A PERSPECTIVE ON OCCUPATIONAL MUSCULOSKELETAL DISEASES IN TURKEY; CASE CLUSTER STUDY

TÜRKİYE'DE MESLEKİ KAS İSKELET SİSTEMİ HASTALIKLARINA BİR BAKIŞ; OLGU KÜMESİ ÇALIŞMASI

ERGONOMICS AND SOCIOECONOMICS IN AUTO INDUSTRY

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Öz

Amaç: Mesleki kas iskelet sistemi (MKİS) hastalıkları tüm dünyada en sık görülen meslek hastalıkları grubunu oluşturmaktadır. Bu araştırmanın amacı, elektrik ekipmanları üreten bir işyerinde çalışan bir grup işçide iş koşullarından kaynaklanan kas iskelet sistemi sorunlarını ortaya koymak ve meslek hastalığı tanısı sonrası iş güvencesizliğine dikkat çekmektir. Gereç ve Yöntem: Araştırma kesitsel türdedir. Meslek hastalıkları polikliniğimiz tarafından aynı fabrikada çalışmakta olan 34 olguya mesleki kas iskelet sistemi hastalığı tanısı konuldu. İşyerindeki ergonomik riskleri değerlendirmek için Rapid Entire Body Assessment (REBA) ve Ovako Working posture Assessment System (OWAS) ölçekleri kullanıldı. Bulgular: Olguların 25 (%73.5)'i erkek, 9(%26.5)' u kadındı. Olguların ortalama yaşı 34.6±5.0 idi. Ortalama çalışma süresi 132.2±57.8 idi. 21 (%61) olguya servikal disk hernisi, 13 (%38) olguya lomber disk hernisi tanısı konuldu. Olguların tümü meslek hastalığı tanısı aldıktan sonra işveren tarafından işten çıkarıldığını belirtti. Tartışma: Mesleki kas iskelet sistemi hastalıkları işyerinde yapılacak düzenlenmeler ile iyileştirmeler ile önlenebilir hastalıklardır. Çalışanların meslek hastalığı tanısı sonrası medikal sonuçların yanında sosyal ve ekonomik güçlüklerle de karşı karşıya kaldığı unutulmamalıdır. Çalışanların meslek hastalığı tanısı sonrası işsiz kalma olasılıkları düşünülerek yasal düzenlemeler yapılmalı ve tanı sonrası çalışma durumları izlenmelidir.

Anahtar Kelimeler

Mesleki Kas İskelet Sistemi Hastalıkları; Ergonomik Risk Değerlendirme; İşten Çıkarılma

Abstract

Aim: All over the world, occupational musculoskeletal diseases represent the most common occupational and work-related health diseases. According to the World Health Organisation's data, OMSD account for 10% of all occupational workforce loss. Many ergonomic factors such as repetitive trauma, working in static postures for prolonged periods, heavy lifting, and monotonous working conditions have been described as risk factors thatcontribute to the development of these diseases. Material and Method: Thirty-four cases were diagnosed with occupational musculoskeletal diseases in Dokuz Eylül University Hospital Occupational Diseases outpatient clinic. Results: Twenty-five (73.5%) of the cases were men; 9 (26.5%) of them were women. The mean age was 34.6±5.0 years. Mean period of employment was 132.2±57.8 months. The Rapid Entire Body Assessment (REBA) and Ovako Working posture Assessment System (OWAS) scales were used to assess the ergonomic risks. All cases had been dismissed from work by their employers. Discussion: This article aims to present a cluster of cases with occupational musculoskeletal diseases at a place that manufactures electrical equipment for a global automotive corporationgto draw attention to the medical and socioeconomic consequences that these employees endure after they are diagnosed with an occupational disease.

Keywords

Automobile Industry; Dismissal Ergonomics; International Company; Occupational Musculoskeletal Disease; Redundancy

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Introduction

Two-thirds of adults in industrialized countries have reported that they have suffered from lower back pain during some point in their lives [1]. Due to advanced imaging technologies it has become easier to diagnose the reasons for musculoskeletal diseases. For instance, the data acquired with these imaging techniques have shown that findings of spinal degeneration are frequently found in asymptomatic cases. The incidence of findings related to spinal column degeneration has been surveyed and has shown that 64.5%-11.5% of 40 to 60+ year old symptomatic people have disk narrowing, facet joint osteoarthritis, and spondylolysis. It has been claimed that this might be related to the influence of disease-promoting factors such as smoking. There have been conflicting results regarding the influence of factors such as anthropometry, body weight, and physical activity[2,3].

Occupational musculoskeletal diseases (OMSD) represent the most common occupational and work-related health diseases[4]. Lakeh et al. have calculated the crude DALYs rate 1606.0 per 100.000 cases in the Eastern Mediterranean Region [5]. Linaker etal have reported that an annual 9.26 million working days were lost in 2008/9 from self reported work related musculoskeletal disorders. Kim etal have reported that OMSD are the most common occupational diseases in Korea and Japan [6,7].

Ergonomic inadequacies such as monotonous tasks, repetitive movements, movements that require force, unhealthy body posture, and vibration have important impact on the development of musculoskeletal diseases [8].Furthermore, it has been emphasized that factors such as poor social relationships at the workplace, work-related distress due to intensified workload, mobbing, situations where the employees cannot make decisions on their own, and insufficient break times effect the development of these diseases and increase the severity of a pre-existing condition[9].

Occupational musculoskeletal diseases of the upper extremity and neck, as well as the lower extremity and back, are common in employees of automobile manufacturing industry due to more than one increased ergonomic risk, including: repetitive hand, wrist, and arm movements; working in a static posture for prolonged periods and increased neck movements; heavy lifting; and monotonous working conditions. Furthermore, increased psychosocial risk factors are also one of the significant problems of this industry[10, 11].

This article aims to put forth the musculoskeletal diseases resulting from the working conditions of a group of employees working at a place that manufactures electrical equipment for the an international automotive corporation and to draw attention to the medical and socioeconomic problems these employees endure after they are diagnosed with an occupational disease.

Material and Method

Thirty-four cases who applied to the Dokuz Eylul University Hospital Occupational Diseases outpatient clinic between October 2014 and May 2015, with a history of working at the same factory were assessed. The clinical assessment of the cases consisted of their working history, medical history, physical examination, and laboratory investigations. The Rapid Entire Body Assessment (REBA) and Ovako Working posture Assessment System (OWAS) scales were used to assess the ergonomic risks [12, 13]. The working conditions were assessed according to the information and images provided by the cases. The clinical assessments were performed by Physical Therapy and Rehabilitation, Neurology, and Occupational Health specialists. The final diagnosis was reached by an occupational health council. The diagnosis of occupational disease was reached because of the health problems associated with their occupations. Also, the clinical, radiological, and electrophysiological findings of the patients were compatible with high ergonomic risk.

The working environments were divided into six main categories according to the working history. Static posture and repetitive hand, wrist, and arm movements were considered as common ergonomic risk factors of all categories. Other risks and working environments were grouped under six titles [Table 1].

This is a descriptive study. The data has been presented with descriptive statistics, and mean ±SD for continuous variables. The entire analyses were carried out by SPSS 15.0 package program.

Results

Thirty-four cases applied to our outpatient clinic with the Republic of Turkey Social Security Institution referral. All of the cases came from a multinational automotive company which was located in the industrial free zone, operating for the automotive industry. They had a history of working 8 hours a day and 5 days a week. It was noted that they had 15 minutes of break twice a day and a half hour meal break once a day. During their application to our outpatient clinic, 34 (100%) of the cases declared that they had been dismissed from work by their employers. Twenty-one (61%) of them were still unemployed at the time, while 13 (49%) had begun to work at another place. Thirty-four (100%) cases were diagnosed with occupational musculoskeletal diseases. Twenty-five (73.5%) of the cases were men; 9 (26.5%) of them were women. The mean age was 34.6±5.0 years. Mean period of employment was 132.2±57.8 months. The distribution of cases according to the department they worked in was: 3 cases (8%) cutting cables, 15 cases (44%) assembly at the fixed vertical board, 15 cases (44%) assembly at the fixed horizontal board, 8 cases (23%) assembly at the rotating board, 2 cases (5%) control and packaging, one case (4%) depot. Thirty-two (94%) cases reported that they worked in two or more departments. While being interviewed about their previous working history, only two (5%) cases reported working at a job involving ergonomic risk.

Twenty-six patients (76%) applied to the outpatient clinic with neck pain, the most common complaint. The time elapsed before the complaint began was 68.9±47.7 (12-180) months. Twenty-one (61%) of the cases were diagnosed with cervical disk hernia and 13 (38%) were diagnosed with lumber disk hernia (table 2).

Thirty-four (100%) cases had undergone pre-employment medical assessments and had taken the Occupational Health and Safety trainingwhen they began employment. All of the cases could use their annual leave. Thirty (88%) of the cases were aware that there was an Occupational Health and Safety board at their workplace and 29 (91%) of the cases knew that there was an employee representative at the workplace. Twenty-

Table 1. The cases' assignments and ergonomic risks

Assignment	Job description	Daily production (average) (piece/employee)	Ergonomic risk*	Type of OMSD	Number of OMSD
Cutting cables	Lifted to the fixed horizontal line and cut into pieces. Height 150 cm	100-350	Repetitive hand movement Heavy lifting (>25 kg) Bending and rotating the body Bending the neck	Carpal tunnel syndrome Lumber disk hernia Other** Cervical disk hernia	2 (66.6%) 3(100.0%) 1(33.35) 2 (66.6%)
Assembly at the fixed vertical board	Assembly on the fixed board. Height 50 cm Length 1.5 m	700-1000	Repetitive neck movement Heavy lifting (<10 kg) Bending and rotating the body	Cervical disk hernia Other** Lumber disk hernia	13(86.6%) 2(13.3%) 6 (40.0%)
Assembly at the fixed horizontal board	Assembly, fusing, taping and routing on the fixed oblique board. Height 40 cm	150-500	Repetitive movement Bending and rotating the neck	Other** Cervical disk hernia	1(0.06%) 4(26.6%)
Assembly at the rotating board	Assembly, fusing and welding procedures on the moving board. Height 50 cm	200	Repetitive movement Bending and rotating the neck	Lumber disk hernia Cervical disk hernia	3(37.5%) 2 (25.0%)
Control and packaging	Control and packaging on the fixed board. Height 170 cm	300-500	Heavy lifting (<10 kg).	Other** Meniscus pathologies	1(50.0%) 1(50.0%)
Depot	Unloading the truck and placing the items on the shelves.	50-100	Repetitive movement Heavy lifting (25-75 kg) Flexion and extension of the knee	Lumber disk hernia Meniscus pathologies	1(100.0%) 1(100.0%)

*Defined with REBA and OVAS ergonomic risk assessment
**Bicipital tendinitis, capsulitis, joint contracture, trigger finger, heel spur

eight (90%) of the cases believed that the employer interfered with the election process of the employee representative, while 6 (10%) believed that the election of the employee representative was done independently. None of the cases were informed about their legal rights. Twenty-five (73%) of the cases believed that the workplace did not register health records regularly, while 9 (27%) of the cases had no opinion of this topic.

Twenty-two (64%) of the cases were aware that risk assessment was done at the workplace and 34 (100%) of the cases thought that there were risks at their environment. Fourteen of the cases (41%) stated that no precautions were taken following the risk assessments, while 20 (58%) employee stated that ergonomic improvements were carried out.

Table 2. The complaints and final diagnosis of the cases (n: 34)

	n(%)
Complaint	
Upper Extremity	
Neck pain	26(76)
Arm pain	8(23)
Weakness	4(11)
Numbness and pins-and-needles sensation in hands	3(38)
Lower Extremity	
Lower back pain	21(61)
Leg pain	6(17)
Weakness	4(11)
Numbness and pins-and-needles sensation in feet	4(11)
Final Diagnosis	
Cervical disk hernia	21(61)
Lumber disk hernia	13(38)
Carpal tunnel syndrome	2(5)
Meniscus pathologies	2(5)
Other*	5(14)

*Bicipital tendinitis, capsulitis, joint contracture, trigger finger, heel spur.

Discussion

With the contribution of competition and intensified workload, the automotive industry presents important ergonomic risk factors such as heavy lifting, repetitive movements, and prolonged static posture. In a study conducted at two automobile factories in the USA, the incidence of occupational musculoskeletal diseases was found to be 31% [11]. At an automotive factory in Malaysia, which also produced electrical cables, the prevalence of musculoskeletal system symptoms among the employees were 49% neck, 48% wrist, and 46% shoulder-related [14]. At another automotive factory in Turkey, the prevalence of lower back complaints was reported to be 52% and neck complaints were reported at 30%. From most to least frequent , the cases stated the reason for their pain as heavy lifting, working in a position which bends the neck forward, sudden movements, staying at a bad position for a long period of time, accident, and work stress [8]. We also studied 34 cases from the same industry who worked at an electrical cable manufacturing line and who were also exposed to similar ergonomic risk factors described in previous studies, and we diagnosed them with musculoskeletal diseases.

Revealing the relationship of occupational risk factors with the disease remains a challenge for the physician because musculoskeletal system related complaints are already widely seen in the general population and their frequency increases with age. However, when we look at our cases, they are from a younger age group, they have been working with similar risks for a long time, and they constitute a cluster coming from the same workplace. They have not stated any other ergonomic risk factors that could have caused the problems. The cases' complaints and their clinical and laboratory findings comply with their job specifications. As mentioned in previous studies, the structural

damage developed in areas of the body that carry the potential of being impacted by the job's requirements, such as heavy lifting and repetitive movements [8-10, 15, 16].The time elapsed for the complaints to develop is approximately half of the total employment period, as short as 12 months. High daily production rates create ergonomic risks, and are an indication of intensified workload. They are one of the important factors that contribute to unhealthy employment conditions [2, 3].

To prevent occupational musculoskeletal diseases, it is known that interventions to working conditions, such as how the employee works (repetitive trauma or body posture problems), to the production system (the mode of production or products used during production), and interventions to improve the health of employees through training and exercise, etc. all have a positive effect [17-19]. However when the cases were interviewed for this study, we were informed that there had been no attempt at any interventions to the production procedure or working conditions and that health improving exercises were not incorporated.

Apart from the morbidity caused by their existing health problem, another important issue for the employees is that they were dismissed from work after lodging their complaints. Dismissal from work due to occupational or work-related diseases is a frequent problem. Cases with occupational diseases such as asthma and contact dermatitis also face a similar employment outcome and then suffer from socioeconomic problems [20-22]. It has been reported that the total annual cost of musculoskeletal diseases for the three major U.S. automobile manufacturing factories is over $18 billion [23]. Even though we have not systematically assessed all the employees working at the factory, our findings indicate that the employees exposed to similar working conditions may also be subject to occupational risks, which would results in high direct and indirect costs of the employees' health problems. It is known that improving the ergonomic conditions of workplaces may decrease and even prevent costs caused by musculoskeletal diseases[23]. However, after our cases developed musculoskeletal system complaints, their workplace did not improve or rehabilitate the working environment; on the contrary, the cases were dismissed from employment.

Occupational diseases may be prevented by implementing interventions to the working conditions. In order to amend the working conditions, it is necessary to have potent national inspection and audit mechanisms. Right after our assessment of the work-related injuries and diseases, we notified the national governmental audit entities to protect the welfare of the other employees by asking that the working conditions be improved.

The Republic of Turkey is a part of the global economic structure. The global structure of the economy implies responsibilities to the international community as much as to the national community. Occupational diseases developing at the employees of factories that manufacture global trademarks is a global problem. Also, maintaining the welfare of the employees' health is not only a national, but an international goal. One of the main interventions to this problem is to create social awareness. In order to maintain this social awareness, it is important to inform the national and international publically about employees' health problems, and the social, economic, and about the legal consequences of these health problems. It is especially important to increase the social sensitivity by informing all relevant health organisations, employee and employer organisations, consumer associations, and the media. These kinds of notifications, such as our article, may have an important influence on both identifying the problem and raising awareness.

Competing interests

The authors declare that they have no competing interests.

References

1. Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. Ann Intern Med 2002; 137:586–97.
2. Kalichman L, Kim D, Guermazi A, Hunter D. Computed tomography-evaluated features of spinal degeneration: prevalence, intercorrelation, and association with self-reported low back pain. Spine J 2010; 10(3): 200-8.
3. Bilir N. Mesleksel kas iskelet sistemi hastalıkları. Turk J Phys Med Rehab 2007; 34: 10-3.
4. Akbal A, Eroğlu P, Yışmaz H, Tutkun E. Mesleki maruziyetler ve kas iskelet sistemi hastalıkları. FTR Bil Der 2012; 15:73-6.
5. Lakeh M, Forouzanfar M, Vollset S, Bcheraoui E, Daoud F, Afshin A etal. Burden of musculoskeletal disorders in the Eastern Mediterranean Region, 1990-2013:findings from the global burden of disease study 2013. Ann Rheum Dis 2017; doi: 10.1136/annrheumdis-2016-210146.
6. Linaker C, Harris C, Cooper C, Coggon D Plamer K. The burden of sickness absence from musculoskeletal causes in Great Britain. Occup Med 2011; 6(7): 458-64.
7. Kim E, Nakata M. Work related musculoskeletal disorders in Korea and Japan: A comparative description. Ann Occup Environ Med 2014; 26: 17.
8. Tanir F, Güzel R, Issever H, Polat UC. Musculoskeletal disorders in an automotive manufacturing plant and the outcomes of ergonomics and exercise training in workers who used sick leave. Turk J Phys Med Rehab 2013; 59: 214-21.
9. Özcan E, Kesiktas N. The occupational musculoskeletal disorders' prevention and ergonomics. Turk J Phys Med Rehab 2007; 34: 6-9.
10. Deros BM, Daruis DDI, Ismail AR, Sawal NA, Ghani JA. Work-Related musculoskeletal disorders among workers' performing manual material handling work in an automotive manufacturing company. Am J App Sci 2010; 7: 1087-92.
11. Punnet L, Gold J, Katz JN, Gore R, Wegman DH. Ergonomic stressors and upper extremity musculoskeletal disorders in automobile manufacturing: a one year follows up study. Occup Environ Med 2004; 6: 668-74.
12. Karhu O, Kansi P, Kuorinka I. OWAS: Correcting working postures in industry: A practical method for analysis. Appl Ergon 1977; 8: 199-201.
13. Hignett S, Mc Atamney L. Rapid entire body assessment (REBA). Appl Ergon 2000;31: 201-5.
14. Winter G, Schaub K, Grobman K, Laun G, Landau K, Bruder R. Ergonomic risk assessment with designcheck to evaluate assembly work in different phases of the vehicle development process. Work 2012; 41: 4284-388.
15. Nicoletti S, Battevi N, Colafemmina G, Di Leone G, Satriani G, Ragone P, Occhipinti E, et al. Manual lifting and manual transport: risk assesment and prevalence of work related diseases in construction companies in Basilicat. Med Lav 2013;104: 1260-40.
16. Oğuz A, Kaymak B. Mesleki kas iskelet sistemi bozuklukları. Hacettepe Tıp Dergisi 2011; 42: 165-72.
17. Westgaard RH, Winkel J. Ergonomic intervention research for improved musculoskeletal health: A critical review. Int J Ind Ergon 1997;20: 463-500.
18. Kayserlink W, Ulin S. Case studies of ergonomic interventions in automotive parts distrubition operations. J Occup Rehabil 2004;14: 307-26.
19. Johansson JA, Kadefors R, Rubenowitz S, Klingenstiema U, Lindstrom I, Engstrom T et al. Musculoskeletal symptoms, ergonomic aspects and psychosocial factors in two different truck assembly concepts. Int J of Ind Ergon 1993;12: 35-48.
20. Haahr J, Frost P, Andersen E. Predictors of health related job loss: a two follow-up study in a general working population. J Occup Rehab 2007;17:581-92.
21. Piirila PL, Keskinen HM, Luukkonen R, Salo SP, Tuppurainen M, Nordman H. Work, unemployment and life satisfaction among patients with diisocyanate induced asthma a prospective study. J Occup Health 2005;47:112-8.
22. Lazarov A, Rabin B, Fraidlin N, Abraham D. Medical and psychosocial outcome of patients with occupational contact dermatitis in Israel. J Eur Acad Dermatol Venereol 2006;20: 1061-5.
23. Punnet L. The costs of work-related musculoskeletal disorders in automotive manufacturing. New Solut 1999;9:403-26.

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