Non-fatal Occupational Injuries Requiring Admission to Hospitals in Al-Khobar City, Saudi Arabia: Prospective Cohort Study

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Aim. To determine the incidence rate of non-fatal occupational injuries among the workers insured by the General Organization of Social Insurance requiring admission to private hospitals in Al-Khobar City during 1995.

Methods. This cohort study was conducted on 65,915 insured industry workers admitted to 2 randomly selected private hospitals in Al-Khobar City. At the admission to the hospital, a data sheet was filled out with necessary data collected from the patient directly and from his medical file.

Results. The injury incidence rate was 7.1 per 1,000 full-time workers a year. Nationally-wise, 1.5% were Saudis, 13.2% were Filipinos, and 74.8% were from the Indian subcontinent. Hands and fingers were most often injured (32.1%) and fall was the main cause of injury (33.4%). The majority of admissions lasted for less than a week. Absence from work was longer than 3 weeks in 35.5%, and shorter than 1 week in 24.9% of admissions. The majority of injured workers (65.0%) visited the clinic 2–7 times. Direct medical cost per admission was less than US$533 (SR2,000) in 63.9% of the cases in one of the hospitals.

Conclusions. The incidence rate of work injuries in Saudi Arabian workers was comparable to the rates from other countries. As these injuries cause high medical charges, human suffering, and loss of productivity, it seems that the social insurance organization should take measures to improve the current situation and encourage similar studies to be conducted in this field, particularly on severe injuries.

Key words: costs, direct service; hand injuries; hospital costs; hospitalization; injuries, poisoning and occupational diseases; insurance, health; occupational health; Saudi Arabia; workplace

The Kingdom of Saudi Arabia is a fast-growing industrial country. Based on the 1995 annual statistics of the Ministry of Industry and Electricity, the number of factories has increased 163% over the last 13 years (1). As a result of this increase, more workers were needed. Consequently, occupational accidents due to exposure to various potential occupational hazards have become unavoidable. The General Organization for Social Insurance (GOSI) is the main body to which all work-related injuries are reported. An injury is considered occupational if it was received during the course of work, while traveling to or from the workplace, or to or from the place where workers usually have meals, or during an official assignment away from the usual place of work (1). Workers with occupational injuries are received in private hospitals, which are able to provide suitable medical care and are paid for it by GOSI. Law requires that the establishments employing 10 or more workers have to have their employees insured with GOSI.

Epidemiological studies on occupational accidents are needed to identify high-risk industries and the pattern and nature of the injuries. So far, few such studies have been carried out in Saudi Arabia (1-6) and their authors did not take into account severe occupational injuries requiring admission to hospital. In the United States, severe occupational traumatic injury is one of the ten leading problems in occupational safety and health (7-9).

There is no study in Saudi Arabia to date that has been conducted on severe occupational injuries requiring admission to hospital. Such a study is expected to show how serious (in number and type of injury) severe occupational injuries are. More information regarding the nature of the severe occupational injury, its causes, risk factors, and outcome will be gained. The objective of this study was to (a) determine the incidence rate of non-fatal occupational injuries among GOSI-in-
sured workers, who required admission to the private hospitals in Al-Khobar City during a twelve months period; and (b) describe the pattern, characteristics, and out come of these injuries, and estimate their subse quent direct medical costs.

Subjects and Methods
A prospective cohort study was conducted on 65,915 GOSI-insured (non-governmental) workers at work places where insurance arrangement ensured the admission of the injured to two hos pi tals (A and B) in Al-Khobar city, East ern Saudi Arabia. There were two hospitals randomly selected out of 6 pri vate hos pi tals serv ing GOSI work ers in Al-Khobar City. Out of a to tal cohort of 65,915 insured work ers, GOSI as signed 37,655 workers to hos pi tal A and 28,260 to hos pi tal B. In case of oc cuipa tional injury, each worker was al lowed treat ment only at the hos pi tal he was as signed to. All GOSI-registered work ers ad mit ted to these hos pi tals as in pa ti ents due to oc cuipa tional inju ries during the study period were in cluded. Pa ti ents treated at emer gency or out pa tient de part men ts only (not ad mit ted to the hos pi tal), were ex cluded. In Saudi Ara bia, it is not per mit ted for pri vate sec tor work ers to be treated in gov ern men tal hos pi tals. The rele vant in for ma tion was col lected at the mo ment of ad mis sion to the hos pi tal. The in ves ti gator de signed a data sheet and col lected the data him self. The source of data was the pa tient with his med i cal re cord. The col lected data was re viewed for ac cu racy and fed into a per sonal com puter. Data anal ysis was per formed us ing sta tis tical pack ages.

Results
Incidence of Occupational Injuries
During the study period there was a total of 468 ad mis sions (213 or 45.5% in hos pi tal A) to a total of 65,915 work ers ex posed to oc cu pa tional inju ries during the same period. The overall annual incidence of occupational injuries requiring admission was 7.1 per 1,000 work ers (1.7 for Saudis and 7.4 for non-Saudis). The annual incidence rate in hospital A was 5.6 per 1,000 compared to 9.0 per 1,000 in hos pi tal B (Table 1).

Table 1. Incidence of occupational injuries per 1,000 workers by nationality and hospital of admission in the cohort of 65,915 workers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number</th>
<th>Incidence rate per 1,000 workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudis</td>
<td>7/ 4,092</td>
<td>1.7</td>
</tr>
<tr>
<td>Foreigners</td>
<td>461/61,823</td>
<td>7.4</td>
</tr>
<tr>
<td>Hospital A (n=37,655)</td>
<td>23/3,753</td>
<td>5.65</td>
</tr>
<tr>
<td>Hospital B (255/28,260)</td>
<td>9.0</td>
<td>9.0</td>
</tr>
</tbody>
</table>

Pattern of Occupational Injuries
Little less than two-thirds of the sample population (64.7%) were under 35 years of age and the vast majority was from the Indian subcontinent (74.8%). There were 13.2% Filipinos and only 1.5% Saudis.

Most of the work injuries occurred at the workplace (89.7%). Fall, as the main cause of the injuries (33.8%), was followed in frequency by tools (23.9%), falling objects (14.5%), and car accidents (12.0%) as a cause of injury. Most fre quently in jured body parts were hands and fi ngers (32.1%), followed by lower limbs (20.5%), eyes, head and neck (11.5%), and back (9.5%). Injuries to two or more parts of the body were found in 20.7% of the cases. The ma jori ty of the in jured (77.8%) were ad mit ted for pe riods less than a week, and only 7.1% of patients stayed in the hospital more than three weeks. However, the majority of admissions (35.3%) resulted in subsequent absence from work for a period of more than three weeks, and 24.9% of admissions resulted in absence from work for less than a week. In hos pi tal A, the cost of medical care for the majority of admissions (63.9%) was less than SR2,000 (US$533) per patient, whereas the cost for 22.1% was between SR2,000–4,000 (US$533–1,066) and for the remaining 13.9% of admissions cost was more than SR4,000 (US$1,066).

Table 2 shows selected admission features in relation to the two hospitals under study. The number of clinic visits, admission days, and absence from work in days significantly depended on the hospital in question. Other results not included in the Table 2, showed significant association between the body part injured and period of absence from work (p<0.0001), duration of hospitalization (p<0.003), number of clinic visits (p<0.001), and cost of treatment (p<0.017). The cause of occupational injury was significantly associated with admission days (p<0.01) and the period of absence from work (p<0.001). Data were

Table 2. Frequency (No., %) of clinic visits, admission days and absenteeism of patients with work-related injuries

| Variable | Total | Hospital A | Hospital B | p-value
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Clinic visits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2</td>
<td>38 (8.2)</td>
<td>26 (12.3)</td>
<td>12 (4.7)</td>
<td></td>
</tr>
<tr>
<td>2-7</td>
<td>303 (65.0)</td>
<td>153 (72.5)</td>
<td>150 (58.8)</td>
<td></td>
</tr>
<tr>
<td>≥8</td>
<td>82 (17.6)</td>
<td>20 (8.5)</td>
<td>62 (24.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Clinic visits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>43 (9.2)</td>
<td>12 (5.7)</td>
<td>31 (12.2)</td>
<td></td>
</tr>
<tr>
<td>Admission (days)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-7</td>
<td>360 (77.8)</td>
<td>178 (84.8)</td>
<td>182 (71.9)</td>
<td></td>
</tr>
<tr>
<td>8-14</td>
<td>50 (10.8)</td>
<td>17 (8.1)</td>
<td>33 (13.0)</td>
<td>0.003</td>
</tr>
<tr>
<td>15-21</td>
<td>20 (4.3)</td>
<td>3 (1.4)</td>
<td>17 (6.7)</td>
<td></td>
</tr>
<tr>
<td>≥21</td>
<td>33 (7.1)</td>
<td>12 (5.7)</td>
<td>21 (8.3)</td>
<td></td>
</tr>
<tr>
<td>Ab sec ence (days)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-7</td>
<td>113 (24.9)</td>
<td>52 (25.0)</td>
<td>61 (24.9)</td>
<td></td>
</tr>
<tr>
<td>8-14</td>
<td>92 (20.3)</td>
<td>49 (23.6)</td>
<td>43 (17.6)</td>
<td></td>
</tr>
<tr>
<td>15-21</td>
<td>88 (19.4)</td>
<td>49 (23.6)</td>
<td>39 (15.9)</td>
<td>0.009</td>
</tr>
<tr>
<td>≥21</td>
<td>160 (35.3)</td>
<td>58 (27.9)</td>
<td>102 (41.6)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Chi-square test.
insufficient to suggest significant association between the different age groups and parts of body injured, length of absence from work, duration of hospitalization, number of clinic visits, or cost of medical care. Place of injury was significantly associated with the body parts injured (p<0.001) and duration of admission to hospital (p<0.001). Time of injury was not found to be significantly associated with period of admission to hospitals, absence from work, or cost of treatment.

Discussion

Incidence of Occupational Injuries

The overall calculated incidence of occupational injuries requiring admission to hospitals was 7.1 per 1,000 insured workers in the one-year period of this study. This rate represents 18.3% of the total occupational injuries cases in the Kingdom of Saudi Arabia calculated for 1995 (1). This rate, which represents only severe occupational injuries requiring admission to hospitals, is lower than the rates reported by other investigators (10-12). However, it is within the range of 0.497-1.52%, reported from Iowa (USA) in 1990 (13).

Pattern of Occupational Injuries

Age and Nationality. The majority of the injured were under 35, which is in accord with other studies (3,14-19). The general trend in these studies is a decline in the incidence with advancing age. This can be explained by experience, which increases with the advance ment of age.

The incidence of occupational injuries among non-Saudis (from the Indian subcontinent and the Philippines) was approximately four times that of Saudis. These findings confirm an earlier study (6) carried in the same region where Indian subcontinent and Filipino workers had the highest incident rate (139 per 1,000), followed by Filipinos (106 per 1,000), and Saudis (87 per 1,000). This may be partly explained by the social stress these expatriates experience, such as differences in the social environment, and the psychological burden of families left back at home. Moreover, these hired foreign employees may be engaged in more jobs with higher injury risks (1,4). In Saudi Arabia, construction and manufacturing industries were found to be among the most stressful jobs, for which Saudi nationals are rarely employed (1). A review of studies conducted in Saudi Arabia has shown that expatriate workers had a higher relative risk to injury compared to Saudi workers (1). In that review, stress was one of the contributory factors behind injury. Johnston, in his review of 20 selected studies found a significant relationship between injury and stress (20). In ability to understand the Arabic language may be an important reason for the high rate of accidents among the expatriate workers. Australian immigrant workers who could not understand English language were found to suffer higher rate of accidents during the first five years after taking residence in the country (21).

Cause of injury and body parts involved. The most common cause of injury found in this study was a fall (33.8%). Other reports from within Saudi Arabia found it the second leading cause of injury (1,5), whereas it is the prime cause of occupational spinal cord injury in the United States (22). Tools-related injuries ranked second in this study, whereas in another large study from Saudi Arabia, tools were the commonest cause of injury (1). It should be emphasized here that the rank of the most common cause of injury among occupational injuries in general (mild and severe) reported by other studies might be different than the one in this study (reporting severe injuries only) and both may not necessarily be the same. Manual work leaves the upper limbs more at risk of injury. This type of work could explain the high rate of hand and finger injuries in the present study, as was suggested by many other studies (3,18,29-27).

Duration of hospital stay and absence from work. For traffic, most of the injuries sustained by the study employees were mild, as judged by the length of stay in a hospital. Work days lost due to occupational injury can be used as an index of case severity and economic impact for both the employee and employer (25,28). In this study there were significant associations between parts of body injured and period of absence from work, period of absence in days, number of clinic visits and cost of treatment. Hand and finger injuries in particular, can cause long spells of absence (5). Reports from Taiwan showed that the severity of injury determines the duration of morbidity and the magnitude of future productivity (29).

Direct Medical Cost

The average cost of inpatient man age for the majority of the injured was less than US$533 per patient. A similar figure was reported for inpatients aged in 1995, but is much higher than the cost in 1983 (1). The increase in the average cost of treatment may be explained by the increase in medical cost over time. However, in other countries the total cost was much higher than the figure from Saudi Arabia. For example, the average medical charge incurred by patients injured at work and requiring hospitalization was US$10,910 per patient (27). The treatment cost of work-related injuries in 1986 in United States amounted to US$34.8 billion and almost doubled in 1991 (30,31).

The incidence rate of occupational injuries in hospital B (9 per 1,000) was higher than that in hospital A (5.65 per 1,000). This difference may be related to the differences in the nature of jobs that workers visiting the two hospitals were exposed to. Workers who visited hospital B may have been exposed to jobs with higher injury risks than workers who visited hospital A.

Based on the results of this study, it seems that the social insurance system covering non-governmental workers (GOSI) could take measures to change the current situation. Improving the working environment through reducing the risk factors and better selection of the workers ad-
quate for the job is expected to reduce the rate of severe occupational injuries. GOSI should encourage further studies in this field in general and particularly those on severe injuries.

References


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