Injuries in Pakistan: directions for future health policy

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Injuries result in major financial and productivity losses to nations while inflicting tremendous personal burden on the injured and their families. Two-thirds of the global deaths from injuries occur in the developing world, consuming substantial health sector resources. Pakistan is a developing country with a population of 136 million and no reported estimate of the national impact of injuries. This study presents a profile of injuries in Pakistan, estimates the impact on the country and recommends strategies to further delineate this important public health problem.

A methodical review of published, unpublished and government literature was undertaken and data collected for all types of injuries principally over the 1982–1994 period. Motor vehicle injuries, homicides, assaults, work-related injuries, poisonings and risk factors have been included. Selected epidemiological estimates have been generated and the WHO motorization index has been used to assess road-side accident risk.

The lack of reliable data and under-reporting of work-related injuries is revealing. The rising time trend in all injuries, the significant loss of life from injuries and the age of those injured have a critical impact on the national economy and health system. Data on injuries in Pakistan are primarily recorded by police authorities and used for legal purposes. Pakistan must institute an information system to evaluate the true impact of injuries and develop national safety standards. Implementation of such standards is especially important for road traffic safety and occupational health in industrial units within the country.

Introduction

Injuries result in major financial and productivity losses to nations while inflicting a tremendous personal burden on the injured and their families (World Bank 1993). Intentional and unintentional injuries kill and maim people, often destroy families and devastate communities. Many of the injured suffer life long disability, physical disfigurement and financial ruin. The critical issue with injuries is that many of them can either be prevented or the severity of their effect reduced. At the same time policy-makers, including health professionals, have been slow in recognizing injuries as a public health problem.

Injuries are gaining recognition as one of the major public health concerns in the world today. It is estimated that 2% of the world’s population is currently disabled as a result of injuries (WHO 1989). Almost three million deaths are reported from injuries and poisonings annually, and 66% of these occur in developing countries (WHO 1989). In many industrialized nations, injuries are now the leading cause of death among children and young adults (World Bank 1993; Baker et al. 1992), and worldwide injuries rank fifth among the leading causes of death (Manciaux and Romer 1986). Data from developing countries reveals that injury mortality from motor vehicle collisions over a period of 15 years has increased by 450% in Thailand, 250% in Venezuela, 210% in Chile and more than 600% in Mexico (Mohan and Bawa 1985; Manciaux and Romer 1986). These changes are much higher compared to the trends observed in developed countries. Throughout the developing world, injuries, together with tuberculosis, cardiovascular diseases and cancers, are major causes of adult mortality (Feachem 1992; Murray and Lopez 1994).

A review of institutional literature from the developing world reveals reports of injuries being a very significant portion (one-third) of the acute patient load in various hospitals in Africa (Weston 1987; Elechi and Etawo 1990; Mock et al. 1993a,1993b). Trauma is the leading cause of in-hospital deaths in some cases (Elechi and Etawo 1990). The causes of such injuries vary, but falls and burns (Mock et al. 1993a, b) predominate especially in rural settings (Weston 1987). Direct comparison with centres in the developed world indicates that pre-hospital care and transportation play a major role in post-injury outcome in these countries (Mock et al. 1993b).

Injuries consume a substantial proportion of health sector resources in developing countries. Data on economic costs of injuries have been virtually non-existent in developing countries (Mock 1995), but injury-related death and disability primarily affect young adults in their working years. Thus it can be reasonably assumed that the loss of economic potential is substantial (Stansfield et al. 1993). It has been demonstrated that 43% of those seriously injured could not return to full
Pakistan is a developing country in South Asia with a population of nearly 136 million and a GNP per capita of US$400 (UNICEF 1996). It reflects a nation at the cross-roads of economic progress while facing the severe problems of under-development. Successful child survival programmes, improved health care systems and economic growth have seen the decline of infectious diseases and an increasing presence of chronic conditions. With these have come changes in life style, rural development, urbanization, increase in the number of motor vehicles and introduction of mechanized farming and pesticides in agriculture. These changes have made risk factors for injuries more common, and the effect of injuries on mortality and morbidity is expected to increase with time.

There is no reported effort on behalf of policy-makers or academics in Pakistan to address the problem of injuries. In this paper, we will analyze available data to make a case that injuries are an important public health problem in the country. The objectives of this study are to present an epidemiological profile of injuries in Pakistan (based on available data) and to recommend strategies to further delineate this issue. This paper will evaluate all types of injuries with special emphasis on the totality of this problem. The intention of the injury, the risk factors and the nature and type of injury will also be evaluated as the data allows. It is hoped that this will provide a background for launching policy initiatives in Pakistan and will contribute to the existing body of literature on injury control in developing countries. To our knowledge no such review has been reported in literature concerning injuries in Pakistan.

**Methods and materials**

A methodical review of available literature was undertaken and data collected for all types of injuries and accidents in Pakistan. Published and unpublished documents including government reports, peer review journals and other literature such as local journals have been included as sources of information for this paper. A systematic review of electronic database searches, regional indexes, police records, institutional reports and national surveys was conducted. Government of Pakistan publications from the Federal Bureau of Statistics, Ministry of Health, Planning Commission, Ministry of Interior and the Pakistan Medical Research Council have been included. Unpublished documents were also obtained from the National Traffic Research Center.

The analysis was helped by discussions with experts in government, donor agencies and non-profit organizations. Data were compiled and analyzed on spreadsheets using Microsoft Excel (Version 7.0) and related software.

For a description of the risk of road-side injuries based on the number of vehicles, the accident fatality rate (total number of deaths in road accidents per 10 000 vehicles) has been used. For country comparisons, the classification of motorization level and risk based on the population, as developed by the World Health Organization (WHO 1989), has been used. In this the motorization level refers to the number of vehicles per 1000 people while risk is evaluated based on fatalities per 10 000 people per year. The ratio of deaths to accidents has also been estimated for Pakistan and used for both internal consistency checks and external comparisons.

**Results**

An exhaustive search revealed only a handful of articles with mention of Pakistan and any type of injuries. Two national health surveys, 1982–83 and 1990–94, contained a few questions specific to injuries. The rest of the data found on this topic were obtained from government sources, which largely limits our observations to the 1985 to 1994 period.

The data for homicides, assaults and work-related injuries are tabulated by number of events and not the number of people involved (Bureau of Statistics 1995). Therefore the actual persons affected in these categories cannot be surmised by government data. We have used the most conservative ratio of one death or injury per event for the data presented below. This may underestimate the deaths and injuries caused but provides a satisfactory assumption to state the impact of injuries at the minimal level in Pakistan.

**Mortality and morbidity from injury**

Causes of deaths in public hospitals in Pakistan are reported annually to the Ministry of Health. The list of causes is based on the International Classification of Disease, 7th edition, and includes 50 causes of deaths for the country. Code number ‘50’ is a composite for deaths due to accidents, poisoning and violence, and also includes occupational accidents. 3.58% of reported deaths were categorized under this code, making it the eleventh most common cause of death (Federal Bureau 1989).

Morbidity data are very difficult to obtain but a national survey in 1982 categorized 1.4% of people self-reporting themselves sick with injuries/accidents, which made this the 15th most common cause of sickness (Federal Bureau 1982). Early figures from a more recent national survey report a 4.8% prevalence of injuries requiring medical attention among children less than five years old (Pakistan Medical Council 1996).

**Motor vehicle injuries**

The number of registered vehicles in Pakistan increased by 93% between 1985 and 1994, resulting in a 47% increase in the motorization level (Table 1). Accident fatality rates were reported as 55 per 10 000 vehicles in 1978 (Jacobs 1983) but data from government records demonstrates a falling trend to 26 and 16 per 10 000 in 1985 and 1994 respectively. There was an 18% increase in the severity of accident outcomes as measured by the proportion of accidents resulting in deaths (Table 1).
There was a reported 55% increase in the number of homicides between 1985 and 1994. A 38% increase in injuries from assaults (including firearms) was also reported in the same time period. The rates per 100,000 population for both homicides and assaults show a similar time trend and are higher during 1988–1990, then decline and show another peak from 1993 onwards (Figure 1).

### Work-related injuries

Government data indicate that between 1982 and 1991 there was a 13% increase in the number of registered factories, but a 49% decline in the total number of industrial accidents per 1000 workers. At the same time a 50% rise in the rate of fatal industrial accidents per 1000 workers was reported (Figure 2). Data for 1985 and 1986 are suspect since numbers reported are far below those for previous or subsequent years.

### Local studies

Two smaller studies revealed local descriptions of work-related injuries and poisoning. A case control study observed that chronic lead poisoning is significantly higher (p<0.01) in factory workers who are exposed to lead fumes than in others (Khan 1994) and was significant for workers in production industries. A single institution-based study demonstrated that only 0.2% of hospital admissions were due to acute poisoning. In this group 4% of those admitted died; insecticides were the most common cause of poisoning; and the majority of poisonings were categorized as unintentional (Chaudhry et al. 1992). An autopsy study of 50 consecutive deaths in military

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### Table 1. Motorization level and accident fatality rates in Pakistan, 1985–1994

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of vehicles</th>
<th>Population</th>
<th>Motorization level</th>
<th>No. of road accidents</th>
<th>Fatalities in road accidents</th>
<th>Accident fatality rate</th>
<th>Ratio of deaths to road accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>1,840,753</td>
<td>96,471,873</td>
<td>19</td>
<td>10,997</td>
<td>4,714</td>
<td>25.6</td>
<td>0.428</td>
</tr>
<tr>
<td>1994</td>
<td>3,543,866</td>
<td>126,467,414</td>
<td>28</td>
<td>10,916</td>
<td>5,492</td>
<td>15.4</td>
<td>0.503</td>
</tr>
<tr>
<td>% change</td>
<td>93</td>
<td>31</td>
<td>47</td>
<td>(0.7)</td>
<td>16</td>
<td>(40)</td>
<td>18</td>
</tr>
</tbody>
</table>

\(^1\): vehicles per 1000 population, \(^2\): fatalities per 10,000 vehicles, (x): % decrease

Source: Federal Bureau of Statistics, Government of Pakistan

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**Figure 1.** Homicide and assault rates in Pakistan, 1985–94

Source: Government of Pakistan
personnel showed that 58% of ‘sudden death’ cases were caused by injuries during peace time (Luqman et al. 1995).

Risk factors
Ali et al. (1994a) report 980 cases of road accidents, in which 86% of the persons involved were males. Of these a third were between the ages of 20 and 30 years. The same authors have also reported the mean age of death in railway accidents as 33.5 years, with nearly 50% of the fatalities between the ages of 21 and 30 years (Ali et al. 1994b). In another study, 88% of the patients admitted to a hospital for acute poisoning were males with a mean age of 25.6 years and all the deaths were between 15–25 years (Chaudhry et al. 1992).

Profile of injuries in a year
Table 2 displays injury rates generated for one year in Pakistan. Assuming a population of 115 million in 1991 and using the fatality rates given, more than 12 000 deaths would occur due to only motor vehicle- and crime-related injuries. This neither takes into account deaths reported from any other cause, including industrial accidents, nor corrects for any assumptions used or under-reporting in the figures shown here.

Discussion
Unintentional injuries are the main cause of injury deaths, both in developed and developing nations (Smith and Barss 1991; Zwi 1993; Mackinney and Baker 1994). Apart from motor vehicle accidents and homicides, we could not find any comprehensive information on drowning, burns, and falls. Reasons for the lack of information include absence of a comprehensive national database for injuries, reporting errors, and little emphasis on injury and violence research in Pakistan. In the absence of a data system which would fulfill the requirements of public policy, existing government recording systems primarily concentrate on injuries or injury-related deaths which are needed for legal purposes. They are inclined to generate information to document levels of injurious events that are in the purview of the police and other enforcement agencies. These sources do not focus on injuries as a health issue. However, with this information we can still estimate the magnitude of the problem and bring it to public notice.

Vital registration is largely ineffective in Pakistan and severe under-reporting has been documented (Irfan 1986). Moreover, the proportion of deaths occurring either in hospitals or certified at hospitals is low, and the process of certification, recording and reporting of deaths is not standardized. Despite these issues, 4% of deaths from public hospitals are injury related, although actual numbers and proportions may be much higher. The contribution of injuries to morbidity is low as recorded by self-reporting in health interviews. The two national health surveys also referred to serious injuries only, and the effect of all types of injuries would be greater.

According to the data for the 1985–1994 period in Pakistan, despite an overall increase in other relevant parameters (Table 1), the motor vehicle accident fatality rate dropped by 40%. Using the WHO classification, Pakistan has a low motorization level and is in a low risk category, which is
contrary to expectation. The accuracy of car registrations is assumed to be good for taxation purposes, and the increase seen in their numbers, together with the small reported change in the number of fatalities, contributes to this low risk. In the absence of evidence for any improved travel safety measures, either through the law or citizen action, we suspect that the data demonstrates under-reporting of both accidents and fatalities. This opinion is strengthened by other studies showing that fatality rates increase with an increase in vehicle ownership along with economic growth, especially in countries where there are poor road safety standards (Fouracre and Jacobs 1976; Wintemute 1985). Data from India, Bangladesh and Nigeria support the increasing trend in fatality rates (Manciaux and Romer 1986; Mohan and Bawa 1985; Fauveau et al. 1989) and indicate that the actual situation in Pakistan may also reflect an increase in the accident fatality rates.

The number of homicide events is reported to be higher than motor vehicle-related deaths and thus becomes the number one cause of injury-related deaths in Pakistan. This is despite the one event to one death ratio that we have assumed for this study. Homicides usually represent a significant proportion of injury deaths, both in developed and developing countries. Compared to the 6.3 per 100 000 homicide rate for Pakistan for 1991, the reported rates are 8.2 in Latin America, 4.7 in North Africa and the Middle East, and 2.3 in Asia (Jamison et al. 1993). The increasing trend in both the number and rate of homicides during the 1985–1994 period is important. This, coupled with a parallel increase in assaults and firearm injuries, is a cause for public policy concern.

Possible reasons for this rising trend include an increase in violence due to socio-cultural changes, such as the easy availability of arms, increasing crime and reported ethnic and sectarian disputes. These changes and their fatal effects make a case for firearm regulation and control in Pakistan. The nature and type of such control, and its implementation, will be a great challenge but may be essential to curb this menace. It should be noted that the accuracy of data for homicides would be expected to be better because of its primary utilization for legal purposes.

The number of industrial units have been steadily increasing in Pakistan (Ministry of Labor 1995) and this has not been accompanied by an enforcement of safety procedures. It is reasonable to assume that such a situation would increase the risk of work-related injuries. The available data, however, are controversial with a reported decline in total industrial accident rates but an increase in fatalities. This indicates that event reporting of all types of accidents needs to be improved and there is an urgent need for life saving safety standards in places of work. Increasing awareness, training of health providers to manage accidental emergencies and implementation of occupational health standards need to be considered.

Individual risk factors which potentially contribute to the burden of injuries are critical to recognize for any preventive measures. There is a preponderance of males among the injured in the data reviewed and this may be expected as more males are likely to be out of their homes, at work on various sites, travelling by various modes and therefore at higher risk of the type of injuries recorded. However, low numbers of registered female workers, problems of access to medical facilities and varied reporting practices may lead to under-reporting of injuries in women. This gender bias in the data may need

<table>
<thead>
<tr>
<th>Injury estimate</th>
<th>Formula</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor vehicle-related data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorization level</td>
<td>No. of vehicles per 1000 population</td>
<td>25</td>
</tr>
<tr>
<td>Fatality rate</td>
<td>No. of fatalities per 100 000 population</td>
<td>4.2</td>
</tr>
<tr>
<td>Accident fatality rate</td>
<td>No. of fatalities per 10 000 vehicles</td>
<td>16.8</td>
</tr>
<tr>
<td>Death to accident ratio</td>
<td>No. of fatalities to no. of accidents</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Crime-related data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assault rate</td>
<td>No. of injuries from assaults (including firearm injuries) per 100 000 population</td>
<td>8.87</td>
</tr>
<tr>
<td>Homicide rate</td>
<td>No. of homicides (murders) per 100 000 population</td>
<td>6.3</td>
</tr>
<tr>
<td><strong>Occupational/work-related data</strong></td>
<td>No. of industrial accidents per 1000 workers</td>
<td>6.0</td>
</tr>
<tr>
<td>Fatal industrial accident rate</td>
<td>No. of industrial accidents causing death per 1000 workers</td>
<td>0.15</td>
</tr>
<tr>
<td>Minor industrial accident rate</td>
<td>No. of minor industrial accidents per 1000 workers</td>
<td>5.17</td>
</tr>
</tbody>
</table>

Source: Federal Bureau of Statistics, Government of Pakistan
special data collection procedures that capture injuries to women at work in homes, farms and the informal sector. For example, data were not obtained on stove burns, which generally affect women and have generated an interesting debate in Pakistan. There is no information on how many women die of burns, but these deaths are both intentionally motivated such as suicides and homicides, and unintentional due to mechanical faults. Many women are reported to be new wives or pregnant at the time of the accident, raising the index of suspicion for the former causes (Ministry of Human Rights 1996).

The 21–30 age group is at greater risk as demonstrated by local studies. This is important to emphasize since injuries and resulting morbidity, disability and death have the potential of affecting the future livelihood of these people and their families.

Estimation of injury-related rates for one year in Pakistan is predictive of the potential impact of injuries on the country (Table 2). More than 12,000 deaths in 1991, based on the limited information available, make a strong case for a serious look at this issue. When we realize the age group of these deaths and their future contribution to the production in the country, this figure is revealing.

Policy implications

Injuries may not be the major cause of death but they are the leading cause of premature mortality (Smith and Falk 1987; Smith 1995). The absolute lack or poor availability of injury data in Pakistan are a major constraint on action to ensure safety. This data-poor environment creates a situation where a thorough analysis of the process of injury causation cannot be done (Haddon 1980; Baker et al. 1992). This is important not only for developing preventive measures and initiation of new policy guidelines but also to help decision-makers understand the magnitude of the problem. As in most developing countries (WHO 1989), policy-makers and managers are not sufficiently aware of the problem of injuries.

The increasing homicide and assault rates are not only an alarming health phenomena but an important social change. Wider availability of weapons, easy access of younger people to firearms and the use of such arms make a case for revision and enforcement of gun control legislation. Traffic safety rules and laws are in place but need better implementation. Regulation of traffic flow, control of traffic density, types of vehicles, speed limits and pedestrian safety measures will all help to decrease injuries on the road. Effective emergency medical services will help in improving post-injury outcome in those involved in accidents.

Injuries are causing thousands of deaths in Pakistan, although the exact number is difficult to gauge. These are often men aged 21–30, causing widespread social and economic effects. Productivity losses when measured for the nation will be significant for their magnitude but more importantly because this is a preventable loss.

The interesting situation in Pakistan with respect to data on injuries is that in the majority of situations (road accidents, homicides) information is recorded by police authorities. We would recommend an increasing role for the health sector, both in data collection and analysis, and also as a partner in multi-sectoral efforts for safety at national and local levels. As in developed countries, health and public health professionals must advocate for injury prevention and strive for bringing this issue to the forefront in national health and development plans. Experience from both developed and developing countries shows that legislation in combination with health education programmes can help to alleviate the problems of injuries (WHO 1989). High risk groups such as factory workers, young male adults and motor vehicle users can be identified for targeting in such programmes. Further studies are required to elaborate on how much each factor contributes to the risk and burden of injury at the individual and population levels.

Conclusion

We recommend that the Government of Pakistan seriously considers an operational assessment of the burden of injuries in Pakistan. This could lead to more epidemiological and economic impact studies in the future but would pave the way for legislation and implementation of safety standards sooner. A well-directed information, education and communication programme could proceed as improvements in the information systems for injury control are made. Pakistan needs to clearly define the public health and related effects of injuries, and prepare to meet the challenges that urbanization and prosperity will surely bring in the future.

Endnotes

1 World Health Organization (1989) motorization levels (number of vehicles per 1000 people): low (<45), medium (45–100), medium to high (>100–<170) and high (>170); and injury risk based on deaths (fatalities per 10,000 people per year): low (<1,2), medium (1–1.5), medium to high (1.0–2.0) and high (2.0–3.0).

References


Injuries in Pakistan


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Biographies

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