OCCUPATIONAL ACCIDENT CHARACTERISTICS IN TÜRKİYE BETWEEN 1997-2005

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Abstract

This study investigated characteristics of occupational accidents in Türkiye between 1997 and 2005. At the result, it was determined that the average of accident rate and fatality rate are 1207 and 15.6 respectively per 100000. Furthermore it was established; 1) 96.1% of injured person are male, 2) the leading age group is 25-29 years old (24.3%), 3) the major rate of injured person by experience is less than 1 year (42.5%), 4) the most risky branch of activity is 'metal based manufacturing' (35.2%), 5) the most risky occupation is 'Craft and related trades workers' (54%), 6) 1-3 employees constitute the leader group (36.7%), 7) the higher rate of accident is at the first work hours (32.5%), 8) the higher rate of injury cause is 'Falling objects' (16%), 9) 'Superficial injuries and open wounds' are in the first rank (40%), 10) the most common injured part of body is 'Upper extremities' (51.8%), 11) 7-13 days incapacity is the bigger group by incapacity (30.6)

Keywords: Occupational accident; accident rate; fatality rate

1997-2005 YILLARI ARASINDA TÜRKİYE'DEKİ İŞ KAZALARININ KARAKTERİSTİĞİ

Özet

Bu çalışmada, Türkiye'de 1997-2005 yılları arasındaki iş kazalarının karakteristiği araştırılmıştır. Sonuç olarak ortalama kaza oranı ve ölüm oranı sırasıyla 100000 de 1207 ve 15.6 olarak bulunmuştur. Ayrıca aşağıdakiler saptanmıştır: 1)Kazalarda yaralananların %96.1' i erkektir, 2) 25-29 yaş grubu %24.3 ile ilk sıradadır, 3) bir yıldan az tecrübesi olanlar %42.5 ile ilk sıradadır, 4) en riskli sektör %35.2 ile metal imalat sektörüdür, 5) En riskli meslek %54 ile zanaatkarlar ve ilgili işlerde çalışanlar grubudur, 6) 1-3 kişi arası çalışanı olan işyerleri %36.7 ile başta gelmektedir, 7) En yüksek kaza oluşumu %32.5 ile ilk çalışma saatindedir, 8) En yüksek kaza sebebi %16 ile cisimlerin düşmesidir, 9) En fazla yara tipi %40 ile yüzeysel ve açık yaralardır, 10) En yaygın yaralanma bölgesi %51.8 ile üst uzuvlardır, 11) En yaygın geçici iş görememezlik süresi %30.6 ile 7-13 gündür.

Anahtar kelimeler: İş kazası; kaza oranı; ölüm oranı

Introduction

Worldwide, millions of occupational accidents occur and at the results of these accidents it consists serious economic and psychologic lost. Occupational injuries have brought about significant health impacts as a whole in both developing and developed countries. The International Labor Organization (ILO) estimated that there were approximately 335000 annual fatalities as a direct result of occupational injuries, observing a worldwide mortality rate of 14 deaths per 100000 workers, with the highest injury fatality rates being found in the developing countries.[1,2] Every day nearly 970 people die because of occupational accidents. Thus, for every fatal occupational accident over 760 accidents occur that causes at least 3 days absence from work.[3] Fatal and nonfatal occupational injuries resulted in about 10.5 million the disability-adjusted life years; that is about 3.5 years of healthy life are lost per 1000 workers every year globally.[4]

Successful strategies for accident prevention should be based on effective analysis. Strategies for accident prevention should be in reasonable agreement with significant variables of occupational accidents. Thus, it is necessary to know the characteristics of accidents and the differences between fatal and nonfatal occupational injuries by industry type.[5]

In different countries, the characteristic of occupational fatal and nonfatal accidents were investigated.[6-19] Although the fatality rate in Türkiye is over the developed country, no investigation of fatal and nonfatal occupational accidents has been done yet overall Türkiye.

In this study, all occupational accidents which were registered at the Social Insurance Institution (SSK) in Türkiye during 1997 through 2005 were reviewed. The main goal of this study was to examine the accident characteristics and finally to explore the implications for preventing work-related injuries.

Materials and Methods

In Türkiye, reporting and recording the work accidents are far behind the developed countries. In the preliminary negotiation performed with the social security institutions before inspecting the work accidents, it has been determined that no accident statistics has been recorded in the institutions such as Bağ-Kur, Emekli Sandığı but these data have been recorded only in Social Insurances Institution (SSK). It has been detected that no work accident statistics were available in State Statistics Institute. In this study, the data obtained by using SSK yearly work accident statistics between the years 1997-2005 and has been collected and classified by Microsoft-Excel program. These data were compiled in a major titles and the percentage of values was determined. The professional diseases are not included in the research. There are various parameters for determining the rate of work accidents. The most important of those is the work accident rate and it is frequently used as the work accident rate among 100.000 workers. Further the rate of fatal injuries to working population is also used. Therefore, these evaluations take place also in this study.

In order to determine the characteristics of the occupational accident the average of gender, age, work experience, branch of activity, occupation, employment size, accident cause, accident hour, injury type, injured part of body and incapacity for all accidents in which the accident took place has been taken for the years 1997-2005.

Results and Discussion

Trend of occupational accidents in the years 1997-2005

The summary of occupational accidents can be seen in Table 1. Insured employees' number has increased with industrial development of country. The membership of SII insurance system rose from 6376982 in 1997 to 7651705 in 2005. Not only population increasing, but also increasing of registration to insurance system have caused this progress. Since 1997, insured workers have risen approximately 20%. But occupational accidents have been in the decreasing trend. Despite of decreasing trend between 1997 and 2005, 722147 people injured and 9305 people died in Türkiye because of occupational accidents. A variety of indices can be used to examine the impact of injuries. For fatal injuries, fatality frequency/count or rates are commonly examined. Counts can be analyzed in a relative manner by comparing the percentage of fatal injuries occurring in an occupation relative to the percentage employed in an occupation. [7,14,20-23] Between the years that were investigated the accident rate and fatality rate are 1207 and 15.6 per 100000, respectively (Table 1).

Table 1. Numbers of insured employees, occupational accidents, death, accident and fatality rate and corresponding mean ($\bar{x}$) and standard deviation (s) in Türkiye between 1997 and 2005.[24-32]

Year	Employees	Total accident	Accident rate [a]	Fatal accident	Fatality rate [a]
1997	6376982	98318	1541.8	1282	20.1
1998	6721169	91895	1367.2	1094	16.3
1999	6355639	77955	1226.5	1165	18.3
2000	6565167	74847	1140.1	1167	17.8
2001	6136107	72367	1179.4	1002	16.3
2002	6563187	72344	1102.3	872	13.3
2003	6750460	76668	1135.7	810	12
2004	6952848	83830	1205.7	841	12.1
2005	7651705	73923	966.1	1072	14
$\bar{x}$	6674807	80239	1207	1034	15.6

[a] The accident and fatality rate are defined as the number of accidents at work per 100000 employed persons.

The rate of nonfatal occupational accident is less than the European countries', but on the contrary the fatality rate is over (Table 2.).

Table 2. Fatal and nonfatal incidences at work in Europe.[20]

Country	Nonfatal incidence rate	Fatal incidence rate
Sweden	1329	2.1
Ireland	1433	5.9
United K.	1512	1.6
Greece	2936	3.7
Denmark	3203	3.1
Austria	3321	4.8
Finland	3435	2.4
Italy	4105	5.0
France	4920	4.0
Germany	4958	3.0
Belgium	5112	3.1
Portugal	5505	7.7
Spain	7073	5.5

Analysis by gender

Fig.1. shows that the workers who injured at an occupational accident were 96.1% male and 3.9% female at the average. The result of chi-square comparison test shows that the distributions of gender are significantly different (chi square=84.84, $p<0.001$).

The reason of that, the number of insured male workers is much more than the female workers. Insured male workers are approximately 80% of all insured workers in Türkiye.[32] The reason of this imbalance is the majority insured male workers and they work most hazardous job. This result is compatible with different research in Türkiye.[10,33-35] In the other countries have also similar data.[36,37,38]

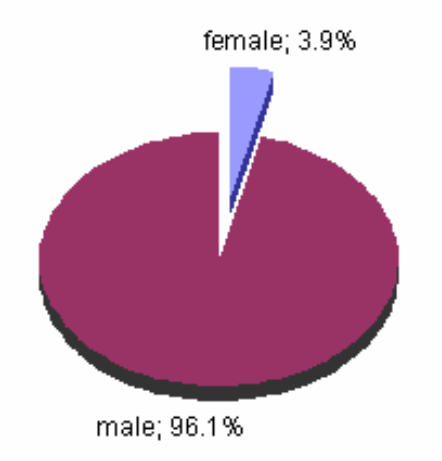

Fig.1. The distribution of injured person by gender

Analysis by age of injured person

The distribution of injured person by age was shown in Fig.2. The major age group is 25-29 years (24.3%) and 30-34 years (20.8%), respectively. The minor age group is over 50 years (2.0%) and under 18 years (3.7%). The weighted average age is 31.6 years at the occupational accidents. The result of chi-square comparison test shows that the distributions of age are significantly different (chi square=39.37, p<0.001). This result is similar with some researches in Türkiye [10,33,34,35,39,40] and some researches in the other countries.[8,37] The SSK statistics give no information on the total number of people employed in each age group. Thus, it couldn't calculate the frequency of occupational accidents within each separate age group.

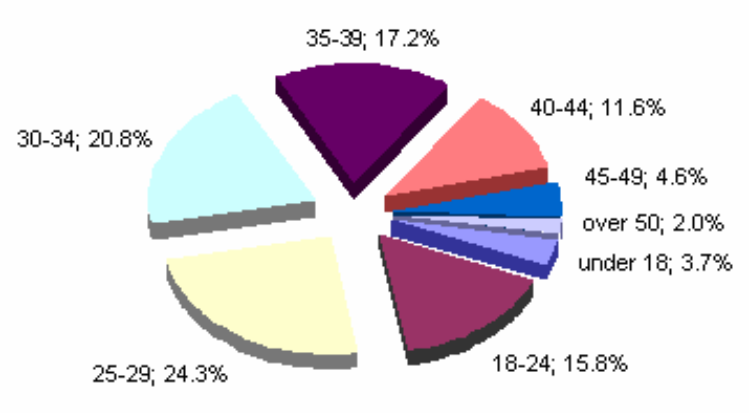

Fig.2. The distribution of injured person by age

Analysis by work experience

The distribution of work experience is shown in Fig.3. It indicates that 42.5 % of all injuries happen during the first year of employment and the rates decrease with increasing experience. The rate of over than 10 years experience is 11.4%. The result of chi-square comparison test shows that the distributions of experience are significantly different (chi square=33.81, $p<0.001$). Similarly, in South Korea, the rate of occupational accident that was occurred during the first year of employment is 51.3%.[8] It shows that workers with less than 1 year work experience have about 3.73 times of the accident risk rate compared to workers with more than 10 years experience. It is clear that the inexperience is very important at occupational accidents and it is necessary to training occupational safety.

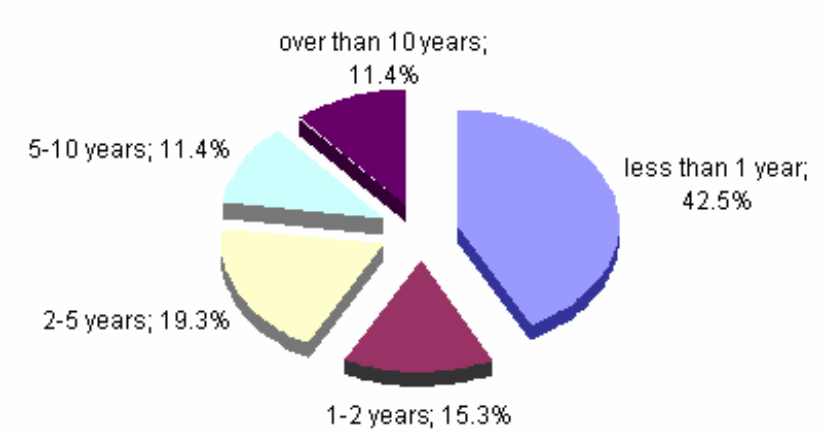

Fig.3. The distribution of injured person by work experience

Analysis by branch of activities

The percentage distribution of branch of activities is shown in Fig.4. 'Metal based manufacturing' is the first rank (35.2%) and followed by 'Mining and quarrying' (15.4%) and 'Other manufacturing' (12.4%), respectively. The result of chi-square comparison test shows that the distributions of branch of activities are significantly different (chi square=76.64, $p<0.001$). Metal based manufacturing branch has about 2-3 times of the accident risk rate compared to other branch.

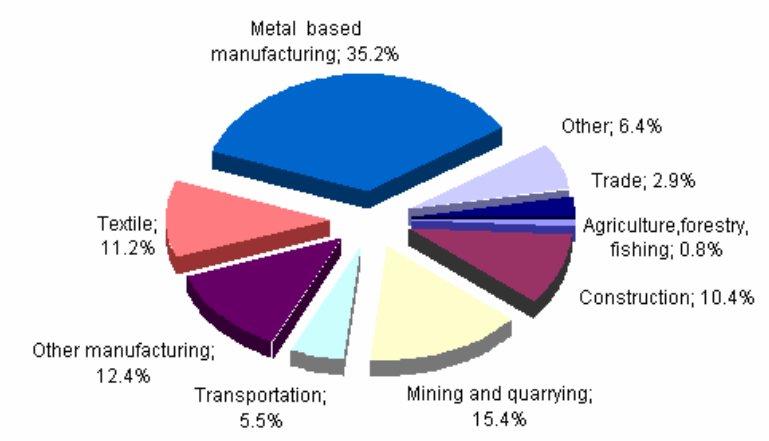

Fig.4. The distribution of injured person by branch of activities

Analysis by occupation

The percentage distribution of occupation is shown in Fig.5. 'Craft and related trades workers' and 'Elementary occupations' are the major group with 54% and 27.9% respectively. The result of chi-square comparison test shows that the distributions of occupation are significantly different (chi square=201.99, $p<0.001$). This result is similar to EU.[20] 'Craft and related trades workers' group has about 2 times of accident risk rate compared to 'Elementary occupations' and about 8 times of 'Plant and machine operators and assemblers'.

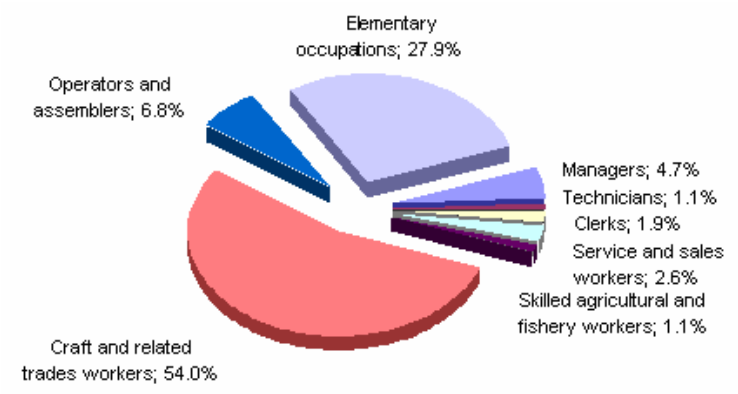

Fig.5. The distribution of injured person by occupation

Analysis by size of employment

Fig.6. shows an analysis of occupational accidents by size of employment. 1-3 employees constitute the bigger group with 36.7%. Minor groups are 501-1000 and over

than 1001 employees with 3.6% and 3.4% respectively. The result of chi-square comparison test shows that the distributions of employment size are significantly different (chi square=72.12, $p<0.001$).

It may calculate that companies with less than 3 employees have about 10.79 times of the injury rate compared to companies with more than 1001 employees. This high rate in small workplaces might be explained by the fact that most companies in Türkiye have exhibited a low level of prevention with respect to safety and health at work issues.

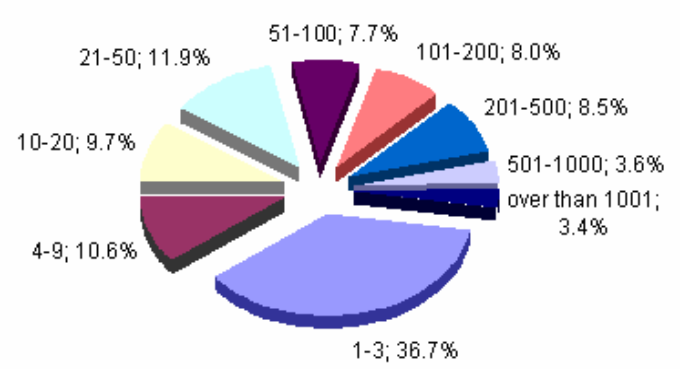

Fig.6. The distribution of injured person by size of employment

Analysis by working hour

Fig.7. shows an analysis of working hour while the occupational accidents have happened. The higher rates of accident are at the 1st and 2nd hours with 32.5% and 13.5%, respectively. The accident rate is at the 7th and 8th hours is 8% and 10.1% respectively. The result of chi-square comparison test shows that the distributions of working hour are significantly different (chi square=57.18, $p<0.001$). The accident rate reduces at onward hours but it rises again at the end of work. It might be explained by concentration absence at the work beginning and fatigue towards to the end of work.

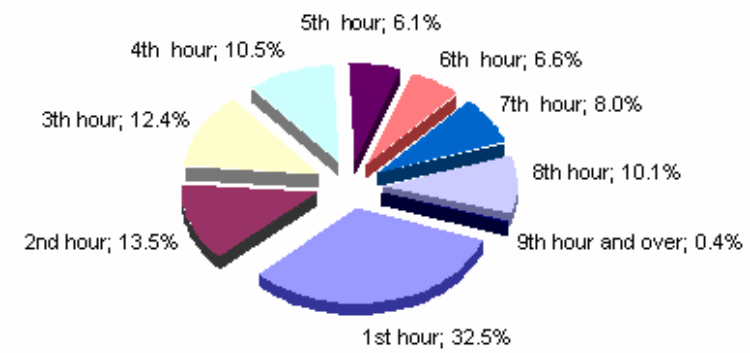

Fig.7. The distribution of injured person by working hour

Analysis by cause of injury

Fig.8. shows the percentage distribution of injury cause. The higher rate of injury cause is 'Falling object' (16%). It is followed by 'Sharp piercing device' (14.3%), 'Caught in and between object' (12.8%), 'Falls' (12.4%), 'Machinery' (10.5%). The result of chi-square comparison test shows that the distributions of injury cause are significantly different (chi square=21.12, $p<0.001$).

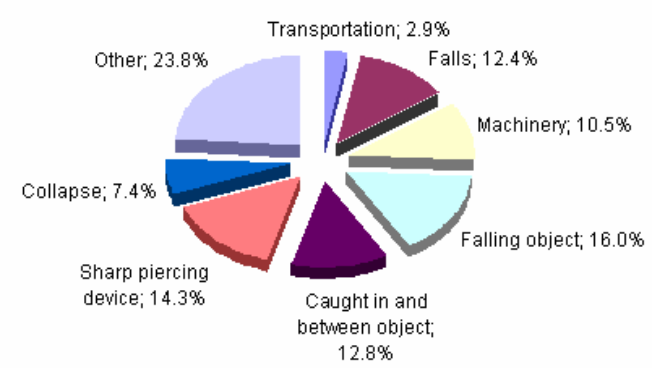

Fig. 8. The distribution of injured person by cause of injury

Analysis by type of injury

Fig.9. shows the percentage distribution of injury type. 'Superficial injuries and open wounds' are in the first rank (40%). 'Crushed and contusions' follow this (31.7%). The result of chi-square comparison test shows that the distributions of injury type are significantly different (chi square=125.52, $p<0.001$). This result is similar to EU (37.4%).[20]

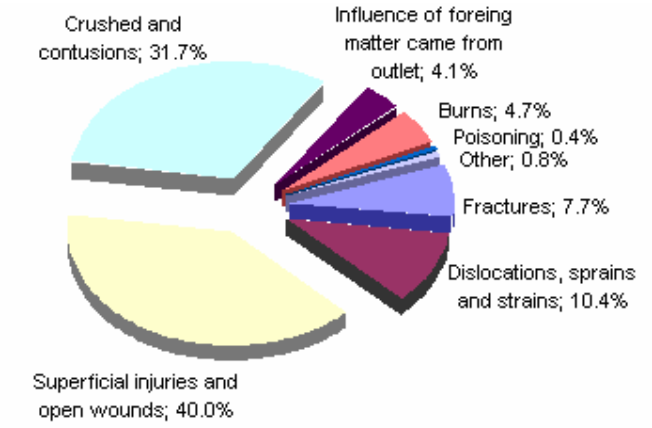

Fig.9. The distribution of injured person by type of injury

Analysis by injured part of body

Fig.10. shows the percentage distribution of injured part of body. The most common injured part of body is 'Upper extremities' with 51.8% and 'Lower extremities' follow this with 25.4%. The result of chi-square comparison test shows that the distributions of injury body part are significantly different (chi square=210.68, $p<0.001$). This result is similar to EU (41.2% and 26.5%, respectively).[20] Hands and fingers are the most hazardous organs by occupational accident.

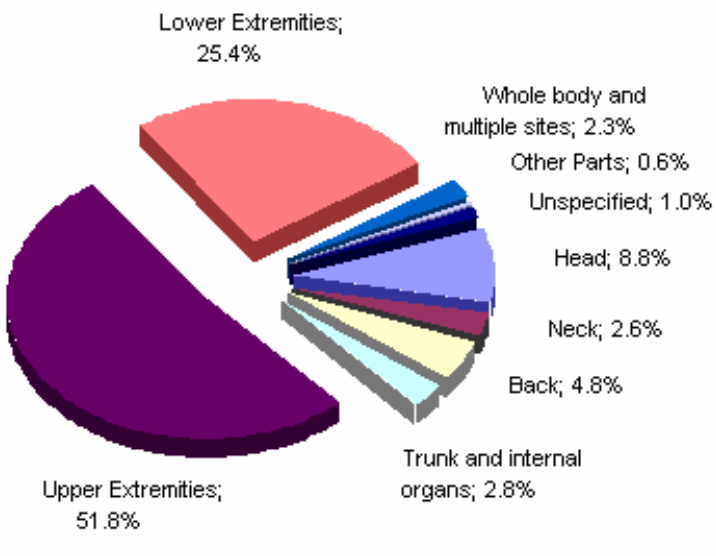

Fig.10. The distribution of injured person by injured part of body

Analysis by incapacity

Fig.11. shows the percentage distribution of incapacity. 7-13 days incapacity is the bigger group of percentage with 30.6%. 4-6 days incapacity follows this with 22.1%. The result of chi-square comparison test shows that the distributions of incapacity are significantly different (chi square=79.26, $p<0.001$). The significant point in Türkiye, the rate of zero day incapacity is only 4.7% and the rate of 1-3 days incapacity is 7.5%. In European Union the rate of 0-3 days incapacity is 36.37%.[41] It might be explained by off-record of unserious small accident. Also a recent study from US has shown that between 33% and 69% of all occupational injuries were missed of the reported injuries.[13]

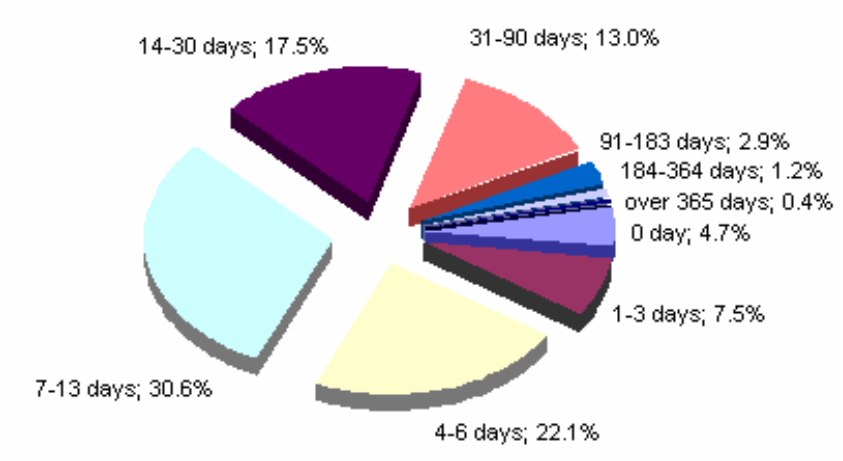

Fig.11. The distribution of injured person by incapacity

Limitations

The rate of those working without being registered to any social security institution is 45.6%. While the rate of those working without social security in agricultural sector is 87.4%, this rate is 31.7% in the sectors other than agriculture[42]. The most comprehensive source related to work accident is the SSK statistics. The record of these data has been reorganized with the EU harmonization protocols and the filtering of the information from the system is possible for the year 2003 and afterwards. However these data cover the work accidents with those working with obligatory insurance in the sector and the work accidents reported by the employer. The insufficiency of the data to be worked about the work accidents has also been emphasized[43]. Accident rates far below the developed countries and fatal accident rates far above the developed countries have been determined as a result of the study. There are great deficiencies related to reporting of the work accidents. It has emphasized that the issue of work health and safety in Türkiye is not adopted by the political authorities in the sufficient level and that the central and local administrations of the government do not fulfill their duties for the required supervision and monitoring on the workplaces[44]. Most of the accidents resulting with small injures are not reported by the worker or the employer and the event is recorded only when a hospitalization is required. Although the accessible accident statistics are limited, they constitute importance for uncovering the characteristics of work accidents.

Conclusion

Between the years that were investigated the accident rate and fatality rate are 1207 and 15.6 per 100000, respectively. The rate of nonfatal occupational accident is less than the European countries, but on the contrary the fatality rate is more over. The most comprehensive source related to work accidents is the SSK statistics. However these

data cover the work accidents with those working with obligatory insurance in the sector and the work accidents reported by the employer. The insufficiency of the data to be worked about the work accidents have also been emphasized in some studies.

As a result of this study, the following conclusions are drawn into most significant points:

Although % 80 insured workers are male, the workers who injured at an occupational accident are 96.1% male. The most risky age group is 25-29 years with 24.3% and accident rate decrease regularly while age increase. 42.5% of victims have experience less than 1 year. This rate decrease with upward experience year. The most risky sector is metal based manufacturing with 35.2%. The most risky occupation is craft and related trades worker with 54%. 36.7% of occupational accident occurs in small size workplaces and the accident rate decreases regularly while workplace size increases. 32.5% of occupational accident happens at the first work hour. This rate decreases until end of the work and it increases in the last two hours. Falling objects are the priority cause of accidents with 16%. Superficial injuries and open wounds (40%) often occur in occupational accidents and upper extremities injure frequently (51.8%).

It is hoped that our findings will be useful as base line data for future follow up comparisons and will be a step for preventing occupational accidents which afflict all us.

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