

Work-related Disability among Egyptian Workers

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Abstract Thorough knowledge of the trends of workplace disabilities is essential for the development of strategies for better assessment and fair judgment. The aim of this study was to focus on cases of disability in workplaces presented to the forensic medicine authority in Cairo, Ministry of Justice during 2008 and 2009. The information used was obtained from reports written by Medico Legal Experts (MLE), and then submitted to statistical analysis. There were a total of 142 cases of workplace disabilities in different establishments. Most cases lie between 18 and 34 years of age. Limitation of joint movements was the most frequent type of injury (49.3%), followed by fractures and nerve, tendon or muscle injuries (26.8%) each. Caught by machine was the most frequent event (40%), followed by falls/slips (20%). Hands were the most affected part of the body (28.2%). After assessment by MLE, the highest number of workplace disabilities fell in the 0 to 20% range, and presented in 86 victims (60.6%). Disabilities due to falls/slips and being hit by object scored the highest rating percentages. Of all current study cases, general establishments recorded 89.2 % where private ones were only 10.8 %. This study recommended to revising Egyptian laws regularly, concerning the work accident notification form, for better accident analysis and employees protection and to get suitable compensation in cases of work-related disability.

Keywords Workplace, disability, Egyptian, Medico-legal Expert (MLE)

Introduction

A major part of the general morbidity of the working people is related to work. The goal of making the workers in the world enjoy complete physical and mental health is not yet achieved (WHO, 2006). Work-related injuries are considered a worldwide health problem because they affect a great number of workers, especially young people at productive age. They are also highly disabling, leading to major social and economic consequences (Roberta et al., 2007).

According to the fifth edition of the Guides to the Evaluation of Permanent Impairment, published by the American Medical Association (AMA), disability is defined as "the alteration of an individual's capacity to meet personal, social, or occupational demands because of the impairment" (Cocchiarella et al., 2000). The Florida Impairment Schedule defines impairment as any anatomical or functional abnormality or loss that follows maximal medical improvement (Hunter, 2005). The World Health Organization WHO, (2007) defined disability as temporary or permanent, partial or complete limitation of the activity that results in a difficulty in the performance, or completion of an

activity that is considered normal for a human being (Edward, 2008).

Despite the availability of effective interventions to prevent occupational hazards and to protect and promote health at the workplace, large gaps exist between and within countries with regard to the health status of workers and their exposure to occupational risks (Pan American Health Organization PAHO, 2008).

Many workers' compensation systems allow for partial disability, generating a need for the AMA Guides to measure the extent of the impairment as related to normal functional capacity (Edward, 2008). The goal of the disability assessment process is to develop a detailed picture of the individual being evaluated, including; among other factors, medical impairments, residual functional capacities, post injury attitudes and skills, personality characteristics, the environments in which the individual might again live and work, and levels of functioning prior to impairment. Disability evaluation and rehabilitation professionals do not always agree on nomenclature and specific methodologies, and as a result, both the

meaning and practice of assessing occupational disability vary (Jasen and Stacy, 2009).

In Canada, Breslin et al., (2007) found that the decline in claims was significantly associated with a decline in the proportion of employment in occupations with high physical demands. These findings should generate interest in economic incentives and regulatory policies designed to encourage investment in safer production processes.

Aim of the work

This work aimed to study the cases of disability in workplaces examined at Forensic Medicine Authority in Cairo through two years (2008 and 2009), to determine the type of injury, the part of the body injured, the direct cause of the event, and the type of occupation and to evaluate the disability rating percentage. Gender and age groups were also taken into consideration.

Subjects & methods

This is a retrospective study based on the data collected from the medico-legal reports of workplace disability

victims who were presented to the Medico-legal Administration Department of Cairo, Ministry of Justice during the years; 2008 and 2009.

The study included:

- 1- All those who claimed that their disabilities occurred due to accidents during the course of their work and because of it.
- 2- Persons on special missions outside the establishment.
- 3- Accidents occurred in the way to, or from work.

Exclusion criteria

- 1- Assaults not related to work and suicide attempts.
- 2- Fatal outcomes.

A data collection sheet (figure 1) was designed according to the available data in the examined medico-legal reports followed by statistical analysis.

Data Collection Sheet	
1. Personal data:	
•	Age:
•	Sex:
2. Work related data:	
•	Workers were classified according to work nature into:
a)	Professional workers: Highly educated personals (e.g. engineers, managers, teachers...etc)
b)	Skilled workers: Have a special skill but not highly educated (e.g. electrician, carpenter ...etc)
c)	Non-skilled workers: No special skills (manual workers, laborers...etc)
•	Work places were classified into:
a)	General: All big establishments, companies and factories
b)	Private: Small workplaces with limited resources.
3. Disability data:	
•	Injury date.
•	Injury type.
•	Part injured.
•	The cause.
•	The estimated percent for disability.
4. Final medico-legal opinion about the claim:	
•	True: if it is really a work disability (during the course and because of the work)
•	False: if could not be confirmed as work disability.
•	Rating percentage: According to the Egyptian rating tables following the social security act no.137 for the year 1978

Figure 1: The data collection sheet used in the current study.

Statistical Analysis

The obtained results were recorded and organized for statistical analysis using SPSS software (statistical

package for the social science) version 15 (Spriestersbach et al., 2009).

For quantitative variables, mean /median (as a measure of central tendency), standard deviation/range, minimum, and maximum (as measures of variability) were presented.

Frequency and percentages were presented for qualitative variables.

Kruskal Wallis test was used to estimate differences in quantitative variables.

Z test was used to estimate difference between proportions.

Kappa was calculated as a measure of agreement.

Results

In 2008, 59 cases were seen by medico-legal experts (MLE) for the disability assessment. This number increased significantly to 83 in 2009 (table 1).

Among the 142 cases, regarding the gender, there were only 4 females representing 2.8%, while males represented 97.2 %. The mean age was 30.81 ± 11.7 years. The youngest worker was only 9 years old; while the oldest was 72 years old.

Most injuries occurred in the age group (18-<25) years where it recorded 30.9 % followed by the age group (25-<35) years in which the percentage was 30.1 %. It is noteworthy to mention that the least affected group was the elderly above 60 years (2.9 %). On the other hand, adolescents below 18 years recorded 7.4 % of all injuries (table 2).

Most of the injured workers were non-skilled ones recording 49.3 %, followed by skilled workers 46.5 %. Only 4.2 % were professionals. The least mean age was among non-skilled workers where it was 29.04 ± 11.21 years. There was no significant relationship between age and work injury nature (table 3).

Regarding the classification of workplace nature and the distribution of cases, of 142 cases data there was missing in records of 3 cases. The injuries in the big (general) establishments recorded 89.2% while in the small (private) ones; it recorded only 10.8 % (table 4).

Concerning the month in which injury occurred, the highest frequency of injured cases reported was in August (14.1%) followed by July (13.4%) and the least was 2.1 % in February (table 5).

Regarding the part of the body injured, hands were the most affected part of the body in workplace disabilities (28.2%) followed by the back (14.1%) then lower limbs (13.4%). Multiple organ affection at a time was recorded in 9.2 % of cases. Despite this percentage was not the highest, it was disabling as it involved the head in 3 cases: two were severe with 100% disability and one was not related to work (figure 2).

Occupational injuries distributed according to the event leading to injury showed in table (6). Caught by machine was the most frequent event (23.9%), followed by falls/slips (14.8%) then hit by object (13.4%).

Figure (3), showed Distribution of injury type among disability cases, where

- Limitation of joint movements were the most frequent type of injury

found in 70 cases (49.3%) followed by fractures and nerve, tendon or muscle injuries (26.8%) each.

- Amputation resulted as workplace disability in 31 cases (21.8 %).
- Hearing loss as well as foreign body (FB) in soft tissue was the least frequent types of injuries found in 1 case for each (0.7%).

Table (7) showed the distribution of injury type according to age groups. Limitation of joint movements was the commonest injury recorded (70 cases) followed by nerve, tendon & muscle injuries as well as fractures (38 cases for each). They occurred in all age groups up to 60 years. The least injuries recorded were hearing loss, which occurred in the age group 18-<25 years and foreign body in soft tissue that affected the age group between 25-<35 years (1 case for each).

Elderly (> 60) were mostly affected by amputation and systemic diseases (2 cases for each).

Out of valid claims, forensic assessment by medico-legal expert (MLE) revealed that 75.9 % were confirmed true (injuries due to and in the course of the work), while 24.1 % were not (table 8).

Out of 137 cases claiming work-related injuries and according to MLE assessment, 104 cases were workplace injuries (i.e. they were due to and in the course of the work). Ninety eight of these resulted in disabilities and scored a rating percentage (i.e. most workplace injuries were disabling). In addition, there were 33 cases with injuries resulted in disabilities and scored a rating percentage but labeled as not due to work (table 9). The majority scored rating percentage, as measure of agreement (kappa) was significant. Cases where percentage is not determined and/or claim is not confirmed are excluded from this table (5 cases). Measure of agreement (Kappa) is 0.737 that means: most cases that confirmed as work disability, the rating percentage was determined

Disability percentage ranges according to MLE assessment were shown in figure (4). The highest percentage of workplace victims' disabilities (60.6%) fell in the (0-20%) range. The lowest percentage of workplace victims' disabilities (4.2 %) was found in the disability percentage range (>60-80%).

While the complete disability (100%) group analysis was;

There were 8 victims suffered from complete disability (100%), their analysis was as the following:

- One victim suffered from; renal failure, left sided paresthesia, cancer bladder and hypertension. He claimed that his disability because of stressful nature of the work but forensic assessment revealed no association.
- Two victims suffered from spinal injury, paralysis and incontinence. One fell down from high level on the back, the other involved in transportation injury.

- One victim suffered from head injury when a heavy object fell on his head complicated by right side paralysis.
- One victim suffered from: amputated fingers in both hands when they were caught by an operating machine.
- One victim suffered from head and eye injuries complicated by brain atrophy.
- One victim suffered from: fractures in pelvis and both lower limbs complicated by paraplegia.
- One victim suffered from bilateral eye injury complicated by loss of vision.

Table (10), showed the relation between injured parts and their disability percentage range. The 0 to 20% range was most frequently scored by extremities (67.6%) and back (19.5%) disabilities. Most severe disabilities scoring > 80% resulted mainly from multiple body parts affection.

Table (11), showed the relation between main types of injuries and their disability percentage range. The most frequent injury type that scored 0-20 % disability was limitation of joint movement (42 cases)

followed by fracture (25 cases). Again Limitation of joint movement (3cases) and nerve, tendon or muscle injury (3 cases) were the most disabling scoring > 80%.

Relation between event and age group was shown in table (12). Relatively old aged (median=43.5 years) were more prone to be disabled by sitting or standing for long time during their work. P value= 0.054 which is > 0.05 which was statistically insignificant.

Table (13) showed the rating percentage difference according to the cause (event). Falls/slips and hit by object were the most disabling events scoring 32.06±27.8% and 32.18±29.9% respectively. Sitting or standing for long time was the least (7.50±12.55 %). P value is < 0.005 which was statistically significant.

The Relation between rating percentage and different age groups were showed in table (14). Elderly (>60 years) are more liable to severe disabilities scoring (31.44 ±9.72 %). Those aging 35-<45 years of age scored the least rating percentage (16.39 ±17.24%). P value= 0.373 which is > 0.05 which was statistically insignificant.

Table (1): Frequency of workplace disability claims in each year.

Year	No.	%	P
2008	59	41.5	<0.05
2009	83	58.5	
Total	142	100	

Table (2): Frequency of cases regarding different age groups.

Age group (years)	Frequency	Valid %
Valid		
<18	10	7.4
18- <25	42	30.9
25-<35	41	30.1
35-<45	28	20.6
45-60	11	8.1
>60	4	2.9
Total	136	100.0
Missing System*	6	
Total	142	

* Age data were missing in records of 6 cases

Table (3): The distribution of cases and mean age ±SD according to work nature.

Work nature	Frequency	Percent	Mean age ±SD (years)	P value
Non-skilled	70	49.3	29.04±11.213	0.125
Professionals	6	4.2	36.17±7.653	
Skilled	66	46.5	32.17±12.478	
Total	142	100.0		

P > 0.05 not significant

Table (4): Classification of workplace nature into general and private sectors and their distribution.

Sector	Frequency	Valid Percent
Valid		
General	124	89.2
Private	15	10.8
Total	139	100.0
Missing System*	3	-
Total	142	-

* Data were missing in records of 3 cases (i.e. total no. of cases =139)

Table (5): Workplace disability cases percentage according to the month in which injury occurred.

Month	Frequency	Percent (%)
January	16	11.3
February	3	2.1
March	11	7.7
April	10	7.0
May	12	8.5
June	12	8.5
July	19	13.4
August	20	14.1
September	14	9.9
October	9	6.3
November	6	4.2
December	10	7
Total	142	100.0

Table (6): Occupational injuries distributed according to the event leading to injury.

Cause of injury	Frequency	%
Stress	18	12.7
Burn	7	4.9
Falls/slips	21	14.8
Caught by machine	34	23.9
Hard activity	5	3.5
Hit by object	19	13.4
Lifting heavy objects	7	4.9
Sitting or standing for long time	6	4.2
Explosion	5	3.5
Transportation injury	6	4.2
Repeated exposure	5	3.5
Assault	1	0.7
Overcrowding	1	0.7
Neglect	1	0.7
Multiple events	4	2.8
Unknown	2	1.4
Total	142	100.0

Table (7): Distribution of injury type according to age groups.

Injuries	Total No.	Age categories (years)											
		< 18		18-<25		25-<35		35-<45		45-60		> 60	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Fractures	38	4	10.5	9	23.6	16	42.1	5	13.1	4	10.5	0	0
Nerve, tendon, muscle	38	5	13.1	13	34.2	13	34.2	4	10.5	3	7.8	0	0
Muscle atrophy	4	0	0	2	50	1	25	0	0	1	25	0	0
Pain	10	1	10	1	10	2	20	4	40	1	10	0	0
Paralysis, paresthesia	12	2	16.7	5	41.7	2	16.7	2	16.7	1	8.3	0	0
Limitation of joint movement	70	5	7.1	21	30.0	20	28.6	14	20.0	8	11.4	0	0
Amputation	31	2	6.4	10	32.2	10	32.2	5	16.1	1	3.2	2	6.4
Eye injury	8	1	12.5	2	25.0	4	50.0	1	12.5	0	0	0	0
FB on external eye	2	0	0	1	50	0	0	1	50	0	0	0	0
FB in soft tissue	1	0	0	0	0	1	100	0	0	0	0	0	0
Spinal injury	3	1	33.3	1	33.3	1	33.3	0	0	0	0	0	0
Incontinence	3	1	33.3	1	33.3	1	33.3	0	0	0	0	0	0
Systemic diseases	21	1	4.8	4	19.0	3	14.3	8	38.0	3	14.3	2	9.5
Head injury	2	0	0	1	50.0	0	0	1	50.0	0	0	0	0
loss of vision	7	1	14.2	2	28.6	2	28.6	2	28.6	0	0	0	0
Hearing loss	1	0	0	1	100	0	0	0	0	0	0	0	0
Skin disfigurement	8	1	12.5	4	50.0	2	25.0	0	0	1	12.5	0	0
Psychological	5	0	0	2	40.0	3	60.0	0	0	0	0	0	0
Others	6	0	0	1	16.6	4	66.7	0	0	1	16.6	0	0

Table (8): Distribution of cases according to claim.

Claim		Frequency	Valid Percent
Valid	False	34	24.1
	True	107	75.9
	Total	141	100.0
Missing System*		1	-
Total		142	-

* There was one case could not be confirmed.

Table (9): Relation between claim and disability percentage recorded.

		Claim		Total
		False	True	
Rating percent	NO count	26	6	32
	YES count	7	98	105
	Total count	33	104	137
		Value	P	
Measure of Agreement	Kappa	.737	0.000	
No. of Valid Cases		137		

Table (10): The relation between injured parts and their disability percentage range.

Part injured	Hand		Back		Lower limb		Upper limb		Multiple parts		Eye		Body systems		Others		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Disability %																		
0-20%	24	48.2	17	19.5	13	14.9	4	4.5	5	5.7	3	3.4	11	12.6	10	11.4	87	60.6
> 20-40%	10	35.7	0	0	3	10.7	5	17.8	1	3.5	5	17.8	2	7.1	2	7.1	28	19.7
>40-60%	5	35.7	1	7.1	3	21.4	1	7.1	2	14.2	0	0	0	0	2	14.2	14	9.9
>60-80%	0	0	0	0	0	0	3	60	1	20	0	0	1	20	0	0	5	4.2
>80-100%	1	12.5	2	25	0	0	0	0	4	50	1	12.5	0	0	0	0	8	5.6

Table (11): Relations between main types of injuries and their disability percentage range.

Injury type	Fracture		Nerve, tendon or muscle injury		Limitation of joint movement		Amputation	
	No.	%	No.	%	No.	%	No.	%
Disability %								
0-20%	25	65.7	22	57.8	42	60	17	54.8
> 20-40%	4	10.5	7	18.4	14	20	6	19.3
> 40-60%	5	13.1	4	10.5	8	11.4	6	19.3
> 60-80%	2	5.2	2	5.2	3	4.3	1	3.2
> 80-100%	2	5.2	3	7.8	3	4.3	1	3.2

Table (12): the Relation between event and age group.

Cause	Median (year)	Mean age (year)
Burn	26.5	29.23+8.786
Fall from height		26.72+8.723
Caught by machine		29.88+14.25
Hard activity		34.57+14.49
Others		27.39+9.611
Hit by object		31.44+9.716
Lifting heavy objects		34.88+4.291
Sitting or standing for long time		43.5

P value= 0.054 which is > 0.05 which was statistically insignificant

Table (13): the rating percentage difference according to the cause.

Cause	Mean rating % \pm SD	Median rating %	Range of rating %
Burn	19.17 \pm 23.5	10.00	0-65
Falls/slips	32.06 \pm 27.8	20.00	7-100
Caught by machine	28.65 \pm 22.9	20.00	5-100
Hard activity	12.27 \pm 25.2	0	0-100
Hit by object	32.18 \pm 29.9	20	0-100
Lifting heavy objects	16.25 \pm 11.877	17.50	0-35
Sitting or standing for long time	7.50 \pm 12.55	0	0-30
Others	27.63 \pm 24.9	35.00	0-75

P value is < 0.005 which was statistically significant.

Table (14): Relation between rating percentage and different age groups.

Age group (years)	Median rating %	Mean rating percentage
<18	30.00	28.6 \pm 20.4
18-24	20.00	30.19 \pm 27.4
25-34	15	25.36 \pm 28.44
35-44	11.50	16.39 \pm 17.24
45-60	20.82	17.42 \pm 20.82
>60	18.50	31.44 \pm 9.716

P value= 0.373 which is > 0.05 which was statistically insignificant.

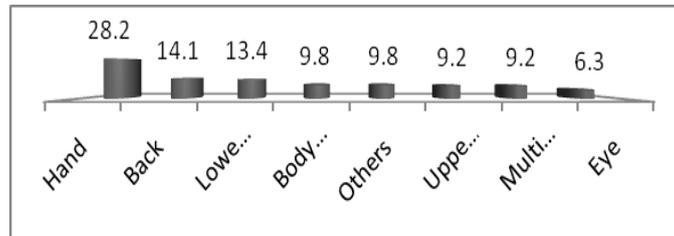


Figure (2): Percentage of cases according to part of the body injured: Lowe=lower limb, Body= body systems, Uppe=upper limb, Multi= multiple organs.

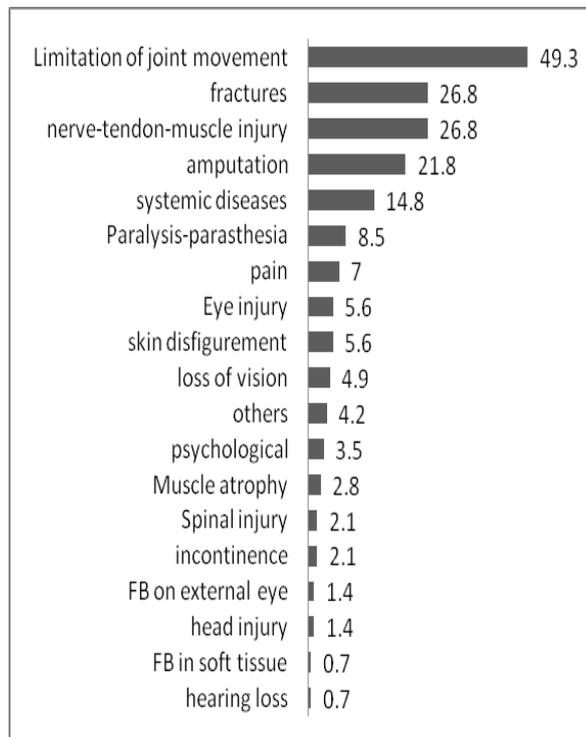


Figure (3): Distribution percentage of injury type among disability cases: FB=foreign body.

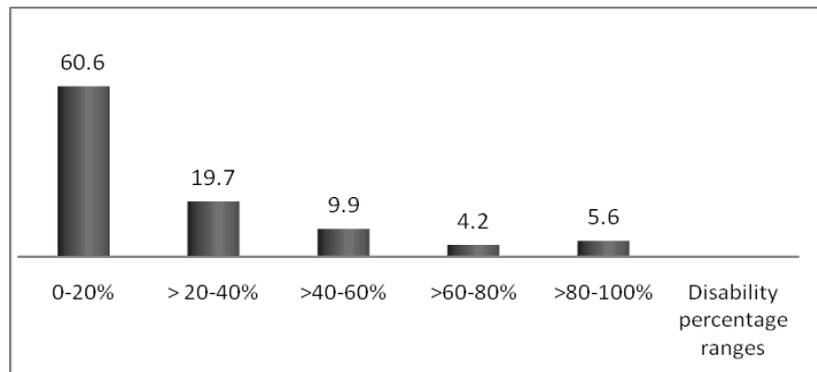


Figure (4): Disability percentage ranges (According to MLE assessment).

Discussion

Bureau of Labour Statistics survey, workers compensation, medical records and physician reporting system are possible channels for reporting workplace injuries and illness but still under-reporting can occur (Azaroff et al, 2002).

Schulte, (2005) stated that the magnitude of occupational disease and injury burden is significant but underestimated. There is a need for an integrated approach to address these underestimates.

Before discussing the findings of the current study, limitations of the study are to be mentioned. First of all, studies that have focused on disability in workplaces in developing countries are scarce. Therefore a comparison of the results with the findings of other studies conducted in similar environments was difficult. Other general injury studies have mentioned workplace injuries, but detailed analysis was lacking. Also, the role of MLE in assessing disability is rarely discussed.

In the present study, as regarding the sex, females represented 2.8 % of cases of occupational injury and there was a predominance of male gender (97.2 %). All studies from developing or developed countries agree with the current study result. In a study in AL-Ain district in Emirate, males accounted for 98% of injuries (Barss et al., 2009). In Iran, among 1180 cases with workplace injuries, 95% of them were males (Roudsari and Ghodsi, 2005). In Egypt, according to the statistical report for occupational injuries for the year 2007, about 93% of workplace injuries were among males (CAPMAS, 2008). Jin et al., (2010) agreed with us and concluded that Injury frequency was more associated with male gender. This finding was explained by Driscoll et al., (2005), who reported that men occupy a large majority of hazardous jobs and so has a higher probability to be injured. Furthermore, in developing countries like Egypt; the majority of the workforce consists of males, making them more liable for injuries than females' counterparts.

Regarding different age groups, in the current study, one third of the injuries occurred in the age group 18-<25 years representing 30.9 %. Besides, there were 7.4 % below 18 years old.

This result agreed with Driscoll et al., (2005) who reported that younger workers (aged 15-24) are significantly more likely to suffer non-fatal workplace accidents than their older colleagues. Again, Chau et al, (2002) found that a higher risk was only found in subjects younger than 30 years.

Young age is associated with a lack of experience which predisposes to the occurrence of injuries; it could also be associated with a lack of job knowledge and know-how (Salminen, 1994). Takala, (1999) also explained that the causes for the increase amongst young workers are various, including their lack of work experience and understanding of workplace hazards. As most of the young employees, in a study presented by Nakata et al., (2006) required acquiring skills on the job but without training; they have a higher risk of being injured.

Contrary to the present study results, CDC, (2007) stated that in USA National Electronic Injury Surveillance System (NEISS) report about workplace injuries in the year 2004; Workers aged 25-54 years accounted for 70% of all injuries/illnesses.

Concerning work nature, in the current study, professionals represented only 4.2% while skilled and non-skilled workers were at high risk recording 46.5 % and 49.3 % respectively. This was consistent with the results of the study done by Bhattacharjee et al., (2003) who stated that the job category made the highest contribution to injury involvement; laborers, farmers, craftsmen and tradesmen had the highest risk, and employees and technicians also had greater risk than executives, intellectual professionals. This also was in agreement with d'Errico et al., (2007).

Concerning the injury frequency's seasons in the current study, the highest frequency of injured cases reported in August (14.1%) followed by July (13.4%) and the least was in February (2.1 %).

This agreed with Morabito et al., (2006) who explained this by thermal effects of hot weather which cause stressful behavior and decreased concentration. This was not the case in CAPMAS, (2009) where most injuries were in January (9.8 %) and the least were in December (5.9 %).

As far as the event leading to injury is concerned, the most frequent event of the current study was Caught by machine (40%) followed by falls/slips (20%) then being hit by object (13.4%).

These findings agreed with the data on serious workplace accidents in three years from the Aegean Region of Turkey showed that 35.6% of cases were due to caught in, under or between something, followed by fall 21% and then collision against or by object (15%) (Ergör et al., 2003). In consistent with this, in USA NEISS report about workplace injury and illness, in table of events leading to injury collision against a part of machine was the most frequent cause (CDC, 2007). In contrast, the events were arranged in an Emirate study as follows: External causes of work related injuries included falls 51%, falling objects 15%, powered machines 11%, animal-related 7% and burns 6 % (Barss et al., 2009). A little bit different results were noticed in a study based on an emergency department injury surveillance system in Managua, Nicaragua where (80%) of the recorded work related injuries were due to falls, blunt objects trauma (28%), and stabs/cuts (23%) (Noe et al., 2004).

Regarding type of injury, the present study showed that Limitation of joint movements was the most frequent type of injury representing (49.3%) followed by fractures (26.8%) and nerve, tendon or muscle injuries (26.8%). Unfortunately, amputation recorded (21.8 %).

In partial agreement with these results, the analysis of nature of injury in a study examining the circumstances and nature of the workplace injuries in Isfahan Steel Company revealed that fracture frequency was 30.8% but had the greatest frequency of injuries (Maryam et al., 2009). Similarly, in 2001 in Michigan, (41%) of work-related injury hospitalizations were due to fracture of an upper or lower extremity (Stanbury, et al., 2003). The finding in this study is not consistent with the national surveillance of occupational injuries in Nicaragua, in 2004, where the most frequent workplace injuries were bruises (41%) followed by wounds (25%) (Noe et al., 2004).

As far as injured part is concerned, hands were the most affected in workplace disabilities (28.2%) followed by the back (14.1%) then lower limbs (13.4%).

This is agreed with Trybus and Guzik, (2004) who reported that hand injuries are the most frequent body traumas sustained at work. While in their cohort study, Craig et al, (2006) gave some credence to these findings. The most injured body parts included lower extremities (28.6%), upper extremities (27.2%), back (25.9%), and head/face/eyes (6.8%). No much difference was noticed in a study in USA among Hispanic and foreign born workers injured workers .Frequency followed this order: upper extremity injury, head and neck injury, lower extremity and trunk injury, respectively (Forst, et al. 2010).

Discussing events leading to injury in relation to age in the current work, it was found that disability among younger age groups (median=26.5 years) occurs mainly when they are caught by a machine while old aged (median=43.5 years) are more prone to be disabled by sitting or standing for long time during their work.

Chau, et al., (2002) noted a higher injury risk among workers <30 years old due to handling materials/machine parts during assembly, using hand tools and collision with/by moving objects or vehicles, whereas among older ages (especially those aged 50-55 years), there was a higher injury risk due to fall on same level or to lower level, handling materials/machine parts during assembly, lifting/handling objects or equipment, collision with/by moving objects or vehicles, and using hand tools. Moreover, Jovica et al., (2004), reported that when injuries do occur, older workers are usually more severely hurt.

Concerning rating percentage, the highest number of workplace victims' disabilities fell in the 0-20% range presented in 86 victims (60.6% of cases). The lowest number of workplace victims' disabilities (6 victims) was found in the disability percentage range (>60-80%). We found that multiple body parts affection despite being not frequent but caused high scores in rating percentage (80-100%) this is due to summation of disability scores for all organs affected.

This agreed with Welch et al., (2005) study which revealed that about 10 % of the injured workers had two injury diagnoses, sometimes to different body parts. Therefore, some workers are counted in more than one category, and the percentages add up to more than 100%. Elleuch et al., (2004) have conducted a similar retrospective study to 242 files examined by Tunis medical board authorized to set out the permanent disability rate resulting from industrial accidents and occupational diseases, but their study was restricted to lumbar back accidents. The present study showed that most back injuries scored a rate between 0 to 20 %. While -in the Tunisian study- the average rate of permanent disability was of 8%.

In the present study, the relation between rating percentage and different age groups showed that elderly (>60 years) are more liable to severe disabilities while those between 35 and 44 years of age scored the least rating percentage. In a statistically significant relation between events and rating percentage, we found that falls/slips and hit by object were the most disabling events while sitting or standing for long time was the least. Jin et al., (2010) found that severity of injury is related mostly to powered machine use. In 2001, in Michigan, the leading causes of work-related disabilities of high rating percentage were; falls, traffic crashes, burns, machinery, electric shocks, and assaults (Stanbury et al., 2003).

In the current study, comparing number of claims in 2008 and 2009, workplace disability claims have increased by 17 % in 2009.

More than three quarter of all cases were true claims according to MLA (i.e. they were due and in the course of the work). The majority scored rating percentage (i.e. most workplace injuries were disabling). Measure of agreement (kappa) was significant.

In contrast to Tasha, (2006) that determined accepted disabling claims in 5 years period by only 18%. This may be due to detailed accident analysis and complex compensation rules. Wind et al., (2009) found that the physicians most often changed their judgment regarding the claimant's work ability when taking the FCE (Functional Capacity Evaluation) protocol into account.

Of all current study cases, general establishments recorded 89.2 % where private ones were only 10.8 %.

A possible explanation is that despite the employee may have the right to apply for workers' compensation; nothing would prevent the employer from discharging or disciplining the injured employee for pursuing compensation. For fear of this possibility, an employee may be less likely to pursue compensation, or even medical attention, for his injuries" (Colledge et al., 2009).

Developing countries, where the rate of accidents has been increasing, face particular challenges. There, most workers are in the informal economy where work-related accidents, disease and death are likely to be unrecorded (ILO, 2009).

In Egypt, the accurate and reliable recording system for cases of work-injuries is still lacking. There is a clear need for better and more reliable data on the nature, causes and extent of injuries. Rating tables approved by social insurance laws are used by medico legal experts in an attempt to reach clear and fair judgment, but still individual variation among examiners affects assessment.

Recommendations

This study recommends modifying and revising Egyptian laws, concerning "the social security act No.79 for the year 1975" demonstrating "the work accident notification form", in comparison to work accident analysis forms in US department of labour, for better accident analysis and employees protection.

In addition, the present work recommends improving the forensic examination and assessment of workers disabilities due to workplace-accidents in Egypt, in order to make workers compensation claims, in front of the civil courts, more subjective, obvious, and fair.

Hopefully, these findings could stimulate and guide future research and intervention work focusing on this major problem from forensic point of view.

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الملخص العربي

الإعاقة المتعلقة بالعمل بين العمال المصريين

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المعرفة الدقيقة لأنماط الإعاقة في مكان العمل أمر ضروري لوضع استراتيجيات لتقييم أفضل وحكم عادل. كان الهدف من هذه الدراسة هو التركيز على حالات العجز في الطب الشرعي التابعة لوزارة العدل بالقاهرة خلال عامي 2008 و 2009، حيث تم الحصول على البيانات المستخدمة في هذا البحث من تقارير مكتوبة من قبل خبراء الطب الشرعي ثم خضعت هذه البيانات للتحليلات الإحصائية.

كان إجمالي عدد حالات الإعاقة في مكان العمل في المؤسسات المختلفة 142 حالة وكانت المرحلة العمرية لغالبية الحالات بين 18 إلى 34 سنة. وقد أظهرت النتائج الإحصائية أن محدودية حركة المفاصل كان هو نوع الإصابة الأكثر شيوعاً بنسبة (49.3%) تلتها الكسور وإصابات الأعصاب والأوتار والعضلات بنسبة (26.8%) لكل منهم. كما أظهرت النتائج أن الإمساك من قبل آلة كان الحدث الأكثر شيوعاً (40%) تلاه السقوط/الانزلاق (20%). وقد كانت اليد هي الجزء الأكثر تضرراً من الجسم (28.2%).

و بناءً على قديم خبراء الطب الشرعي أعلى عدد (86 ضحية) من حالات الإعاقة في مكان العمل في النطاق "صفر إلى 20%" من تصنيف الإعاقة، وبنسبة 60.6% من إجمالي عدد الحالات في هذا البحث، بينما سجل العجز بسبب السقوط/الزلل والتعرض للارتطام أعلى نسبة مئوية من تصنيف الإعاقة. وفيما يتعلق بنوعية جهة العمل فقد أوضحت الدراسة الحالية أن المؤسسات العامة سجلت النسبة الغالبة (89.2%) بينما كانت نسبة الحالات بالمؤسسات الخاصة 10.8% فقط.

وقد أوصت الدراسة بمراجعة القوانين المصرية بانتظام فيما يتعلق باستمارة التبليغ عن حادث العمل من أجل تحليل أفضل للحادث ولحماية العاملين وللحصول على تعويض مناسب في حالات الإعاقة ذات الصلة بالعمل.

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