

# WORK-RELATED ACCIDENTS REFERRED TO INDUSTRIAL MEDICAL CENTER, KUWAIT, FROM 2015 TO 2017

By

Al-Fajjam SM<sup>1</sup> and Samir AM<sup>2</sup>

<sup>1</sup>Department of Occupational Health, Al Shuaiba Industrial Medical Centre, Ministry of Health, Kuwait,

<sup>2</sup> Department of Occupational and Environmental Medicine, Faculty of Medicine, Cairo University, Egypt.

## Abstract

**Introduction:** Occupational accidents comprise an important health and economic burden for societies around the world especially developing countries. There are variety of factors that determine the frequency of accidents at work. **Aim of work:** This study aim to obtain an overall view of non-fatal occupational injuries through analyzing injury causes, types and mechanism of accidents and to propose forms of accident data collection, investigations, safety records and accident results to be followed in Shuaiba Industrial Medical Center. **Materials and Methods:** A record based retrospective descriptive study was conducted on non-fatal occupational-related injuries in Al Shuaiba Industrial Medical Center in Kuwait. The study included 1304 reported non-fatal occupational injuries referred to Al Shuaiba Industrial Medical Center from June 2015 to June 2017. **Results:** The reported injured workers were all males with mean age  $35.2 \pm 8.9$ , mainly laborers (76.7%), involved in different industrial work activities. The highest number of reported injuries came from the metal and machinery industries (44%), manufacture of wood, textile, glass, plastic and paper (23.8%), chemicals, oils and petrochemicals industries (10.2%). Upper extremities (44.1%) and eyes (26.8%) were the most frequently affected body parts injured. Sharp objects and machinery injuries (49.2%), being struck by heavy objects (32.9%), followed by falling from height (10.8%) were the commonest agent of injury. Over ninety percent of the reported injured workers (94.9%) had 4 days or more lost from work after the accident occurrence. **Conclusion and Recommendations:** Nonfatal occupational injuries in Shuaiba industrial area are mainly in manufacture sector. Implementation

of appropriate health and safety practices, applying safety regulations at workplace are recommended.

**Keywords:** Non-fatal occupational injuries, Industries activities, Injuries, Risk factors and Accidents prevention.

### **Introduction**

Occupational accident is an unexpected and unplanned event, arising out of or in connection with work which results in one or more workers' injury, disease or death. An occupational injury resulted from occupational accident could be fatal; considering that death occurred within one year of the day of the accident, or it could be non-fatal and will cause loss of work time (ILO, 1998). In 2005, the International Labor Organization stated that the estimates of the number of deaths caused globally by work-related accidents as well as work-related diseases were around 2.3 million (Driscoll et al., 2005). According to the report of European Statistics on Accident at Work; an accident at work is defined as an event that occurs during the course of work which leads at least to four days of absence from work. Non-fatal accidents at work cause harm to the workers and their families because accidents at work have the potential to cause a permanent disability to the workers or force them to change

their job (ESAW, 2005). Recently the International Labor Organization (ILO) Congress on Safety and Health at Work held in Singapore 2017 has shown that work-related fatal injuries and diseases have increased from 3 million in 2010 to 3.74 million in 2014, highlighting the failure to adequately address occupational safety and health concerns and this lead to estimated global cost of 2.99 trillion US dollars (ILO, 2017). Data also reveals that 40% of youth suffers from work-related injury and illness than older workers (ILO, 2017). However, occupational accidents are underestimated world-wide, the problem in the developing countries are bigger and serious. Moreover, 10% of the gross domestic product (GDP) is lost because of occupational accidents and diseases in the developing countries (Dorman, 2000). Most of the work-related injuries are preventable; therefore, identifying the distribution patterns of occupational injuries, causes, risk factors and mechanism of occurrence can lead to more effective preventive strategies. In

the absence of systematic occupational injuries surveillance, data collection and analysis make the management of the problem difficult (Abas et al. 2011). In Kuwait, according to labor law, the employer is obliged to inform public authority of manpower about the work-related accidents in his plant or factory. The goal is to identify why accidents happened and to take action to reduce the risk of future accidents. In addition, national statistics are produced annually to track the trend of the incidence of work-related accidents in Kuwait and to compare the resulted prevalence with other countries (Kuwait Labor Law, 2010). There are many industrial areas in Kuwait including Al Shuaiba and Abdulla Port industrial area. Al Shuaiba area consists of two areas; East and west areas. There are limited studies on the prevalence and the characteristics of nonfatal occupational injuries in Kuwait. Previous studies emphasized on the pattern of accidents in Kuwait on only construction sector (Kartam and Bouz, 1998; Zawilla et al., 2008) or they describe fatal accidents (Al-Kandary and Al-Waheeb, 2015).

### **Aim of work**

This study aim to obtain an overall view of non-fatal occupational injuries through an analyzing injury causes, types and mechanism of accidents and to propose forms of accident data collection, investigations, safety records and accident results to be followed in Al Shuaiba Industrial Medical Center .

### **Materials and Methods**

**Study design:** This research is a retrospective descriptive study.

**Place and duration of the study:** The study was conducted in Al Shuaiba Industrial Medical Center in Kuwait, from June 2015 to June 2017. The center has been established in 1982, by Ministry of Health; Kuwait and is located in Al Shuaiba Industrial Area, Ahmadi Governorate, Kuwait. The center provides occupational preventive medical services; primary medical care and emergency services for workers of different companies and industrial plants situated in the surrounding areas, mainly Al Shuaiba industrial area, Abdulla Port and Al Ahmed area.

**Study sample:** non-fatal occupational accidents/injuries notified

and registered in the industrial medical center. There were six sectors of industrial economic activities in Al Shuaiba area which were included in this study; (1) Repair and installation of metals and machinery equipment, (2) Manufacture of wood products, textile, glass, plastic and paper industries, (3) Activities chemicals, oil and petrochemicals products, (4) Manufacture of fabricated metal product, computers, electric equipment and basic metals, (5) Specialized construction activities, (6) Services. The total number of employees working at the time of the study in these industrial activities were 50,000 workers.

**Study method:** This study is a database in this center which is used to monitor and extract causal data of occupational accidents and related injuries. The data registry was established according to ILO classification concerning statistics of occupational injuries (ILO,1998).

In this study, occupational non-fatal injuries were defined as injuries taking place while the worker was engaged in work-related activities during his working hours and result in

an employee having to take time away from work. Injuries that occurred while traveling to and from work were also included. The registered data included the following: (1) Injured persons; name, age, sex, nationality, occupation, duration of employment, company name and economic activity, (2) Information about the accident and its circumstances; date, time, shift work, location of accident, mechanism of the accident, factors contributing to the accidents, first aid at site of accident and the number of days lost, (3) Information about the injury; type and nature of injury, part of body injured and the results of the injury. This study includes only non-fatal injuries. The direct causes leading to the accident included: (a) Falling from height, (b) Struck by heavy objects, (c) Sharp objects and machinery, (d) Chemicals, (e) Others. Type and nature of the injury included: (a) Wounds (cut/abrasion/contused etc.), (b) Bites (insect / animal), (c) Eye trauma and foreign body, (d) Fractures, tendon and joint sprains, (e) Bleeding, (f) Burns and Scalds, (g) Others. Factors contributing to accidents at work include the following: (a) Unsafe work methods (b) Lack of training and

knowledge (inexperience), (c) Lack of management policy, (d) lack of personal protective equipments.

The occupational injuries were classified according to severity into: (a) injuries which result in absence of the injured person from work for a period not more than 4 days, (b) injuries which results in the absence of the injured

person from work for a period exceeding 4 days (ILO, 2017). The differences in employment size, as well as the hours worked, a number of rates which took into consideration these differences was calculated, including the following measures; frequency rate, incidence rate, severity rate and days lost per new case of occupational injury (ILO,1998).

(a) *The frequency rate of new cases of occupational injury:*

Number of new cases of occupational injury during the reference period x 1,000,000

Total number of hours worked by workers during the reference period

(b) *The incidence rate of new cases of occupational injury:*

Number of new cases of occupational injury during the reference period x 1,000

Total number of workers in the reference group during the reference period

(c) *The severity rate of new cases of occupational injury:*

Number of days lost as a result of occupational injury during the reference period x 1,000,000

Total amount of time worked by workers during the reference period.

(d) *Days lost per new case of occupational injury:* Median or mean of the number of days lost for each new case of occupational injury during the reference period.

In this study, the total number of reported nonfatal related occupational injuries were 1304 in total number of 50,000 workers from different industrial sectors in Al Shuaiba industrial areas.

The total number of days lost from work due to non-fatal injuries were 1537 days with mean (1.2 ± 4.2) and ranged from (0 to 90) days.

Injury frequency rate =  $\frac{1304}{50,000 \times 8 \text{ hours} \times 5 \text{ days} \times 50 \text{ weeks} \times 2 \text{ years}} \times 1000,000 = 6.52 \text{ s injuries} / 1000,000 \text{ working hours}$

Injury severity rate =  $\frac{1537}{50,000 \times 8 \text{ hours} \times 5 \text{ days} \times 50 \text{ weeks} \times 2 \text{ years}}$  x 200,000 = 1.54 days lost / 200,000 working hours

Mean days lost = 1.2 days, ranges from (0-90 days)

### Ethical approval

Approval was obtained from the director of the Occupational Health Department of the Al Shuaiba Industrial Medical Center to conduct this study.

### Data management

Data was analyzed using the Statistical Package of Social Science Software program, version 23 (IBM

SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.). Data was presented using range, median, mean and standard deviation (SD) for quantitative variables; frequency and percentage for qualitative ones. Comparison between groups was performed through Chi-square test.  $p < 0.05$  considered statistically significant.

## Results

**Table (1) Demographic characteristics of reported cases of nonfatal work related injuries.**

General Characteristics	Description (No=1304) No (%)
<b>Age (Years)</b>	
Median (range)	33 (20-74)
Mean $\pm$ SD	35.2 $\pm$ 8.9
<b>Age Category (years)</b>	
up to 20 yrs	3 (0.2)
21 - 30 yrs	435 (33.4)
31 - 40 yrs	522 (40)
41 - 50 yrs	250 (19.2)
51 - 60 yrs	81 (6.2)
60+ yrs	13 (1)

<b>Nationality</b>	
Arabs	161 (12.3)
India	965 (74)
Pakistan	37 (2.8)
Bangladesh	32 (2.5)
Philippine	33 (2.5)
Sri Lanka	10 (0.8)
Nepal	58 (4.4)
Others	8 (0.6)
<b>Duration of employment</b>	
Median (range)	4 (1- 20)
Mean $\pm$ SD	15.7 $\pm$ 3.2
<b>Industries activities:</b>	
Repair and installation of metal and machinery	574 (44)
Manufacture of wood products, textile, glass, plastic & paper industries	310 (23.8)
Manufacture of fabricated metal product, computers, electric equipment & basic metals	69 (5.3)
Activities chemicals, oil and petrochemicals products	133 (10.2)
Specialized construction activities	30 (2.3)
Services	188 (14.4)
<b>Occupation Category</b>	
Maintenance laborers (skilled)	1000 (76.7)
Technical	46 (3.5)
Administrative	1 (0.1)
Professional	12 (0.9)
Unskilled	245 (18.8)
<b>No of days lost from work</b>	
< 4 days	67 (5.1)
$\geq$ 4 days	1237 (94.9)

Table (1) showed that all workers were males with mean age  $35.2 \pm 8.9$ , 40% of them were in age category (31- 41) years. The majority of injured workers were Indians (74%). The mean duration of employment was  $15.7 \pm 3.2$  years. The largest number of nonfatal injuries reported from different industrial activities were; Repair and installation of machinery and equipment (44%), followed by Manufacture of fabricated metal product, computers, electric equipment and basic metals (23.8%). Injured workers were mainly skilled maintenance laborers (76%), followed by unskilled workers (18.8%). Over ninety percent of the reported injured workers (94.9%) had lost 4 days or more from work after the accident occurrence.

**Table (2): Percentage distribution of factors related to accident analysis among reported nonfatal work related injuries.**

<b>Factors related to accident</b>	<b>Description (No =1304) No (%)</b>
<b>Location of the accident</b>	
On site	1271 (97.5)
Out site	33 (2.5)
<b>Causes of the accident</b>	
Sharp objects & machinery	641 (49.2)
Struck by heavy objects	429 (32.9)
Falling from Height	141 (10.8)
Chemicals	80 (6.1)
Others (burns, electric shock)	13 (1)
<b>Factors contributing to the accident</b>	
Unsafe work conditions	1054 (80.8)
Lack of training & knowledge	142 (10.9)
Lack of management policy	57 (4.4)
Not using PPE	51 (3.9)
<b>Type and nature of the injury</b>	
Wounds (cut/abrasion/contused)	537 (41.2)
Eye trauma & foreign body	189 (14.5)
Bites (insect / animal)	162 (12.4)
Fractures, tendon & joint sprains	174 (13.3)
Bleeding	127 (9.7)
Burns & Scalds	62 (4.8)
Others	53 (4.1)
<b>Part of the body injured</b>	
Eyes	350 (26.8)
Head & neck (without the eyes)	154 (11.8)
Abdomen, pelvis & spines	26 (2)
Upper extremities	575 (44.1)
Lower extremities	199 (15.3)
<b>First aid at time of the accident</b>	
Yes	273 (20.9)
No	1031 (79.1)
<b>Had Accident before</b>	
Similar	28 (2.1)
Different	100 (7.7)
No	1176 (90.2)
<b>Outcome of the accident</b>	
Treated	512 (39.3)
Referred	792 (60.7)
<b>If referred (n=792)</b>	
Surgery	279 (35.2)
Medical	8 (1)
Orthopedic	156 (19.7)
Ophthalmology	331 (41.8)
Others	18 (2.3)

Table (2) showed that sharp objects and machinery injury (caught in or between the machine) (49.2%); struck by heavy objects (32.9%) were the most commonly reported injuries. Wounds (cut/abrasion/contused) (41.2%) followed by eye trauma and foreign body (14.5%) constituted the highest percentage of reported occupational injuries types. Upper extremities (44.1%) followed by eye injuries (26.8%) were the most frequency injured part of the body. Unsafe work conditions (80%) was the main factor contributing to the accidents. The majority of accident happened at workplace (on site) (97.5%), while only (2.5%) happened outside workplace, but during working hours. Seventy-nine percent (79%) didn't receive first aid treatment at the site of accident, but they were referred to the nearest medical center. Ninety percent of the workers (90.2%) didn't have accident before.

**Table (3): Relations of industrial activities and different variables resulting in nonfatal work related injuries.**

	Repair and installation of metals and machinery	Manufacture of wood products, textile, glass, plastic & paper industries	Manufacture of fabricated metal product, computers, electric equipment & basic metals	Activities in chemicals, oil and petrochemicals products	Specialized construction activities	Services
	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)
	574 (100)	310 (100)	69 (100)	133 (100)	30 (100)	188 (100)
<b>Occupation Category</b>						
Maintenance laborers (skilled)	460 (80.1)	255 (82.3)	44 (63.8)	86 (64.7)	21 (70)	134 (71.3)
Technical	22 (3.8)	6 (1.9)	2 (2.9)	5 (3.8)	0 (0)	11 (5.9)
Administrative	0 (0)	1 (0.3)	0 (0)	0 (0)	0 (0)	0 (0)
Professional	3 (0.5)	3 (1)	0 (0)	1 (0.8)	1 (3.3)	4 (2.1)
Unskilled	89 (15.5)	45 (14.5)	23 (33.3)	41 (30.8)	8 (26.7)	39 (20.7)
<b>First aid at site of accident</b>						
Yes	115 (20)	70 (22.6)	13 (18.8)	29 (21.8)	5 (16.7)	41 (21.8)

No	459 (80)	240(77.4)	56 (81.2)	104 (78.2)	25 (83.3)	147 (78.2)
<b>Had accident before</b>						
Similar	6 (1)	10 (3.2)	2 (2.9)	1 (0.8)	2 (6.7)	7 (3.7)
Different	46 (8)	24 (7.7)	3 (4.3)	13 (9.8)	0 (0)	14 (7.4)
No	522 (90.9)	276 (89)	64 (92.8)	119 (89.5)	28 (93.3)	167 (88.8)
<b>Factors contributing to the accident</b>						
Lack of training & knowledge	77 (13.4)	24 (7.7)	12 (17.4)	7 (5.3)	2 (6.7)	20 (10.6)
Unsafe work conditions	461 (80.3)	257(82.9)	49 (71)	117 (88)	23 (76.7)	147 (78.2)
Lack of management policy	21 (3.7)	15 (4.8)	5 (7.2)	4 (3)	3 (10)	9 (4.8)
Not using PPE	15 (2.6)	14 (4.5)	3 (4.3)	5 (3.8)	2 (6.7)	12 (6.4)
<b>Type and nature of the injury</b>						
Wounds (cut/abrasion/contused)	210 (36.6)	130 (41.9)	33 (47.8)	67 (50.4)	10 (33.3)	87 (46.3)
Bites (insect / animal)	63 (11)	41 (13.2)	9 (13)	13 (9.8)	2 (6.7)	25 (13.3)
Eye trauma & foreign body	87 (15.2)	56 (18.1)	6 (8.7)	19 (14.3)	3 (10)	18 (9.6)
Fractures, tendon & joint sprains	81 (14.1)	31 (10)	9 (13)	13 (9.8)	5 (16.7)	23 (12.2)
Bleeding	84(14.6)	25 (8.1)	3 (4.3)	13 (9.8)	4 (13.3)	19 (10.1)
Burns & scalds	25 (4.4)	20 (6.5)	4 (5.8)	2 (1.5)	1 (3.3)	10 (5.3)
Others	24 (4.2)	7 (2.3)	5 (7.2)	6 (4.5)	5 (16.7)	6 (3.2)
<b>Cause of the accident</b>						
Falling from height	59 (10.3)	23 (7.4)	8 (11.6)	2 (1.5)	12(40)	78 (41.5)
Struck by heavy objects	183 (31.9)	171(55.2)	21 (30.4)	52 (39.1)	12 (40)	67 (35.6)
Sharp objects & machinery	288 (50.2)	94 (30.3)	35 (50.7)	57 (42.9)	3 (10)	26(13.8)
Chemicals	36 (6.3)	19 (6.1)	5 (7.2)	22 (16.5)	3 (10)	15 (8)
Others	8 (1.4)	3 (1)	0 (0)	0 (0)	0 (0)	2 (1.1)

Table (3) showed that reported accidents were more common among maintenance laborers (skilled) workers in different industries. Absent of first aid at the site of the accident and unsafe work conditions were the most prevalent factor contributing to accidents in all industries. Sharp objects and machinery and being struck by

heavy objects were the most common causes of accidents ( 50.2% and 31.9% respectively) in repair and installation of metals and machinery industries. Wounds and eye trauma were the most prevalent injuries (41.9% and 18.1%, respectively) in manufacture of wood products, textile, glass, plastic and paper industries.

**Table (4) Comparison regarding number of days lost from work and different risk factors.**

Risk factors	No of days lost from work		OR (95% CI)	P value
	< 4 days (No =67)	≥ 4 days (No=1237)		
<b>Age Category</b>				
≤ 30 yrs	22 (32.8)	416 (33.6)	ref.	
31 - 40 yrs	29 (43.3)	493 (39.9)	1.51 (1.03-2.97)	<b>0.04*</b>
41 - 50 yrs	11(16.4)	239 (19.3)	0.87 (0.42-1.83)	0.853
> 50 yrs	5 (7.5)	89 (7.2)	1.06 (0.40-2.88)	0.801
<b>Occupation Category (Maintenance VS Non-maintenance)</b>	60 (89.6)	940 (76)	2.71 (1.23-5.99)	<b>0.011*</b>
<b>Outcome of the accident (referred VS treated)</b>	51 (76.1)	741 (59.9)	2.13 (1.20-3.78)	<b>0.009*</b>
<b>Factoring contributing to accident</b>				
Lack of training & knowledge	8 (11.9)	134 (10.8)	ref.	
Unsafe work condition	52 (77.6)	1002 (81)	3.03(1.4526.342)	<b>0.002*</b>
Lack of management policy	3 (4.5)	54 (4.4)	0.93 (0.24-3.64)	0.918
Not using PPE	4 (6)	47 (3.8)	1.43 (0.41-4.95)	0.520
<b>Part of body injured</b>				
Extremities	37 (55.2)	737 (59.6)	ref.	
Eye	27 (40.3)	323 (26.1)	1.67 (0.11-2.78)	<b>0.023*</b>
Head & neck	1 (1.5)	153 (12.4)	1.13 (0.02-0.95)	<b>0.013*</b>
Abdomen, pelvis & spine	2 (3)	24 (1.9)	1.66 (0.38-7.29)	0.365

<b>Type and nature of injury</b>				
Burns & scalds	3(4.5)	59(4.8)	ref	
Wounds (cut/abrasion/contused etc.)	11 (16.4)	526 (42.5)	4.51 (2.03-10.02)	<b>&lt;0.001**</b>
Bites (insect / animal)	15 (22.4)	159 (12.9)	3.90 (1.19-12.72)	<b>0.001**</b>
Eye trauma & foreign body	15 (22.4)	174 (14.1)	4.122 (1.86-9.14)	<b>&lt;0.001**</b>
Fractures, tendon	15 (22.4)	147 (11.9)	4.879 (2.19-8.85)	0.503
Bleeding	4 (6)	123 (9.9)	1.56 (0.49-4.97)	0.169
Others	4(6)	49(4)	2.43 (0.66-8.96)	0.804
<b>Cause of accident</b>				
Chemicals	7(10.4)	73(5.9)	ref	
Falling from height	3 (4.5)	138 (11.2)	1.46 (0.07-2.897)	0.804
Struck by heavy objects	19 (28.4)	410 (33.1)	4.41 (1.10-7.31)	<b>0.038*</b>
Sharp objects & machinery	38 (56.7)	603 (48.7)	2.89 (0.88-9.528)	0.092
Others	0 (0)	13 (1.1)	0.13 (0.62-7.31)	0.314
<b>Company category</b>				
Services	9 (13.4)	179 (14.5)	ref.	
Repair and installation of metal and machinery	39 (58.2)	535 (43.2)	1.45 (0.68-3.052)	0.389
Manufacture of wood products, textile, glass, plastic & paper industries	10 (14.9)	300 (24.3)	0.66 (0.26-1.663)	0.470
Manufacture of fabricated metal product, computers, electric equipment & basic metals				
	5 (7.5)	64 (5.2)	1.55 (0.50-4.81)	0.535
Activities in chemicals, oil and petrochemicals products	4 (6)	129 (10.4)	0.61 (0.18-2.046)	0.569
Construction activates	0 (0)	30 (2.4)	0.31 (0.01-5.461)	0.615

\*: Statistically significant

\*\*: Highly statistically significant

Table (4) showed that the risk of 4 days or more loss from work were higher in: the age group 30-40 years (OR=1.51, 95% CI: 1.02-2.86, p=0.04) when taking the age group <30 years as a reference group; maintenance (labour) workers (OR=2.71, 95% CI:1.23-5.99, p=0.01) when taking non-maintenance as a reference group. Accidents associated with less days loss are those who were referred to the nearest hospital (OR=2.13, 95% CI:1.20-3.75, p=0.009) when taking treated victim at Al Shuaiba Medical Center as reference. Being struck by heavy objects during work (OR=4.41, 95% CI: 1.11-7.31, p=0.04), was the most risky agent of accident when taking chemicals as a reference group. On studying the nature and type of injury; bites, wound, eye trauma and foreign body significantly increase among reported injuries (OR=3.90,95% CI:1.20-12.72, p<0.001; OR=4.51,95% CI:2.03-10.02, p=0.001; OR=4.12, 95% CI:1.86-9.14, p<0.001, respectively) compared with burns and scalds. Probability of injuries were observed to be significantly higher with injury of the eyes, head and neck (OR=1.67, 95% CI: 1.00-2.78, p=0.023; OR=1.13,95%;CI: 0.02-0.97, p=0.013)) compared with the extremities.

## Discussion

Al shuaiba industrial area in Kuwait included industries of private sector. This work showed some differences and some similarities when compared to other studies of injury surveillance. This may be attributed to differences in the studied population and to the differences in the sources of data analyzed.

In the current study, reported non-fatal occupational injuries were more frequent among younger workers of age category (31-40 years) ( Table 1). This may be due to the fact that older workers occupied senior supervisor positions and they are at a lower risk of exposure to risky situations than younger workers. This is in agreement with several studies (Awadalla and Kamel, (2011); Al Thani et al., 2014; ILO, 2017), which revealed that occupational injury rates are more common among younger workers than older. The majority of reported non-fatal injuries were Indians workers, this is similar to the work done by Barss et al. 2009, who detected higher levels of severe occupational injuries among migrant workers in the UAE, mainly in Pakistanis, Indians and Bangladeshis.

Al Thani et al., (2014) reported that (66% )of work-related injury patients are from South Asia.

In the present study, the higher proportion of injuries among younger age groups and migrant Indians can be due to lack of experience, skills, negligence of safety rules and the deficient in pre-employment training courses in work safety practices (Al Thani et al., 2014).

The proportion of non-fatal accidents taking place in the manufacturing sector is high in all countries reported injuries. This may be because of the large number of people employed in this sector (ILO, 2017). In this study, there is neither agriculture nor fishing activities. However, the high proportion of injury claims to be in machinery repair and installation (44%) and metal (23%) industries ( Table 1), because almost all industrial activities in Al shuaiba area are in manufacturing sector. The present study showed that the highest proportion of reported occupational injuries were among maintenance labourers (76.7%) and unskilled workers (18.8%) (Table 1). This is in accordance to the study of Al-Thani,

et al. 2015, which demonstrated that the highest proportion of occupational injuries in Qatar were among general labourers (42%), transportation and construction workers (19%). Regarding the type of injury ; wound injuries constituted (41.2%) of reported injuries followed by eye trauma and foreign body (14.5%) ( Table 2) . Moreover, the most frequent parts of the body injured were upper extremities (44.1%), followed by eye (26.8%) (Table 2). In accordance to our findings, Al Thani et al., 2014, in their study of work-related traumatic injuries in Qatar;2011-2012, found that (53%) of work-related injuries were in the skin and soft tissues. Both Abbas et al., (2011) and Smith et al., (2005), reported a higher percentage of wound injuries followed by fractures. Comparing our results with injury patterns in other studies, Awadalla and Kamel, (2011), in their study of work-related injuries in Suez Governorate, Egypt; 2008-2009, found that the upper extremities (38.2%) were involved in the largest percentage of work-related injuries. Also, our work was in accordance with Smith et al. (2005) who analyzed the work-related injuries in United states adult population and

found that the upper extremities were the commonest site of injury. However, Al Thani et al., 2014, found that the lower extremities represented (28%) of total work-related injuries in Qatar. Also, According to Al-Arrayed and Hamza, (1995); brass et al., (2009) extremities were most frequently injured followed by chest, head, neck, abdomen and face in Bahrain, Qatar and other Middle East countries.

On the contrary to the present study findings, Awadalla and Kamel, 2011, found that fractures and bruises constituted the highest percentages of occupational injuries (39% and 25%, respectively). In the current study, sharp objects, machinery injuries and struck by heavy objects were the most prevalent of the occupational injuries (49.2%, 32.9%, respectively) ( Table 2). These results were in resemblance to the findings from Chinese (Perry et al., 2005),and from Canadian (Alamgir et al., 2006) studies. On the other hand, Al Thani et al., (2014), found that falling from height (66%) followed by being struck by heavy objects (21.9%) were more commonly observed among work-related injuries admitted patients.

Awadalla and Kamel ( 2011), found that the main working activity contributing to injuries was movement of the worker through the workplace (30%). These movements resulted in slipping, tripping or being struck by objects which represented the main direct causes of the reported injuries (30% and 24 %, respectively).

In the current study (80%) of the causes or factors contributing to accidents collected from the registered data were due to unsafe work conditions and workers not follow safety precautions ( Table 2). This was similar to the findings reported by Al-Thani et al., 2014 who added that only (36%) work-related injured patients used personal protective equipments, while the remaining injured workers were not in compliance with safety regulations in the workplace.

The variety of different work activities in different industries made the cause and type of injury different in each industry, so it is important to identify the risk factors for serious occupational injuries that cause permanent disability or death. This can be used to recognize priority problems and focus on their prevention.

In the present study, most of the injuries happened while the workers moved or handled objects as in repair and installation, manufacture of wood products and nonmetallic products industries, (Table 3). Therefore, the most frequent agents of the accidents were hurt or struck by sharp objects. Unsafe work conditions, lack of training and knowledge increased the incidence of accidents. In these industries, consequently, the most common injuries were wounds injuries followed by foreign body and trauma to the eyes. These findings were in accordance with Khanzode et al. (2010) and Awadalla and Kamel (2011).

In the present work, most of the injuries of construction and services activities are falling from heights (Table 3). These results were in agreement with Zawialla et al (2008) and brass et al. (2009).

On analyzing nonfatal reported accidents that caused 4 or more days work loss and which cause burden at workforce of the studied industrial activities, revealed that the risk was higher among the age group 30-40 years (OR=1.51, 95% CI: 1.02-2.86, p=0.04) when taking age group <30 years old as

a reference group (Table 4). This can be attributed to the increase of the risky activities which these age group are exposed to. Also, apparently the more day loss in maintenance laborers when taking non-maintenance as reference group (OR=2.71, 95% CI:1.23-5.99, p=0.01)) (Table 4). These findings are in accordance to Smith et al. (2005) and Awadalla and Kamel (2011). In the present study, injuries involving eyes (OR=1.67, 95% CI: 1.00-2.78, p=0.023), head and neck (OR=1.13, 95% CI: 0.02-0.97, p=0.013) were associated with high proportion of sick leaves of 4 or more working days, additionally unsafe work conditions was observed to have the higher incidence of more days loss (Table 4). It was observed that accidents associated with less days loss are those who were referred to the nearest hospital (OR=2.13, 95% CI:1.20-3.75, p=0.009) which represented high proportions of wound injuries (OR=4.51, 95% CI:2.03-10.02, p=0.001), eye trauma and foreign body (OR=4.12, 95% CI:1.86-9.14, p<0.001.). Moreover, most of the studied activities in this research deal with movement, working with operating tools and machines. Struck by heavy objects is the most

evident agent (OR=4.41, 95% CI: 1.11-7.31,  $p=0.04$ ) in comparing with chemicals as reference (Table 4). This is in accordance to Mitchell et al., (1998) who have concluded that the increased risk of injuries in different industries were due to the variety of adverse working conditions which workers were exposed to.

### Conclusion and Recommendations

Nonfatal occupational injuries in Al Shuaiba Industrial area are mainly in manufacture sector. Therefore, it is important for the Health Centers in Kuwait to update knowledge and skills and build the capacity of healthcare professionals about the way for reporting occupational accidents and diseases. This study recommends creation of an integrated occupational injury registry database with sources of data from the ambulance, emergency, hospital, and rehabilitation services in collaboration with the Ministry of Labor and Insurance Companies in order to overcome the shortcomings in this surveillance system. Implications of the study findings for occupational practice and policy need to be considered. Appropriate health and safety practices need general implementation.

Implementation of proper protection and applying safety regulations at workplace are recommended.

**Limitations of the study:** There are several limitations in this study such as underrepresentation of encodes data from patients with severe injury or polytrauma; lack of data about medical insurance issues, disability and compensation; employers' details of both private and public sectors. Furthermore, retrospective exploration of this database shows that it still lacks certain specific data about policies and programs for occupational safety and health implementation at workplace.

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