: are policy, practice and research evidence aligned? *Journal of Health Organization and Management*. 2017; 31(3): 331-346.
 30. Franche RL, Murray E, Ibrahim S, Smith P, Carnide N, Côté P, et al. Examining the impact of worker and workplace factors on prolonged work absences among Canadian nurses. *JOEM*. 2011; 53(8): 919-927.
 31. Elyildirim A. Bir üniversite hastanesinde çalışan hemşirelerde kas iskelet sistemi ağrılarının sıklığının saptanması ve omurga ağrıları ile ilişkili risk faktörlerinin değerlendirilmesi. Bursa Uludağ Üniversitesi Tıp Fakültesi. Uzmanlık Tezi. 2019. Bursa.
 32. Zakerian SA, Monazzam MR, Dehghan SF, Mohraz MH, Safari H, Asghari M. Relationship between knowledge of ergonomics and workplace conditions with musculoskeletal disorders among nurses: a questionnaire survey. *World Appl Sci J*. 2013; 24 (2): 227-233.
 33. Önder ÖR, Ağırbaş İ, Yaşar GY, Aksoy A. Ankara Numune Eğitim ve Araştırma Hastanesinde çalışan hekim ve hemşirelerin geçirdikleri iş kazaları ve meslek hastalıkları yönünden değerlendirilmesi. *Ankara Sağlık Hizmetleri Dergisi*, 2011;10(1): 31-44.
 34. Erdoğan E, Genç KG. The significance of occupational health and safety culture. 5. International Congress of Political, Economic and Social Studies (ICPESS), Oktober 26-29, 2018, Nigde. 2018; 309-331.
 35. Tucker SJ, Lanningham-Foster LM, Murphy JN, Thompson WG, Weymiller A J, Lohse C, et.al. Effects of a worksite physical activity intervention for hospital nurses who are working mothers. *AAOHN Journal*. 2011; 59(9): 377-386.
 36. Saleem F, Malik MI, Qureshi SS. Work stress hampering employee performance during COVID-19: Is safety culture needed?. *Front Psychol*. 2021; 12: 655839.
 37. Yıldız A. Hastane iş güvenliği uygulamalarının sağlık çalışanlarının iş güvenliği performansına etkisi. *Akademik Araştırmalar ve Çalışmalar Dergisi (AKAD)*. 2020; 12(23): 566-578.
 38. Lee SJ, Lee JH. Safe patient handling behaviors and lift use among hospital nurses: a cross-sectional study. *International Journal of Nursing Studies*. 2017; 74: 53-60.
 39. McCaughey D, Delli Fraine JL, McGhan G, Bruning NS. The negative effects of workplace injury and illness on workplace safety climate perceptions and health care worker outcomes. *Safety Science*. 2013; 51(1):138-147.
 40. Zanon REB, Dalmolin GDL, Magnago TSBDS, Andolhe R, Carvalho REFLD. Presenteeism and safety culture: evaluation of health workers in a teaching hospital. *Rev Bras Enferm*. 2021;74(1): e20190463.