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Klinik Çalışma

Occupational injuries admitted to the Emergency Department

Acil servise gelen iş kazalarına bağlı yaralanmalar

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BACKGROUND

We aimed to identify the characteristics, causes and rates of injuries associated with occupational accidents.

METHODS

Patients who presented to the Emergency Department due to injuries occurring as a result of occupational accidents were determined retrospectively. In occupational injuries, several parameters were evaluated, such as gender, occurrence mechanism, injury type, injury localization, severity score of the injury, and the type of profession.

RESULTS

The number of occupational injury admissions in the Emergency Departments of our two centers during 2006 was 1038. Mean age of the cases was 31.6±9.6. The most common mechanism of injuries was determined to be caught-in-machinery, at 31.5%, followed by blunt object injury (21.5%), fall from height (18.9%), penetrating-sharp object injury (17%), ocular foreign body (3.9%), and others. Isolated extremity injuries (74.2%) were the most common injury site, followed by multiple bodily injuries (8.5%), facial injuries (5.5%) and head-neck injuries (4.6%). While 90% of cases were discharged after treatment in the Emergency Department, 7% were referred to various departments for hospitalization.

CONCLUSION

In the majority of cases, patients with injuries associated with occupational accidents presented to Emergency Departments. Observations in Emergency Departments may help reveal details of occupational injuries and prevent workplace-related accidents.

Key Words: Emergency Department; injury; occupational accidents; trauma; wounds and injuries.

AMAÇ

Çalışmamızda iş kazalarına bağlı yaralanmaların özelliklerini, nedenlerini ve sonuçlarını tanımlamayı amaçladık.

GEREÇ VE YÖNTEM

İş kazaları sonucunda oluşan yaralanma ile acil servise gelen hastalar geriye yönelik olarak incelendi. İş kazalarına bağlı yaralanmalarda, cinsiyet, yaralanmanın oluş mekanizması, yaralanma tipi, yaralanmanın olduğu yer, yaralanma şiddet skoru ve iş tipi gibi parametreler değerlendirildi.

BULGULAR

Her iki acil bölümüne 2006 yılı boyunca gelen iş kazasına bağlı yaralanma sayısı 1038 idi. Olguların yaş ortalaması 31,6±9,6 idi. En yaygın görülen yaralanma mekanizması %31,5 ile vücuduna makinaya kaptırma olarak saptandı. Bunu sırasıyla %21,5 ile künt cisimle yaralanma, %18,9 ile yüksekten düşme, %17 ile delici kesici aletle yaralanma, %3,9 ile göze yabancı cisim kaçması ve diğerleri izledi. İzole ekstremite yaralanması (%74,2) en çok yaralanan vücut bölgesi idi. Bunu sırasıyla çoklu vücut yaralanması (%8,5), yüz yaralanmaları (%5,5), baş-boyun yaralanmaları (%4,6) izledi. Olguların %90'ı acil serviste tedavisi yapıldıktan sonra taburcu edilirken, %7'si değişik bölümlere yatırıldı.

SONUÇ

İş kazalarına bağlı yaralanmaların büyük kısmı acil servislerde değerlendirilmektedir. Acil servislerdeki gözlemler, iş yeri ile ilişkili kazaların önlenmesinde ve iş kazalarına bağlı yaralanmaların özelliklerinin tanımlanmasında yardımcı olabilir.

Anahtar Sözcükler: Acil servis; yaralanma; iş kazaları; travma; yaralar ve yaralanmalar.

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Occupational injury is an accident that occurs during performance of a job assigned by the employer. [1] Occupational injuries are common health problems constituting an important share among all types of injuries in terms of morbidity and mortality.[2-5]

Each year, 270 million occupational injuries occur in the world, causing 1.1 million deaths per year. [6] Particularly in developing countries, the rate of occupational injuries is high, and the rate is considered as one of the significant indicators of the work environment.[7] Developing countries constitute 60% of the global workforce; 80% of those laborers work in small enterprises involving illegal sectors and requiring hard and dangerous work.[7,8] Severe injury to workers can have serious financial, social, medical, and psychological repercussions, particularly in the case of young workers.[9]

Most of the injuries associated with occupational accidents result in presentation to Emergency Departments. The majority of those accidents, which can lead to serious results, are preventable. In the present study, we aimed to identify the characteristics, causes and rates of injuries associated with occupational accidents; analyze the differences between various professions; and elucidate helpful results that could be used for taking measures in the prevention of occupational injuries.

MATERIALS AND METHODS

Our study was carried out in two centers: the Emergency Departments of the Medical School in Erciyes University Faculty of Medicine and Toyota State Hospital. Patients who presented to the Emergency Department between 1 January 2006 and 31 December 2006 due to injuries occurring as a result of occupational accidents were determined retrospectively. Patient files were retrieved from the hospital archives and reviewed. The information in the files was recorded on to prepared forms. The ethical committee of our university approved the study (Decision number: 01/252/08.05.2007). The data included in those forms were recorded on to the SPSS 11 and statistical analyses were carried out. In occupational injuries, several parameters were evaluated, such as gender, occurrence mechanism, injury type, injury localization, severity score of the injury, and the profession. Different professions were compared in terms of occurrence mechanism, injury localization and injury types. One-way ANOVA and post-hoc Bonferroni tests were used for statistical assessments.

RESULTS

Demographic Characteristics

The number of occupational injury admissions in Emergency Departments of both centers during 2006 was 1038 [1024 (98.7%) male, 14 (1.3%) female]. Mean age of the cases was 31.6±9.6. Distribution of age ranges was as follows: 15-29 years (485, 46.7%), 30-44 years (448, 43.2%), 45-59 years (87, 8.4%), and >60 years (18, 1.7%). The distribution of gender and age over the different professions is shown in Table 1. The median injury severity score (ISS) was calculated to be 4 (min 0 - max 57). The evaluation of injuries according to the business sector revealed the manufacturing industry as having the highest injury rate, at 60% (n=623), followed by the construction industry at 24% (n=247) (Table 1).

Occurrence Mechanism of Injuries

The most common mechanism of injuries was determined to be caught-in-machinery, at a rate of 31.5% (n=327), followed by blunt object injury (21.5%), fall from height (18.9%), penetrating-sharp object injury (17%), ocular foreign body (3.9%), and others (Table 2).

Apart from others, the occurrence mechanism and type of 31 injuries occurring in the manufacturing industry included mass intoxication as a result of carbon monoxide intoxication due to fire in a rubber manufacturing plant. All the workers were discharged following monitoring and treatment in the Emergency Department.

Table 1. Demographic characteristics of occupational injuries

Industry	Male n (%)	Female n (%)	15-29 years n (%)	30-44 years n (%)	45-59 years n (%)	≥60 years n (%)	Total n (%)
Manufacturing	616 (98.9)	7 (1.1)	297 (47.7)	266 (42.7)	49 (7.9)	11 (1.8)	623 (60.0)
Construction	246 (99.6)	1 (0.4)	102 (41.3)	122 (49.4)	23 (9.3)	–	247 (23.8)
Agriculture	31 (93.9)	2 (6.1)	15 (45.5)	11 (33.3)	2 (6.1)	5 (15.2)	33 (3.2)
Transportation	44 (100)	–	25 (56.8)	15 (34.1)	3 (13.0)	–	44 (4.2)
Woodworking	23 (100)	–	8 (34.8)	11 (47.8)	3 (13.0)	1 (4.3)	23 (2.2)
Electricity	19 (100)	–	6 (31.6)	10 (52.6)	3 (15.8)	–	19 (1.8)
Mining	5 (100)	–	3 (60.0)	1 (20.0)	–	1 (20.0)	5 (0.5)
Other	40 (90.9)	4 (9.1)	29 (65.9)	12 (27.3)	3 (6.8)	–	44 (4.2)
Total	1024 (98.7)	14 (1.3)	485 (46.7)	448 (43.2)	87 (8.4)	18 (1.7)	1038

Table 2. Mechanisms of occupational injuries in the various industries

Injury Mechanism	Manufacturing n (%)	Construction n (%)	Agriculture n (%)	Transportation n (%)	Woodworking n (%)	Electricity n (%)	Mining n (%)	Other n (%)	Total n (%)
PSOI	131 (21.0)	17 (6.9)	4 (12.1)	1 (2.3)	1 (4.3)	–	1 (20.0)	21 (47.7)	176 (17.0)
Blunt object injury	108 (17.3)	91 (36.8)	2(6.1)	11 (25.0)	9 (39.1)	–	2 (40.0)	–	223 (21.5)
Fall	25 (4.0)	121 (49.0)	3(9.1)	21 (47.7)	6 (26.1)	1 (5.3)	2 (40.0)	17 (38.6)	196 (18.9)
Caught-in-machinery	284 (45.6)	5 (2.0)	24(72.7)	7 (15.9)	3 (13.0)	–	–	4 (9.1)	327 (31.5)
Burn	13 (2.1)	–	–	1 (2.3)	–	–	–	1 (2.3)	15 (1.4)
Ocular foreign body	25 (4.0)	10 (4.0)	–	–	4 (17.4)	1 (5.3)	–	1 (2.3)	41 (3.9)
Electrical shock	5 (0.8)	1 (0.4)	–	–	–	17 (89.9)	–	–	23 (2.2)
Intoxication	31 (5.0)	–	–	–	–	–	–	–	31 (3.0)
Lifting heavy weight	1 (0.2)	2 (0.8)	–	3 (6.8)	–	–	–	–	6 (0.6)

PSOI: Penetrating-sharp object injury.

Table 3. Injury site according to the various industries

Injury Site	Manufacturing n (%)	Construction n (%)	Agriculture n (%)	Transportation n (%)	Woodworking n (%)	Electricity n (%)	Mining n (%)	Other n (%)	Total n (%)
Head-neck	16 (2.6)	28 (11.3)	–	3 (6.8)	–	–	1 (20.0)	–	48 (4.6)
Face	34 (5.5)	13 (5.3)	–	2 (4.5)	5 (21.7)	2 (10.5)	–	1 (2.3)	57 (5.5)
Thorax	1 (0.2)	6 (2.4)	–	1 (2.3)	–	–	–	1 (2.3)	9 (0.9)
Abdomen	4 (0.6)	5 (2.0)	–	–	1 (4.3)	–	–	2 (4.5)	12 (1.2)
Spine	1 (0.2)	3 (1.2)	–	2 (4.5)	–	–	–	1 (2.3)	7 (0.7)
Pelvis	1 (0.2)	8 (3.2)	1 (3.0)	2 (4.5)	–	–	–	2 (4.5)	14 (1.3)
UE	447 (71.7)	57 (23.1)	27 (81.8)	14 (31.8	9 (39.1)	5 (26.3)	3 (60.0)	26 (59.1)	588 (56.6)
LE	76 (12.2)	80 (32.4)	1 (3.0)	13 (29.5)	7 (30.4)	–	1 (20.0)	5 (11.4)	183 (17.6)
Skin	1 (0.2)	–	–	–	–	–	–	–	1 (0.1)
MOI	11 (1.8)	47 (19.0)	4 (12.1)	7 (15.9)	1 (4.3)	12 (63.2)	–	6 (13.6)	88 (8.5)
Other	31 (5.0)	–	–	–	–	–	–	–	31 (3.0)

UE: Upper extremity; LE: Lower extremity; MOI: Multiple organ injuries.

Differences regarding occurrence mechanism of injuries are shown in Table 2. Particularly in the manufacturing and agriculture industries, caught-in-machinery accidents (the majority involving the hand) were the most common. The most common injury type in the construction industry was determined to be fall from height. While penetrating sharp object injuries were encountered mostly in the manufacturing industry, blunt object injuries were observed primarily in manufacturing and construction industries.

Injury Localizations

Isolated extremity injuries [74.2% (n=771)] were the most common. Particularly, isolated upper extremity injuries accounted for 56.6% (n=588) among overall injuries, and 544 (92.5%) of those consisted of hand injuries. Lower extremity involvement rate was found to be 17.6% (n=183), followed by multiple bodily injuries (8.5%), facial injuries (5.5%), and head-neck injuries (4.6%) (Table 3).

For all industries, extremity injuries were observed to rank first among the common injury sites. Many upper extremity injuries were determined particularly in the manufacturing industry. While lower extremity injuries constituted the most common injury site among cases in the construction industry, multiple organ injuries and upper extremity injuries were determined to be the second most common. Moreover, multiple organ injuries taking place in the construction industry were found to constitute 47% of overall injuries in the construction industry.

While 91% (n=535) of upper extremity injuries were found to have affected people below 44 years, 76% of them were found to have taken place as a result of accidents occurring in the manufacturing industry. Caught-in-machinery accidents involving hands were the most common injury mechanism (50.5%), and lacerations-cuts were the most common injury type (36.4%). Ninety-two percent (n=542) of upper extremity injuries were treated in the Emergency Department (Table 4). Emergency treatment of upper extremity injuries included skin cuts, tendon lacerations, finger amputations, phalanx fractures, and crushes. Those treatments were carried out by residents of the emergency and orthopedics departments.

Regarding injury sites, facial injuries were ob-

Table 4. Injury type

Injury Site	Manufacturing n (%)	Construction n (%)	Agriculture n (%)	Transportation n (%)	Woodworking n (%)	Electricity n (%)	Mining n (%)	Other n (%)	Total n (%)
Cut	218 (35.0)	22 (8.9)	5 (15.2)	5 (11.4)	2 (8.7)	–	2 (40.0)	19 (43.2)	273 (26.3)
STI	161 (25.8)	149 (60.3)	7 (21.2)	33 (75.0)	12 (52.2)	–	3 (60.0)	16 (36.4)	381 (36.7)
Amputation	57 (9.1)	3 (1.2)	9 (27.3)	–	1 (4.3)	–	–	2 (4.5)	72 (6.9)
Crush inj	52 (8.3)	7 (2.8)	7 (21.2)	–	2 (8.7)	–	–	3 (6.8)	71 (6.8)
Fract-dis	58 (9.3)	46 (18.6)	2 (6.1)	5 (11.4)	2 (8.7)	–	–	2 (4.5)	115 (11.2)
Burn	13 (2.1)	–	–	1 (2.3)	–	–	–	1 (2.3)	15 (1.45)
Electrical inj	5 (0.8)	1 (0.4)	–	–	–	13 (68.4)	–	–	19 (1.8)
Intoxication	31 (5.0)	–	–	–	–	–	–	–	31 (3.0)
Ocular inj	25 (4.0)	10 (4.0)	1 (3.0)	–	4 (17.4)	–	–	1 (2.3)	41 (3.98)
MOI	2 (0.3)	8 (3.2)	2 (6.1)	–	–	6 (31.6)	–	–	18 (1.7)
Isolated head inj	1 (0.2)	1 (0.4)	–	–	–	–	–	–	2 (0.1)

STI: Soft tissue injuries; Inj: Injuries; Fract-dis: Fracture-dislocation; MOI: Multiple organ injuries.

served to constitute a considerable segment. Isolated ocular injuries accounted for 72% (n=41) of facial injuries and all of them were cases presenting to the emergency room due to ocular foreign body complaint. Foreign body in the eye included metal shard in 27 (66%) cases, cement-lime in 6 (14%) cases, wood-sawdust in 4 (10%) cases, caustic materials in 2 (5%) cases, and contact of air hose to the eye in 2 (5%) cases. Metal shards were encountered generally among cases in the manufacturing industry. While ocular lavage and medical treatment were applied to 42% (n=17) of ocular injuries, surgical treatment was applied in 34% (n=14), and removal of foreign body with guidance of biomicroscopy was carried out in 24% (n=10) of cases.

Injury Type

The most common injury among the general injury group was soft tissue injuries, at a rate of 36.7% (n=381), followed by lacerations-cuts (26.3%), fractures-dislocations (11.2%), amputations (6.9%), crushes (6.8%), and others (Table 4).

Analysis of the injury types revealed cuts-lacerations as the most frequent type of injury in the manufacturing industry, followed by soft tissue injuries, fractures, amputations, and crush injuries. Amputation and crush injuries were the most common types of injury in the agricultural industry. Soft tissue injuries ranked first in construction-related jobs, followed by fractures-dislocations as the most common injury types. Electricity-related injuries were mostly encountered among workers employed in an electricity company or working in the manufacturing and construction industries. The most common occurrence mechanism among workers employed in an electricity company was determined to be fall from height as a result of electric shock while repairing a transformer station. Therefore, the majority of them had multiple injuries as well as electricity-related injury.

Prognosis

While 90% of cases were discharged after treatment in the Emergency Department, 7% (n=78) were referred to various departments for hospitalization. The overall mortality rate was 1% (n=7). The mean age was 46.7±12.3. The occupational spectrum of the exitus patients was as follows: 3 (42.9%) electricity workers, 2 (28.5%) agricultural workers, 1 (14.3%) construction worker, and 1 (14.3%) manufacturing worker. The occurrence mechanisms of injury particularly among workers employed in electricity companies were electric shock and fall from height. All had both electricity-related injury and multiple injuries. While 6 exitus cases showed multiple injuries, 1 case had an isolated severe head injury, and median ISS value was calculated as 41 (min 25 - max 57). The injuries of the exitus agricultural workers were caught-in-machinery type. A construction worker and manufacturing worker had severe injuries related to fall from height and head trauma due to hit from a blunt foreign object, respectively.

DISCUSSION

Injuries associated with occupational accidents can have serious consequences for workers and the public, such as physical incapacitation, loss of workforce, and healthcare necessity. Previous epidemiologic studies have determined the following as potential risk factors for occupational accidents: age too young or old, male gender, poor workplace conditions, long work hours, nightshift, lack of systemic occupational training, inadequate sleep, high level of work stress, poor workplace security, emotional instability, insufficient work experience, smoking, use of alcohol, and lack of physical exercise.[6,10]

Work-related injuries exhibit higher injury risk for males compared to females.[11,12] Holizki et al.[9] found the occupational injury rates for women as 14% and for men as 86%. In the present study, the rate for in-

jured females was as low as 1.3%, and this result exhibited a correlation with the statistics of our country. In Turkey, according to the statistics of the SSK (the state-run social security system) for 2002, while the occupational accident rate was 72,344, 96.5% of those were male and only 3.4% were female.[11,13] The low rate of work-related accidents among women is a result of the small number of women employed as workers. Moreover, the number of females working under social security is known to be much lower compared to that of men.[11]

In the present study, 89.9% of the cases were found to be below 44 years old. Particularly, the injury rate among the 15-29 age group was determined to be the highest (46.7%). Other studies in the literature also underline the higher risk for young workers.[7,9,11,14,15] Jackson et al.[14] reported 73% of workplace-related injuries as taking place among people aged 20-44 years. The high incidence of occupational injuries in young people may be associated with the high numbers of youth and young workers in our country. Almost all of the serious injuries affecting young people are preventable. Moreover, it is an ethical obligation to take the necessary precautions in order to prevent those injuries.[9] In the present study, the rate of injuries was found to decrease, particularly after age of 45. This may be related to the low number of people working after this age or to the experience they gained over time.[11] While the injury rate among elderly people is low, it still causes serious outcomes. Twenty-five percent of permanent physical incapacitation cases and 54% of mortalities were seen among elderly people.[1] In the present study, elderly people accounted for 42% of the mortality cases. While it changes on an individual basis, elderly people exhibit certain health problems, such as weakness against cold, bone fragility due to osteoporosis, decrease in muscle power, and decline in articular and mental abilities.[1,16] The employers should consider such factors and take proper precautions.

Both of the centers housing the study had many laborers working in the manufacturing industry. Those regions have developed food, textile, furniture, metal goods, machinery, and automotive industries. As a result, injury rates among the manufacturing industry were found to be the highest followed by the construction industry. Similar to our results, another study showed the manufacturing industry as having the highest injury rate followed by the construction industry.[9] Dufort et al.[3] determined that more than 50% of the injuries encountered in the Emergency Department were due to accidents in manufacturing, sales, and construction industries. Nakata et al.[6] found the highest injury rate in the manufacturing industry, at 44.2%. Ergor et al.[7] found the highest rate of occupational injuries in the manufacturing industry (52%), followed by the construction industry (23.1%) and mining industry (11.8%).

Caught-in-machinery type injury was the most commonly encountered injury mechanism followed by blunt object injury, fall from height, and penetrating sharp object injury. A study revealed the rate of penetrating sharp object self-injury rate as 22.5% and of falls as 18%.[9] A study conducted by Jackson et al.[14] determined injury due to some object in the workplace as the most common injury type, with a rate of 54%. Ergör et al.[7] found sharp object/machinery injuries as the most common types, with a rate of 35.6%, and falls as the second most common injury type, at 21%. While the mechanism of injuries may show alteration depending on different types of work prevalent in different countries, injuries resulting from work-related machinery and objects generally rank first.

Isolated extremity injuries were the most frequent corporal injury localization, followed by multiple bodily injury and facial injury. Isolated upper extremity injuries constituted 56.6% of all injuries, and 76% of them had taken place during accidents in the manufacturing industry. A study conducted by Holizki et al.[3] and another study performed by Dufort et al.[9] both showed upper extremity injuries as the most common localization of injuries, with rates of 47.5% and 55.9%, respectively. Hand injuries are generally known to be less serious injuries but are encountered more frequently.[17] A study performed by Dufort et al.[3] on adolescents showed hand injuries (42.7%), particularly lacerations, and ocular injuries as the most common injuries. In the present study, hand injury was determined in 544 (52.4%) cases. The most common injury mechanisms in our study were caught-in-machinery involving hands, penetrating sharp object, and blunt object injuries. The most frequently encountered injury type was cuts-lacerations. The majority of the injuries were determined to have taken place in the manufacturing industry. Our results are consistent with the results obtained previously by other investigators. The study conducted by Sorock et al.[17] determined cuts and lacerations among 69% and fractures among 26% of workers, while observing that 60% of those had occurred in the manufacturing industry. Thirty-seven percent of the injuries were caused by machines. Another study performed by Sorock et al.[18] showed the rates of injuries as follows: 63% lacerations, 13% crush injuries and 5% fractures. While 42% of injuries were due to machinery accidents, 46% were found to involve a person having less than three years' work experience.[18]

In the present study, 92.2% of upper extremity injuries were treated in the Emergency Department, and included skin cuts, tendon cuts, digital amputations,

phalanx fractures, and crush injuries. Treatment in these cases was carried out by residents of the Emergency and Orthopedics Departments. Digital laceration, which was the most common injury type, caused an average sick-leave of 3 days, and 22 days for the most severe injury, which was digital amputation.[17] Work equipment, work practices and characteristics of the workers are all factors that relatively alter the risk of acute work-related hand injuries.[18] There are several precautions that are known to reduce the risk of hand injury, such as usage of protective equipment by the personnel, frequent safety inspections applied by the administration, identification of the dangerous equipment and procedures, increasing the usage of protective gloves, and reducing contact with dangerous objects such as moving machine parts, sharp metal tools and knives.[3,17] With encouragement of glove usage alone, injuries can be reduced by 60%.[18]

The numbers of facial injuries were not high, yet they were the third most common injury observed. In particular, isolated ocular injuries comprised 72% of all facial injuries. Patients presented to the hospital with the complaint of ocular foreign body. While foreign bodies were metal pieces and shards in manufacturing industry injuries, objects included wooden pieces and splinters in woodworking and corrosive substances in industries dealing with chemicals. While a previous study showed ocular injuries as accounting for 18% of all injuries, another study found this rate as 7.5%.[3,5] In the present study, ocular injuries constituted 3.9% of all injuries. More than half of the work-related ocular injuries take place in manufacturing, service and construction industries.[19] Producers, laboratory workers, equipment operators, repairmen, and production and adjustment workers are known to be at risk for ocular injuries. People should be instructed on the importance of eye protection and proper maintenance of equipment. Ninety percent of work-related ocular injuries can be prevented with adequate eye protection.[3,19]

Injuries arising from occupational accidents are generally encountered and treated in Emergency Departments.[14] In the present study, 90% of cases were treated in the Emergency Department as well. A study performed by Jackson et al.[14] showed that 73% of injuries resulting from occupational accidents were treated in Emergency Departments.

Mortality cases were observed to occur as a result of the accidents in the electricity, agriculture, construction, and manufacturing industries. The study carried out by Ergor et al.[7] showed 37% of fatal accidents as occurring in the construction industry and 25% in the manufacturing industry, followed by service and mining industries. While Holizki et al.[9] reported accidents associated with motor vehicles as the most common mortality mechanism, with a rate of 40%, this was followed by being crushed by heavy equipment and fall from height. In the present study, the low rate of injuries resulting from transportation accidents may be associated with the fact that traffic accidents might not have been noted as occupational accidents in Emergency Department records. The study performed by Holizki[9] found the rate of mortalities due to electrical shock as 5%. In the present study, while the rate of injuries associated with electrical shock among overall injuries was 2.2%, this rate was 42.8% among mortalities. Although the injury rate among workers in the electricity sector is lower than the other sectors, it can result in serious outcomes. Because such injuries occur particularly in electricity transformer stations, they cause both electrical shock and fall from height. A previous study showed that burn and electricity injuries constitute 3% of all injuries.[20] Mortalities associated with electricity injuries comprise 3% of mortalities occurring as a result of occupational accidents.[21] Taking the appropriate precautions for the safety of laborers working in the electricity sector is an important subject that should be seriously taken into account. In particular, precautions such as usage of non-flammable clothing, non-conducting stairs, insulated covers, alarm devices to alert workers to the close proximity of an electrical current, improvement in training and alarm systems, and turning off the electrical current prior to working might help in the reduction of injuries.[20-22]

In agricultural regions, traumatic injuries associated with agriculture are a serious threat to public health and contribute to the rates of diseases and permanent disability. The majority of people exposed to such injuries are known to be technicians of agricultural machines and elderly workers.[23] The study performed by Dufort et al.[3] determined injuries occurring in the agricultural sector as constituting less than 5% of all work-related injuries. In the present study, this rate was observed to be 3.2%, and two of the mortalities were found to be among agricultural workers. Both cases were over 60 years of age and had suffered caught-in-machinery type injuries. Since workers in the agricultural industry do not retire after a certain age, injuries in elderly people may be more common than in other sectors.

Generally, the mortality rate of our study was found to be lower than reported previously. The difference in business sectors between the regions investigated in our study and the other regions and our failure to determine several cases due to the retrospective nature of our study might be the underlying reasons for these results.

In conclusion, in the majority of injuries associated with occupational accidents, patients presented to Emergency Departments, and were mostly young in

age. The most common injury site was the extremities, particularly the upper extremities, most of which were treated in the Emergency Department. Therefore, observations in Emergency Departments may help to reveal details of injuries, demographic characteristics and difficulties faced by employers and will contribute to the prevention of workplace-related accidents. Better safety training and improved risk management together with preferable equipment and workplace design, frequent engineer inspections, and usage of protective gear by workers might prove to be effective in reducing workplace accidents.

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