

WORK RELATED INJURIES IN THE INDUSTRIAL SECTOR FOR THE YEARS 1981 AND 1985

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دراسة إصابات العمال في القطاع الصناعي لعامي 1981 و 1985

الخلاصة

دراسة إصابات العمال في القطاع الصناعي لعامي 1981 و 1985. تم إجراء دراسة إحصائية على إصابات العمال في القطاع الصناعي في العراق لعامي 1981 و 1985. أظهرت النتائج وجود فروق ذات دلالة إحصائية بين عدد الإصابات التي وقعت في هذين السنتين. في عام 1981، كان متوسط عدد الإصابات لكل 1000 عامل هو 4.4، بينما في عام 1985، كان متوسط عدد الإصابات لكل 1000 عامل هو 2.3. كما لوحظ أن نسبة الإصابات تزداد مع تقدم العامل في العمر، وكذلك مع زيادة مدة عمله. من الأسباب الشائعة للإصابات في هذين السنتين: الآلات، السقوط، والحوادث. كانت الجروح هي النوع الأكثر شيوعاً من الإصابات، تليها الكسور. كانت الإصابات في الأطراف العلوية هي الأكثر شيوعاً. كما لوحظ أن نسبة الإصابات تزداد مع تقدم العامل في العمر، وكذلك مع زيادة مدة عمله.

SUMMARY:

This study, showing work-related injuries in the industrial sector, a statistically significant difference between the number of injuries that happened in 1981 and in 1985 was detected. In 1981, the average number of injuries was 4.4 per 1000 workers, while in 1985 it became 2.3 per 1000.

A decrease in incidence was noticed as the workers grew older or as their work duration was increased except in those whose work duration was over 10 years, and the incidence among skilled workers was found to be higher. The most common causes that led to the injuries were the machines, falls and slips of workers and materials, while the most common type of injuries was wounds, whereas the average work days lost due to fractures were higher. Upper limbs were the commonest sites of injuries in the body.

A significant difference was also detected when the injuries were studied

according to the time of the day, day of the week, or the month of the year of its occurrence.

INTRODUCTION:

Modern technology in industry was accompanied by a noticeable increase in work-related injuries and this could be attributed to a lower pace progress in safety inspection techniques and hazard prevention facilities. In addition, the difficulties that might arise whenever workers are asked to adapt themselves to a recently modified or invented machine.

Annually, approximately 50 million industrial injuries are registered world-wide⁽¹⁾, or about 160 thousands injuries a day. The same reference indicates that the economical losses due to these injuries is about 50% of the gross national product. Other studies⁽²⁾ indicate that countries such as Japan and the U.S.A. report more than a million injuries every year, while countries such as France, FRG, and Italy report even more.

In Iraq, we depend on our annual statistical report in identifying the incidence of our work-related injuries. Such report contains some information issued by the Ministry of Labour and social affairs about such injuries and following the scheme used by the ILO⁽³⁾. The numbers published in these forms only reflect total numbers which makes it difficult to detect for a real increase or decrease in injuries that happen in a particular type of industry, which in turn will make it difficult for the safety personnel to apply protective procedures in that particular industry affected most by injuries.

In this study we want to throw some light on the nature of work-related injuries in a particular industry in order to give the necessary recommendations to limit the increase of such injuries and even to prevent them from happening in the future.

METHODS:

1. Information regarding workers involved in the study were taken out of their record files kept in the State Foundation for Retirement and Social Security. The workers involved were those who were affected by an injury during 1981 or 1985. This work was done with the help of Workers Union Secretariat of Work Relations, Dept. of Industrial Safety.

2. The total number of the Iraqi work force (labourers only) was taken from the Departments of Planning and Statistics in the Ministry of Industry as well as the Ministry of Heavy Industry for 1981 and 1985. The number of workers for 1985 included both males and females involved.
3. No information were available as to gender, occupation, ethnic group, duration of work, educational level.
4. Data were analyzed and a Chi-square test of significance was used whenever applicable.
5. Since a significant difference ($P < 0.001$) was detected between injuries of 1981 and those of 1985, we decided to keep them apart.
6. Since no statistically significant difference ($P > 0.05$) was detected between males and females for the year 1985, then they were kept together and a similar procedure was done for 1981 based on the same conclusion.
7. In tables 8 and 9, we hypothesized that the number of injuries were equal as to the time of the day, day of the week and month of the year, and we used the chi-square test on this basis.
8. In the tables, there will be a column for "missing values" due to the lack of such information in the workers' files.
9. Since the information regarding age, occupation, etc. were missing in the 'workers' regards in general, than it would be impossible to use any statistical method to give any specific explanation for the results, and that is why we will only use percentages as a basis for our discussion in comparing our results with results of other studies done in the countries^(4,5,6,7).

RESULTS:

In 1981 there were 506 work-related injuries (4.4 per thousand), while in 1985 there were 315 injuries only (2.8 per thousand), Table 1. In spite of the higher incidence of male injuries, no statistically significant difference was detectable (Table 2). In the same table it is found that the workers affected belong to different nationalities. Table 3 shows that the rate for "illiterates" has declined from 12.5% in 1981 to 10.3% of workers in 1985. Those with a "lower income" i.e. less than 69-89 Iraqi dinar monthly had also shown a decline in the incidence of their injuries in 1985 as compared to 1981.

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Table 1. The average number for injuries per 1000 insured workers according to the site of their work.

		1981	1985
Insured work force	In industry	114518	111387
	Other sectors	588106	631397
	Total	702624	742784
Injuries	In industry	506	315
	Other sectors	4076	1902
	Total	4582	2217
Average number of injuries per 1000 insured workers.	In industry	4.4	2.8
	Other sectors	6.9	3.0
	Total	6.5	3.0

* Chi-square value for 1981 = 80.8 ($P < 0.001$).

* Chi-square value for 1985 = 1.95 ($P > 0.05$).

* Chi-square value for 1981 vs 1985 for industry sectors. = 39.4 ($P < 0.001$).

Table 2. Distribution of workers in industry according to sex and the number of injuries.

		1981		1985	
		No.	%	No.	%
Work force	Females	•	-	16460	14.8
	Males	•	-	94927	85.2
	Total	•	-	111387	100
Nationality Injuries	Females	50	9.9	40	12.7
	Males	456	90.1	275	87.3
	Total	506	100	315	100
	Iraqi	444	87.8	240	76.2
	Egyptian	44	8.7	64	20.3
	Arabian	3	0.6	2	0.6
	other than Iraqi and Egyptian				
	Foreign	3	0.6	8	2.5
	Unknown	12	2.3	1	0.3
	Total	506	100	315	100

* Information not available.

The chi-square value for injuries in males and females for 1985 = 1.6 ($P > 0.05$).

Table 3. Distribution of injuries by the salary of the injured in industry sector and the educational rate.

Table 3. Distribution of injuries by sector and the educational rate.					Injuries				
Education	Injuries		1985		Salary Iraqi dinars	1981		1985	
	No.	%	No.	%		No.	%	No.	%
Ignorant	89	19.5	31	10.3	Less than 70	137	44.7	80	36.7
Read only	29	6.3	15	5.0	70-79	58	18.9	37	17.0
Write & read	300	65.6	214	73.0	80-89	48	15.6	30	13.8
Elementary	21	4.6	17	5.7	90-99	39	12.7	30	13.8
Secondary	13	2.8	15	5.0	100-119	17	5.5	22	10.1
Others	5	1.2	3	1.0	120-144	8	2.6	13	6.0
					150 and over	-	-	6	2.6
Total	457	100	300	100	Total	307	100	218	100
Unknown	49		15			199		97	
Grand total	506		315			506		315	

Table 4. Number of injuries in the industry sector classified according to age and years of employment.

Age and years of employment									
Age years	Injuries				Years employed	Injuries			
	1981		1985			1981		1985	
	No.	%	No.	%		No.	%	No.	%
19	110	25.2	76	27.2	<one	96	23.6	67	25.3
20-24	63	14.4	35	12.5	1-3	77	18.9	56	21.1
25-29	63	14.4	32	11.5	4-6	67	16.5	36	13.6
30-34	49	11.2	31	11.1	7-9	41	10.0	28	10.6
35-39	46	10.5	29	10.4	>10	126	31.0	78	29.4
40-44	36	8.3	27	9.7					
45-49	28	6.5	23	8.3					
50-54	26	6.0	15	5.4					
55	15	3.5	11	3.9					
Total	436	100	279	100		407	100	265	100
Unknown	7		36			99		50	
Grand									
Total	506		315			506		315	

Table 4 shows a gradual decline in injury rates with their progress in age and this situation was similar in the two periods, i.e. 1981 and 1985. It was also

noted that the rate of workers affected has decreased with the increase in the duration of their service, except for those with a duration of 10 years or more. Table 4 also shows that a high rate of those affected were skilled workers (71.7% in 1981 and 63% in 1985), and that the most common cause for injuries in both periods was the machine followed by "falls" of workers than spill in materials.

Wounds were the commonest among the type of injuries (36.2% in 1981 and 42.2% in 1985) followed by fractures then amputations and contusions. The situation was similar in both periods (Table 5). The highest average for work days lost was due to fractures (39.7 days in 1981 and 26.0 days in 1985) follo-

Table 5. Number of injuries according to the occupation of the injured classified according to the cause of injury.

Occupation	injuries		Cause of Injury		Injuries		Injuries		
	1981		1985		1981		1985		
No	%	No	%	No.	%	No.	%		
Non skill					Machine	120	23.7	97	30.8
workers	135	28.3	114	37.0	Falls of				
Machine opera					person	94	18.6	57	18.0
tor	62	13.0	29	9.4	Caught bet-- object	91	18.0	43	13.7
Machine worker	54	11.3	33	10.7	Falls of	88	17.4	56	17.8
Mechanic	51	10.7	24	7.8	objects				
Driver	22	4.6	7	2.3	Crashes	41	8.1	28	8.9
Welder	21	4.4	2	0.6	Chemical	22	4.3	13	4.1
	20	4.2	5	1.6	burn				
Weaver	19	4.0	5	1.6	Heat burn	19	3.7	11	3.4
Electrician	17	3.6	10	3.2	Splashes	16	3.2	5	1.6
Skill worker	13	2.7	4	1.3	Electrocution	15	3.0	5	1.6
Technical ins-	13	2.7	13	4.2	Total	506	100	315	100
pector									
Production									
worker	11	2.3	14	6.2					
Carpenter	10	2.1	12	3.9					
Work inspector	10	2.1	21	6.9					
Tailor	8	1.7	7	2.3					
Cook	7	1.5	3	1.0					
fireman	4	0.8							
Total	477	100	308	100					
Unknown	29		7						
Grand total	506		315						

wed by amputations then wounds and burns in 1985 (Table 6). Upper and lower limbs were the mostly affected parts of the body. such situation was similar in 1981 and 1985 (Table 7). The highest number of injuries happened at 10:00 a.m. (14.2%) . Such high number was detected between 8:00 a.m. and 11:00 a.m. also (Table 8). There was a detectable difference in the number of injuries when classified according to the months of the year or days of the week in which they happened. This difference was statistically significant (Table 9).

Table 6. Number and percentage of injuries in industry sector and the days lost.

Type of Injury	1981				1985			
	injuries		Days lost		injuries		Days lost	
	No.	%	No.	%	No.	%	No.	%
Fractures	122	24.1	4846	39.7	67	21.3	1740	26.0
Amputation	66	13.0	1132	17.2	39	12.4	869	22.3
Wounds	183	36.2	2509	13.7	133	42.2	919	6.9
Burns	48	9.4	518	10.8	24	7.6	297	12.4
Pains	20	4.0	188	9.4	12	3.8	141	11.8
Sprains	51	10.1	469	9.2	37	11.7	351	9.5
Total	490	96.8	9662	19.7	312	99	4317	13.8
Deaths	16	3.2	96000	6000	3	1	18000	6000
Grand total	506	100	105662	208.8	315	100	22317	70.8

Table 7. Distribution of injuries in industry sector by their position on the human body.

Position on the body	1981		1985	
	No.	%	No.	%
Upper Limbs				
Fore arm	24	4.9	19	6.1
Fingers	260	53.1	168	53.8
Lower Limbs				
Thigh	10	2.0	5	1.6
Leg	44	9.0	31	9.9
Foot	48	9.8	24	7.7
Head (Except eye)	36	7.3	24	7.7
Eyes	24	4.9	10	3.2
Chest & Abdomen	9	1.8	5	1.6
Back	10	3.1	11	3.5
Others	20	4.1	15	4.8
Total	490	100	321	100
Deaths	16		3	
Grand total	506		315	

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Table 8. Injuries according to the time of occurrence.

Time	Injuries			
	1981		1985	
	No.	%	No.	%
a.m.				
1.00	7	1.4	8	2.5
2.00	3	0.6	5	1.6
3.00	6	1.2	9	2.9
4.00	4	0.8	1	0.3
5.00	2	0.4	1	0.3
6.00	15	3	5	1.6
7.00	32	6.3	14	4.4
8.00	41	8.1	34	10.8
9.00	64	12.6	39	12.4
10.00	72	14.2	45	14.3
11.00	55	10.9	28	8.9
12.00	23	4.5	21	6.9
p.m.				
1	36	7.1	20	6.3
2	36	7.1	12	3.8
3	28	5.5	13	4.1
4	25	4.9	9	2.9
5	21	4.2	11	3.5
6	10	2	11	3.5
7	4	0.8	5	1.6
8	7	1.4	5	1.6
9	5	1	3	1
10	7	1.4	10	3.1
11	2	0.4	5	1.6
12	1	0.2	1	0.3
Total	506	100	315	100

P<0.001

Table 9. Injuries by month and day of occurrence.

Months of the year	Injuries 1981		Injuries 1985		Days of the week	Injuries 198		Injuries 1985	
	No.	%	No.	%		No.	%	No.	%
Jan	38	7.5	30	9.5	Sat.	102	20.2	78	24.8
Feb	55	10.9	25	7.9	Sun.	91	18	53	16.8
March	58	11.5	18	5.7	Mon.	67	13.2	45	14.3
April	51	10.1	32	10.2	Tues.	84	16.6	33	10.5
May	45	8.9	22	7	Wed.	74	14.6	41	13
June	54	10.7	20	6.3	Thurs.	50	9.9	50	15.8
July	40	7.9	23	7.3	Fri.	38	7.5	15	4.8
Aug.	43	8.5	24	7.6					
Sept.	36	7.1	27	8.6					
Oct.	26	5.1	39	12.4					
Nov.	27	5.3	32	10.2					
Dec.	33	6.5	23	7.3					
Total	506	100	315	100		506	100	315	100

P<0.001

P<0.001

DISCUSSION:

The study has shown that there is a statistically significant differences ($P < 0.001$) between the number of injuries of 1981 as compared to those of 1985. The average number of injuries was 4.4 per thousand in 1981 and 2.8 per thousand in 1985 (Table 1). This could be attributed to many reasons of which is the progress achieved in the Iraqi industry or by introducing occupational safety regulations⁽⁶⁾. Another reason could be the increased awareness of occupational hazards among employees⁽⁹⁾. In fact this is (proved) by the steady decrease in the average number of injuries that was noticed among all insured (secured) work force in Iraq where the averages per thousand were 9.9, 14.0, 5.5, 6.5, 3.8, 3.3, 2.9 and 3.0 for the years 1977, 1978, 1979, 1981, 1982, 1983, 1984, and 1985 respectively⁽¹⁰⁾, especially if we know that a statistically significant difference ($P < 0.001$) exists between the number of injuries that happened in the industrial sector as compared with other sectors for the year 1981, and the disappearance of such difference ($P > 0.05$) in 1985 (Table 1).

Both males and females were exposed to injuries and no statistically si-

the various national groups because we lack the information among the illiterate or those who can read only but cannot write between 1981 and 1985 calls for a special attention to increase the level of education of workers and to make them better understand the concept of health and work (Table 3). Such findings were shown in other studies too^(4,5,6). It is noted (same table) that the rates during the two periods are decreased with increasing income of workers which calls for the study of the fact in this field.

It is found from analyzing the data of both periods that injury rates decline with increasing workers' age (Table 4) which indicated their gain of job experience with advance in age. Here we have supposed that the number of workers in each age group are the same. This finding was different from those found in other sectors of workers in the construction industry⁽⁵⁾ or the electricity, mechanic, or other sectors⁽⁶⁾. In the same table, it was found that the rate of injuries decline with increasing workers' duration of service at their factory but when this duration reaches 10 years or over we see that the rates rise up sharply. Such phenomenon was found in both periods. This could be explained on the basis of their experience number as compared to other duration groups. Similar results were found in studies involving other sectors^(5,6,8).

Table 5 has shown that the injury rates of skilled workers was higher than those of unskilled in the two periods (71.7% in 1981 and 63% in 1985). A similar trend was observed in the construction workers⁽⁵⁾, weaving workers⁽⁷⁾, and other workers.

wed by falls of workers and materials in addition to the case reports indicate a bad working environment. Similar results were obtained from other studies involving construction⁽⁵⁾, petroleum⁽⁴⁾, electricity, mechanic, and printing sectors⁽⁶⁾.

We have found that wounds constituted the most common type of injuries followed by fractures and amputations (Table 6) while the working days lost due to injuries was higher due to fractures (39.7 days lost in 1985), this is followed by amputations (17.2 days in 1981 and 22.3 days in 1985), then wounds in 1981 and burns in 1985. This calls for appointing an industrial first aider in every job site and equipped with first aid materials. The high rates of wounds and fractures in industry are similar to those found among construction⁽⁵⁾ and petroleum⁽⁴⁾ industries. The upper limbs were the most affected parts of the body (51.6% of all injuries in 1981 and 59.9% in 1985) and particularly the fingers (260 injuries out of 490 in 1981 and 168 injuries out of 312 in 1985), followed by the lower limbs (20.8% in 1981 and 19.2% in 1985) which indicate that it is possible to prevent such injuries if the workers use personal protection devices and if we insure safety factors in the machine. Such results are similar to those found in the petroleum⁽⁴⁾ and construction industries⁽⁵⁾ as well as electricity, mechanic, printing⁽⁶⁾ and weaving⁽⁷⁾ industries (Table 7).

The highest rate of injuries happened at 10:00 a.m. (Table 8) also at 8:00, 9:00 and 11:00 a.m. were high too. A statistically significant difference ($P < 0.001$) was found when injury rates were compared according to the time of the day at which they happened which indicates the importance of studying this phenomena to find the reason behind it. This finding was similar to other studies^(4,5,6,7). A difference was found in the incidence of occurrence of such injuries according to the month of the year (Table 9) significant ($P < 0.001$).

- Doing an epidemiological study that includes all the necessary steps and aiming at identifying the real causes behind the occurrence of injuries in order to prevent them from happening in the future.
2. Mandating the use of personal protective devices.
 3. Appointing a first aider in every job site.
 4. Health education of workers as far as occupational health and safety regulations are concerned.

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