AN EPIDEMIOLOGICAL STUDY OF ACCIDENTS IN TEHERAN, IRAN

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Introduction.

Accidents are a major source of medical concern; they are steadily increasing throughout the world, and, as one of the prime causes of casualty and fatality, are of direct epidemiological concern.

In Iran, preliminary researches into this area have just begun. Research into this area of ecology is likely to be of considerable importance to preventive medicine in Iran and elsewhere, despite certain considerable difficulties.

Research method

Clearly, a survey of this sort should desirably embrace both a statistical analysis and direct interrogation of families for a period of from 5 to 10 years. However, with respect to Tehran, all accessible statistics were investigated for the period (1960-1961). Attention is called to the partial nature of the ensuing data.

Sources of this study: A study of the accident pages and rapportage of newspapers in Iran during the year 1961 with all repetitions deleted, revealed 5363 accidents. Nine major Tehran hospitals were also investigated. The statistics of five of these were employed for study, survey and analysis. Altogether, 16,903 accidents were extracted from hospital records.

Data of deaths due to accidents were also obtained from the Forensic Medicine Department of the Ministry of Justice; as well as some statistics for the period (1950-1959) though different types of accidents not separable for these years utilized for extrapolative purposes. (See graph 1) The Office of Vital Statistics of the Ministry of Health also provided cause-of-death data for Tehran, 1961; and statistics relating to accidents to insured

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workers for all Iran during 1960 were obtained from the Labor's Insurance Organization.

In sum, more than 25,000 accidents cases for the period 1960-61 were studied. Data processing by IBM Machines was carried out with the assistance of the General Statistical Department of the Ministry of Commerce. The effort was made to make the distribution of categories as complete as possible.

**Discussion:**

Despite the aforementioned difficulties and drawbacks and the insufficiency of the collected data, we believe the results of the study to be valid, interesting and useful.

It is to be hoped that the foundations have been laid for future detailed and multi-faceted studies.

A number of problems of direct and immediate interest have been exposed and their nosology considered.

Accidents are significant to preventive medicine not only because of a large number of deaths, but also because of the even greater number of accident-induced injuries, with concomitant economic, social and psychological traumas and losses.

Approximately 1400 deaths and 17000 severe injuries have been accident-induced annually in Tehran in recent years. Accidents are in sixth place as causes of death in Tehran. (See table 1 and graph 2). They rank first as the cause of death for the age groups of five to 44 years, and fourth for ages one to 44 years. (It should be noted that these age groups embrace both the new generations and the active generations, sociologically speaking). *

Employing the general classification recommended by WHO, the distribution of accident types are the following:

1. Motor vehicle accidents 27.6%
2. Other transport accidents 3.7%
3. Drowning 16.6%
4. Falls & build. collapse 10.5%
5. Burns (all sorts) 12.4%
6. Poisoning 8.5%
7. Accident caused by electricity 2.6%
8. All other accidents 8.3%

*) Despite notable improvements in hygiene and health education, mortality among children in Tehran is still very high; 36.7% of total mortality in Tehran is of infants under the age of one year; 51.0% of the total mortality is taken up by children between 0 - 4 years of age. In other words, if we eliminate child-mortality (4 and under) from the general mortality figures, accidents would rise from sixth to third place as a cause of death.
Table I. The ten leading causes of death, all ages, Tehran (1961)

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Causes of death</th>
<th>No. of deaths</th>
<th>% of each cause to all causes</th>
<th>Death rates per 100,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1-BE50</td>
<td>All causes</td>
<td>20432</td>
<td>100.0</td>
<td>1133.8</td>
</tr>
<tr>
<td>B30-B32</td>
<td>Diseases of respiratory system</td>
<td>3606</td>
<td>17.7</td>
<td>200.1</td>
</tr>
<tr>
<td>B33-B37</td>
<td>Diseases of the digestive system</td>
<td>2842</td>
<td>13.9</td>
<td>157.7</td>
</tr>
<tr>
<td>B24-B29</td>
<td>Diseases of the circulatory system</td>
<td>2330</td>
<td>11.4</td>
<td>129.3</td>
</tr>
<tr>
<td>B1-B17</td>
<td>Infective and parasitic diseases</td>
<td>1775</td>
<td>8.7</td>
<td>98.5</td>
</tr>
<tr>
<td>B42.</td>
<td>Congenital Malformations and certain diseases of early infancy</td>
<td>1457</td>
<td>7.1</td>
<td>80.8</td>
</tr>
<tr>
<td>BE47-BE48</td>
<td>All Accidents *</td>
<td>1367</td>
<td>6.7</td>
<td>75.8</td>
</tr>
<tr>
<td>B18</td>
<td>Neoplasms</td>
<td>1007</td>
<td>4.9</td>
<td>55.9</td>
</tr>
<tr>
<td>B20</td>
<td>Allergic, Metabolic, and Nutritional diseases</td>
<td>772</td>
<td>3.8</td>
<td>42.8</td>
</tr>
<tr>
<td>B38</td>
<td>Diseases of Genito-urinary system</td>
<td>680</td>
<td>3.3</td>
<td>37.7</td>
</tr>
<tr>
<td>B22</td>
<td>Diseases of the Nervous system and sense organs</td>
<td>396</td>
<td>1.9</td>
<td>22.0</td>
</tr>
<tr>
<td></td>
<td>All other diseases and unspecified</td>
<td>4200</td>
<td>20.6</td>
<td>233.0</td>
</tr>
</tbody>
</table>

* Suicides and homicides are included.
Within these 8 categories (subdividable to 33 subcategories) of accidents, the fact that traffic accidents have attained top place is of interest. (See graph 3).

The ratio of vehicles to population in Teheran is less than in the United States: Tehran has one motor vehicle per 20 persons, the U.S. has one for every three. Yet the proportion of fatal accidents is about the same in the two places. Out of each 100,000 persons in Teheran, approximately 23 die in auto accidents. (see table 2)

Age distribution for different types of accidents and causes of death are shown in tables 3 and 4.

In the U.S. (and elsewhere), the proportion out of 40 accidents is about one fatality to 6-8 serious injuries, and 20-30 slight injuries. In Teheran, of 9 injured persons, one dies. This datum is ambiguous as to cause: it may result from insufficient care; from insufficient recording of the slighter injuries; or from inadequate and, or delayed treatment of injuries leading to more severe consequences.

21% of deaths due to accidents is among infants (age 0-4). Of these, 65% are due to drowning; 19% to burns and falls; 16% to poisoning and other accidents. This contrasts with the age-group 25-44 where the major cause of death is auto accidents (36%), followed by falls and building collapse ("savaar") (17%), burns (11.5%), poisoning (13.0%) - of which 6.5% food and alcohol poisoning and 6.5% carbon monoxide and other poisonings and other accidents (22.5%).

The analysis of 5,582 records of accidents extracted from newspapers for the year (1961) has shown that the proportion of accidents is, expectably, greater in Teheran (Tehran: 57%; other part of the country: 43%). The greatest number of accidents occur in the summer. The level of casualties due to accidents has risen steadily since 1950. In 1950, there were 370 accident-deaths in Teheran of which 237 were caused by autos; in 1961, total deaths reached 1367 with 396 auto deaths (1).

With the exception of deaths due to burning, the ratio by sex is one woman killed for every three men. Thus, in 1961, 12,340 men were involved in accidents in which 960 deaths resulted (7.7%). 1454 women had accidents, with 407 deaths (9.1%).

Certain accidents are necessarily seasonal: deaths from carbon monoxide suffocation occur almost exclusively in winter; death by drowning is of course greatest in summer.

Falls and injuries suffered in the collapse (in whole or part) of buildings accounted for 2325 hospitalizations in 1961. Of these, 1818 were male and 507 female. 572 were between 1 and 4 years of age. In general, 8.6% of

1. Attention is once drawn to the incomplete nature of the data.
### Table 2. Number of deaths and % of deaths from various types of accidents to total deaths due to accidents and ratio per 100,000 population

**Teheran (average of years 1960-61)**

<table>
<thead>
<tr>
<th>Type of Accident</th>
<th>No. of death</th>
<th>% of each accident to all accidents</th>
<th>Death Rate per 100,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>All accidents *</td>
<td>1273</td>
<td>100</td>
<td>71.5</td>
</tr>
<tr>
<td>Motor vehicle accidents</td>
<td>401</td>
<td>31.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Drowning</td>
<td>249</td>
<td>19.6</td>
<td>14.0</td>
</tr>
<tr>
<td>Falls</td>
<td>214</td>
<td>16.8</td>
<td>12.1</td>
</tr>
<tr>
<td>Fire and burns</td>
<td>158</td>
<td>12.4</td>
<td>8.9</td>
</tr>
<tr>
<td>Poisoning</td>
<td>112</td>
<td>8.8</td>
<td>6.2</td>
</tr>
<tr>
<td>Deaths by electricity Accident Caused by electricity</td>
<td>33</td>
<td>2.6</td>
<td>1.8</td>
</tr>
<tr>
<td>Other accidents</td>
<td>106</td>
<td>8.3</td>
<td>6.9</td>
</tr>
</tbody>
</table>

* Suicides and homicides are not included

### Table 3. Deaths due to different types of accidents by sex and age, Tehran (1961)

<table>
<thead>
<tr>
<th>Age Groups in Years</th>
<th>All accidents</th>
<th>Accident caused by electricity</th>
<th>Accident caused by fire, explosion and hot substance</th>
<th>Accidental poisoning</th>
<th>Accidental falls</th>
<th>Other transport accidents</th>
<th>Motor vehicle accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>49</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6-10</td>
<td>39</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11-20</td>
<td>30</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>21-30</td>
<td>24</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>31-40</td>
<td>19</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>41-50</td>
<td>16</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>51-60</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>61-70</td>
<td>12</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>71-80</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>81-90</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>91-100</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>&gt;100</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
these causalities died immediately or shortly after hospital admission. The greatest mortality in this category is that of infants below 1; as age increases from 1 to 19, the rate of mortality decreases to 2.6%; thereafter, as age increases, mortality increases in direct ratio (from 45 to 64, 16.5%. At 65 and year over 21.5%).

With respect to poisoning, 5009 persons (3098 male 1911 female, of which 1016 children under 4 years of age) were hospitalized in 1961. Food and alcohol poisoning caused a substantial number of death. The mortality of poisoned persons is 2.5 percent. Among 1016 children, most were poisoned by the ingestion of kerosene and petrol taken in place of water, or consumption of over dose of medicine or excessive opium given as a tranquilizer. 12 children died from poisoning in 1961; the number of death due to poisoning among children (0-4) in 1960, was 17, but the total number of poisoned children is not known for this year.

Trauma, entrance of foreign bodies and burns of the Eyes caused 3434 persons mostly males to suffer in 1961. 76% of the above figure was occupational accidents, and 24% by fighting and through children's play. Unfortunately it is not possible to give the percentage of blindness caused by eye accidents.

During the years (1960-1961) there were 27 deaths caused by medical accidents; 17 cases caused by penicillin injection shock and the rest criminal abortion and haemorrhagia or retention of placenta.

**Fights, Suicides and Murders**

Fights, murders and suicides have not been included in the above rubrics and call for separate discussion.

**Suicide:** The number of suicides has increased from (1950) to (1961). In 1950, there were three recorded cases; in 1960, there were 52; in 1961 there were 49. (Also 17 adults workers of both sexes died from poisoning with insecticides, Luminal tablets or some other poisons, not recorded as suicide.)

For 1961, the reported distribution was:

<table>
<thead>
<tr>
<th>Type of Accident</th>
<th>Attempts</th>
<th>Suicides</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Causes</td>
<td>707</td>
<td>40</td>
<td>5.6%</td>
</tr>
<tr>
<td>Male</td>
<td>376</td>
<td>33</td>
<td>8.7%</td>
</tr>
<tr>
<td>Female</td>
<td>331</td>
<td>7</td>
<td>2.1%</td>
</tr>
</tbody>
</table>

The most prevalent method of suicide was taking of opium (90%). Other methods included the ingestion of indigenous depilatories containing lime ("vadji","zarnik") barbiturates and other narcotics, vegetable poisons, hanging, slashing of veins and arteries. The greatest number of suicide attempts occur in spring.
Fights and Murders

In both 1960 and 1961, there was an average of one murder every five days, or six per month.

There were 1034 instances of assault and battery; 521 stabblings, 485 fistfights and 28 shootings. 120 of these involved women. 7% of these resulted in deaths; 15% in the case of women fights, 6% in the case of men.

The greatest number of deaths due to these causes occur in the Iranian month of Ordibeshet (i.e., ca. April).

Summary

In order to study the epidemiology of accidents in Tehran City, the author has collected and analysed records of more than 25,000 accident cases for the period 1960-61 from all available sources such as newspaper reports, police reports, and the Forensic Medicine Department of the Ministry of Health, Labor, and Public Welfare, etc.

Approximately 1400 deaths and 17000 severe injuries are accident-related annually in Tehran and accidents are in the sixth place, as causes of death (5.6%). They rank first as the cause of death for the age group 3-45 years (22.2%) and fourth for the age group 1-44 (6.2%).

The distribution of accident types is as follows:
1. Motor vehicle accidents 27.8%
2. Other transport accidents 3.7%
3. Drowning 19.0%
4. Falls and building collapses 16.8%
5. Burns (all sorts) 12.4%
6. Poisoning 8.8%
7. Accident caused by electricity 6.5%
8. All other accidents 8.3%

Various epidemiological aspects of these accidents and an analysis of fights, suicides and murders are given in the body of the text.

Sommaire

L’auteur a réuni et analysé les records de plus de 25,000 cas d’accidents à Tehran pour la période 1960-61.

Approximativement 1400 morts et 17000 cas de blessures sévères sont produits par les accidents chaque année à Tehran.

Ces accidents occupent la place No. 6 dans la liste des causes de décès (5.6%). Ils sont le premier parmi les causes de décès pour le groupe âgé 0-4 ans (27.8%) et le quatrième pour le groupe âgé 1-44 (6.2%). La distribution des types d’accidents est donnée ci-dessous:

Epidemiological Study of Accidents

1. Accidents de véhicule a moteur 27.8%
2. Autres accidents de transport 3.7%
3. Noyade 19.0%
4. Chutes et collapes de bâtiments 16.8%
5. Brûlure (Toute sorte) 12.4%
6. Empoisonnement 8.8%
7. Accidents causé par l’électricité 6.5%
8. Autres accidents 8.3%

Différent aspects epidemiologiques de ces accidents ainsi qu’une analyse des cas de luttes et accidents, suicides et crimes sont décrits dans cet article.

Bibliography

1— Adham, M.H. (1955) Public Health Statistical data, Public Health Statistical Department, Ministry of Health, Iran, 1, 22. (in Persian)
2— Adham, M.H. (1955) Public Health Statistical data, Public Health Statistical Department, Ministry of Health Iran, 2,93. (in Persian)
3— Adham, M.H. (1955) Public Health Statistical data, Public Health Statistical Department, Ministry of Health-Iran, 3,117. (in Persian)
4— Adham, M.H. (1960) Public Health Statistical data, Public Health Statistical Department, Ministry of Health-Iran, 4, 29 (in Persian)
17. Public Statistical Department (1958); Census of Tehran in 1956, Ministry of Interior Iran., 21. (in Persian)