

AN EPIDEMIOLOGICAL STUDY OF INDUSTRIAL ACCIDENTS AMONG INSURED WORKERS IN TEHRAN, IRAN

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ABSTRACT

The study of 10,504 cases of industrial accidents, involving 590,164 insured workers employed in different industries in Tehran industrial pole during one year shows that the over all incidence rate is 17.80 with a significant variation in regard to age and the type of industry. Furthermore, 96.58% of accidents have happened within the workshops. Considering the final outcome of the accidents, 0.75% of all accidents which terminated in death involves only male workers and 0.29% of insured workers suffers from some degree of disability.

INTRODUCTION

Only doctors can see and feel the full consequences of accidents, bringing wastage of life and work efficiency with the disruption of family life and the tragic effects on the individual⁽¹⁾.

Accidental injury, after heart disease and cancer, is the largest cause of death in industrialized countries⁽²⁾. The speed and complication of modern life is such that the ordinary person in his home, at work or in recreation is subject to many more and greater risks than at any time in history. In today's life the scourge of disease is being lifted but in its place has appeared this new scourge of accidents. All

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evidence suggests that in general, the risk of accident in industry is significantly less than it is at home or on roads(3). Nevertheless, accidents in industry still remain a black spot and cause death and disability among the workers with the loss of about 5 per cent of total working days of the nations(4).

There are many factors which lead to industrial accidents, including primary causes such as: handling of goods, machinery, persons falling, struck by falling objects, striking against objects, use of hand tools, transport and unsafe physical conditions, unsuitable environment, as well as defect in human behavior(5, 6).

The purpose of this paper is to study the pattern of industrial accidents especially those fatal in the insured workers in Tehran industrial zone, how the incidence of the accidents varies in relation to the factors such as age, sex, occupation, experience, working conditions, and the main causes of the fatal accidents.

MATERIAL AND METHOD

A specially designed questionnaire covering questions on age, sex, occupation, length of employment, time of the occurrence of accident, nature of the work being carried out at the time of the accident, how the accident happened, main cause of accident, other causes, nature of the injury, final result and other necessary information were completed by review of the files of 10,504 workers in Tehran industrial zone with industrial accidents during the period of 21 March 1976 through 21 March 1977.

Accident incidence rate was calculated in one year period according to the formula suggested by international labour organization (7, 8):

$$\text{Incidence rate} = \frac{\text{Total number of accidents} \times 1,000}{\text{Average number of persons exposed}}$$

RESULT AND DISCUSSION

1. Having an incidence rate of 17.80 per thousand in the workers employed in different industries in Tehran, the workers below the age of 19 years constitute the highest incidence rate 27.03 per thousand when compared with other age groups. There is also an evident decrease in incidence rate along with the progress of the workers age as indicated in Table 1. This can be explained by the fact that with aging, the workers get more work experience and pay more attention to the safety rules and regulations.

2. Considering the accidents by place of occurrence which is indicated in Table II, 96.58% are accidents which have happened within the workshops, where as only 3.24% are in the "out of the shop" category.

Furthermore, the results obtained from analysing the data indicate that the more severe accidents have happened outside the workshops.

3. Topography of the injuries. As indicated in Table III, in majority of accidents the upper extremities are involved (50.60%) followed by lower extremities (26.53%) and eye injuries (6.29%). This unevenly distribution of the organs involved in studied group of industrial accidents is mainly due to the nature of the works carried on and organs exposed to hazardous conditions.

4. In Table IV the final outcome of accidents is reflected. It is shown that 0.75% of all accidents terminated in death, 0.20% of injured workers suffered from disability of 33 to 66 per cent and 0.09% disability of less than 33 per cent degree of working capacity. Further study of results obtained indicates that the accidents terminated in death or disability involve only male workers.

5. Table V reflects the industrial accidents by type of industry. As indicated in this table the chemical and plastic industries with an accident rate of 77.72 per thousand constitute the highest rate followed by construction (45.74) and metal industries (36.55). Considering the rate of fatal accidents, transportation and communication industries with a death rate of 0.73 per thousand show the highest rate followed by construction (0.68), and chemical and plastic industries (0.28). Further study of the fatal accidents indicates that 50.63% happened in the morning, followed by 40.51% in the afternoon and 8.86% in the night shifts. This unevenly distribution of accidents in different shifts may be due firstly to the workers majority working in the morning, secondly, the more hazardous working being carried out in the morning shifts.

Also, as indicated in Table V, the rate of disability varies with the type of industry; the electricity, water and gas industries with a rate of 0.34 per thousand constitute the highest rate followed by mining and chemical industries in the second place and others in the order indicated in the mentioned Table.

CONCLUSION

The use of word "accident" as an excuse for faulty attitudes and practices is no longer tenable. Accidents or critical events which lead to injury, damage or both are results of environmental and personal causes.(6)

The study of statistics of industrial accidents reported by different countries, which in some instances are not comparable, indicates the importance of the problem. This is the ransom that workers pay year after year in a world dominated by technical progress⁽⁴⁾. It is impossible to measure the suffering and unhappiness or cost that lie behind this number of industrial accidents.

Certainly the epidemiological investigation is fundamental to the study of accidents trend, discovering means of their prevention but so far, full use of this field has not been in reach⁽¹⁰⁾.

The need for improvement on notification of work accidents as well as elaboration on safety and educational programs aimed at controlling circumstances that lead to the causation of accidents is felt⁽¹¹⁾. Also, with regard to the results obtained on fatal accidents, it is realised that the responsibility of decreasing fatal accidents is not only that of the Ministry of Labour, employer or employee, but also of road safety authorities.

TABLE I
INDUSTRIAL ACCIDENTS BY AGE (TEHRAN 76-77)

AGE GROUPS (YEARS)	NUMBER OF WORKERS	INCIDENCE RATE						TOTAL	
		< 19	20-29	30-39	40-49	50-59	60+		
	47213	165245	159346	123934	70820	23606	-	590164	
	1276	3896	2391	1110	372	57	1402	10504	
ACCIDENT	INCIDENCE RATE	27.03	23.58	15.00	8.96	5.25	2.41	-	17.80

TABLE II
INDUSTRIAL ACCIDENTS BY PLACE (TEHRAN 76-77)

PLACE	NUMBER OF ACCIDENTS	PERCENT
IN THE SHOP	10145	96.58
OUT OF THE SHOP	340	3.24
UNKNOWN	19	0.18
TOTAL	10504	100

TABLE III
INDUSTRIAL ACCIDENTS BY SITE OF INJURY
(TEHRAN 76-77)

ORGAN INJURED	NUMBER	PERCENT
HEAD & NECK	377	3.59
FACE	361	3.44
EYE	661	6.29
UPPER EXTREMITIES	5315	50.60
LOWER EXTREMITIES	2787	26.53
THORAX	168	1.60
ABDOMEN	655	6.24
SPINAL COLUMN	20	0.19
OTHER ORGANS	63	0.60
UNKNOWN	97	0.92
TOTAL	10504	100

TABLE IV
INDUSTRIAL ACCIDENTS - FINAL OUTCOME (TEHRAN 76-77)

FINAL OUTCOME	NUMBER	PERCENT
COMPLETE RECOVERY	8035	76.49
DISABILITY LESS THAN %.33	9	0.09
DISABILITY FROM %.33 TILL %.66	21	0.20
TOTAL DISABILITY	-	-
DEATH	79	0.75
UNKNOWN	2360	22.47
TOTAL	10504	100

TABLE V
INDUSTRIAL ACCIDENTS BY TYPE OF INDUSTRY (TEHRAN 76-77)

TYPE OF INDUSTRY	NUMBER OF WORKERS	ACCIDENTS		DEATHS		DISABILITY	
		No.	%..	No.	%..	No.	%..
AGRICULTURE - FORESTRY	5986	42	7.02	1	0.17	-	-
MINING	5816	83	14.27	1	0.17	1	0.17
FOOD	88525	495	5.59	4	0.05	4	0.05
TEXTILE	76721	529	6.89	2	0.03	3	0.04
WOOD, PAPER & LEATHER	29508	454	15.39	4	0.13	6	0.20
CHEMICAL & PLASTIC	17705	1376	77.72	5	0.28	3	0.17
METAL	147540	5393	36.55	14	0.09	8	0.05
CONSTRUCTION	23607	1080	45.74	16	0.68	1	0.04
ELECTRICITY, WATER, GAS & FIRE BRIGADE	5901	140	23.73	1	0.17	2	0.34
TRADE	29508	112	3.80	5	0.17	-	-
TRANSPORTATION & COMMUNICATION	17705	458	25.87	13	0.73	1	0.06
SERVICE	135736	195	1.44	12	0.09	-	-
OTHERS	5901	147	24.90	1	0.17	1	0.17
TOTAL	590164	10504	17.80	79	0.13	30	0.05

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