



Published in final edited form as:

Public Health. 2013 August ; 127(8): 699–703. doi:10.1016/j.puhe.2012.12.020.

The challenges of injuries and trauma in Pakistan: An opportunity for concerted action

A.A. Hyder^{a,*} and J.A. Razzak^b

^aInternational Injury Research Unit, Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, USA

^bDepartment of Emergency Medicine, Aga Khan University, Karachi, Pakistan

Abstract

Injuries and trauma are a major cause of mortality and morbidity in low and middle income countries (LMICs). In Pakistan, a low income South Asian developing country, they are among the top ten contributors to disease burden and causes of disabilities, with the majority of the burden falling on younger people in the population. This burden of injuries comes with a high social and economic cost. Several distal and proximal determinants, such as poverty, political instability, frequent natural disasters, and the lack of legislation and enforcement of preventive measures, make the Pakistani population susceptible to injuries. Historically, there has been a low level of investment in the prevention of injuries in Pakistan. Data is limited and while a public sector surveillance project has been initiated in one major urban centre, the major sources of information on injuries have been police and hospital records. Given the cost-effectiveness of injury prevention programs and their success in other LMICs, it is essential that the public sector invest in injury prevention through improving national policies and creating a strong evidence-based strategy while collaborating with the private sector to promote injury prevention and mobilizing people to engage in these programs.

Keywords

Pakistan; Injuries; Trauma; Low and middle income countries

Introduction

Injuries, intentional (violence) and unintentional, cause over 5 million deaths globally each year, with nearly 20% just from road traffic injuries (RTIs); this includes over 830,000 child deaths under the age of 18 years annually.¹ Non-fatal injuries are one of the leading causes of emergency department visits, hospitalizations, and long term morbidity and burden for

© 2013 The Royal Society for Public Health. Published by Elsevier Ltd. All rights reserved.

* *Corresponding author*. Johns Hopkins International Injury Research Unit, Johns Hopkins Bloomberg School of Public Health, 615 North Wolfe Street, Baltimore, MD 21205, USA. Tel.: +1 410 955 3928; fax: +1 410 614 1419. ahyder@jhsph.edu (A.A. Hyder).

Ethical approval

None sought.

Competing interests

None declared.

health systems around the world.² Low and middle income countries (LMICs) bear 90% of this burden, with injuries represented in the top 10 causes of mortality and burden of disease especially in the younger age groups. The Eastern Mediterranean region of the World Health Organization (WHO), which includes Pakistan, has some of the highest death rates from injuries such as RTIs and war; a recent review indicated 146,000 deaths and 2.8 million injuries just from road traffic crashes.³

This commentary provides a review of the current status of injury prevention and control in Pakistan as a case study and reviews both the burden and the policy context for interventions in this large South Asian country. The aim is to share the current status of injury management in a low income country, while also highlighting the gaps in responses which offer immediate opportunity for interventions. This commentary calls for such analysis from other countries and for concerted action by governments, non-profit organizations and academics to reduce the burden of injury.

Burden of injuries

The burden of disease from injuries in Pakistan was recognized historically in the literature two decades ago, with concern over the undercounting of injuries in the country.^{4,5} Hyder et al.⁶ reported injuries as the 5th leading cause of disease burden, 11th leading cause of death and 5th leading cause of disability in 1990. The 1990–94 national health survey estimated that over 6 million injuries occur annually, yielding an annual incidence of 45.9 per 1000 for unintentional injuries for those 5 years and older.⁷ A national injury survey in 1997 revealed an overall injury incidence of 41 per 1000 with slightly higher rates for urban than rural populations and a mean age of only 29 years for those injured.⁸ Specific studies from large urban areas have documented the burden of injury on male children under the age of 15 years, and provided an estimate of incidence of 19.2 per 100 child-years for non-fatal injuries among children aged 1–8 years.^{9,10}

According to more recent 2005 data from the Pakistan Health and Demographic Survey (PDS), injuries cause 42 deaths per 100,000 population or 6% of all deaths (Table 1).¹¹ Injuries contribute about 11% of all deaths for those above the age of 60 years. Fifty-seven percent of all injuries occur among 15–59 year olds, with males (8% vs 4%) and rural dwellers (8% vs 5%) being more likely to suffer injuries compared to women and urban dwellers, respectively (Table 1).

RTIs specifically are the 18th leading cause of death in Pakistan, with 46% of the 23,445 deaths due to road traffic occurring in the young and productive 20–39 year age group. Unintentional falls and drowning caused 6014 deaths, with 44% of these occurring among children aged 5–9 years.¹¹ Violence against women and children is a significant problem in Pakistan, with studies estimating the rates of physical and sexual violence perpetrated by an intimate partner range from 14% to 80% and 14% to 77%, respectively.^{12–17} Estimates of the incidence rate of violence against children range from 1.57 to 3.18 per 100,000 per year.¹⁸

Economic and social impact

The economic and social consequences of injuries are evident and yet challenging to capture. Globally, the annual cost of RTIs was estimated to be USD 518 billion in 2000.¹⁹ The economic cost of injuries includes the cost of treatment, loss of productivity of both the victim and the care givers, and loss of property. Such costs are not available for many LMICs though estimates for RTIs are in the range of 1–3% of Gross Domestic Product (GDP) of nations.²

In Pakistan, the estimated cost of RTIs is USD 1.6 billion per year which is 1.3% of the total GDP of the country. The National Injury Survey of Pakistan reported an average of 17-work-day loss per injury, of which 15% involved a hospital stay in the nineties.⁸ A recent study on cost of road traffic injury showed an average out of pocket expense on health care of USD 271 (SD:441) and an average loss of work of about USD 67 (SD:132), with a greater loss among victims who were the breadwinners.²⁰ The average health care cost was greater than average monthly household income in more than 80% of cases.²⁰

Political instability and terrorism has a tremendous social impact. In Karachi alone between 1987 and 1989, schooling for 5473 children was interrupted due to violence. More than half a million people were suspected to be psychologically traumatized by violence and injuries or deaths suffered by family members.²¹ Post-traumatic stress disorder is common among victims of bomb blasts and their family members,²² which could limit their ability to be productive members of society and engage in normal social interaction.

Risk factors

Pakistan has multitude of risk factors for all the major types of injuries including distal determinants such as poverty, a demographically young population, political instability, terrorism, and frequent natural disasters such as earthquakes and floods. These are compounded by more proximal determinants, including the lack of legislation and enforcement on issues such as building codes, speed control on roads, helmet use, seat belt use, and home safety measures. In addition, risk factors for poor injury outcomes in the country include the lack of organized prehospital and hospital based trauma care.²³

However, there is limited data on specific risk factors for injuries in Pakistan. RTIs for example have been reported to affect pedestrians, two-wheelers, and young males much more than other groups. Most unintentional injuries among children were reported to occur either in the home or on the roads, while road, school and urban injuries were found to result in greater disability.^{7,9,24} Among cases of childhood poisoning, low socio-economic status, poor education of mothers and unsafe storage practices of kerosene oil, medications and other chemicals were found to be risk factors.²⁵

Domestic violence was more prevalent among women who were married, young, and pregnant; women married to men who were unemployed; or those with more than one wife/partner.¹⁵ Suicides are more prevalent among those less than 35 years of age, males who are married, and are from low socio-economic status. Deliberate self-harm also tends to affect

younger adults (less than 35 years) and is most common among women, those who are married and are housewives, and those who belong to a lower socio-economic status.¹⁷

Crime in Pakistan is responsible for a large portion of the injury burden; in 2010 alone, an estimated 28,280 people were injured and 12,580 murdered.²⁶ Terrorism caused at least 2722 deaths and 6129 injuries from 2002 to 2009. Suicide terrorist events increased by 1350% from four events per year during 2002–06 to 58 events per year from 2007 to 09. Civilians were victims in almost all events, comprising 74.1% of deaths and 93.8% of those injured.²⁷ Sixty-seven suicide attacks were reported in 2010 resulting in 1159 fatalities, 1041 of whom were civilians.⁸ Media reports indicate that in the province of Khyber Pakhtunkhwa in 2010 alone, there were 453 terrorist attacks, including 34 suicide bombings, causing 813 deaths and 1741 injuries.²⁶ Explosives have been responsible for the majority of injuries and the most of these injuries have been to the extremities, which are associated with significant morbidity but a lower risk of death, indicating the need for rehabilitative services.²⁸

Policy context

The policy context in Pakistan has not been pro-injury prevention and control; for example, very low investments were reported for road injury prevention in the nineties.²⁹ Pakistan has had three national health policies during the last 20 years and there was no mention of injury in two of these health policies.^{30,31} The 1997 National Health Policy identified ‘accidents’ as a public health issue in one paragraph but did not refer to any operational plan.³² There is a current health policy under review in parliament; however this policy also does not recognize injury as an area of focus.

A National Action Plan for Prevention and Control of Non-Communicable Diseases was launched in 2004 by a non-governmental organization (NGO) with buy-in from the government and the WHO. Seven non-communicable diseases were targeted, one of which was injuries. The plan called for a National Safety Commission in addition to a number of other interventions but the action plan is still awaiting implementation. In 2009, a *National Commission on Non-Communicable Diseases* was launched, and included injury as a priority area and drafted a policy document identifying the following areas for interventions: creating a governance structure for injury prevention and control, raising public awareness, focussing on high impact preventive interventions, improving trauma care at all levels, and strengthening data monitoring and research capacity. However, this commission plan is also yet to be adopted.

In 2007, a Road Safety Secretariat was established under the Ministry of Communication within the Government of Pakistan. The secretariat produced a National Road Safety Plan, addressing the prevention and control of RTIs in a comprehensive manner. However, the Road Safety Secretariat stopped work after about 2 years due to reported budgetary constraints. The Ministry of Health does not have a department of injury prevention though it has appointed a focal point for injury prevention in the country. Recently, the President of Pakistan announcement plans for the establishment of a Road Safety Institute under the National Highway and Motor Police.

Violence against self, individuals and groups continues to be ignored at the policy level. Women were put at great disadvantage by laws collectively known as 'Hudood ordinance' enacted in 1979. These laws were revised in 2006 under the name of 'Women Protection Bill' but its impact on domestic violence and violence against women remains to be seen. Child physical and sexual abuse remains under-recognized and under-reported, though Pakistan is a signatory to the United Nations Convention on the Right of the Child. Laws on protecting children remain poorly defined and implemented.³³ Similarly, deliberate self harm remains a legal offense punishable by prison and more often harassment.³⁴

Examples of current programs

Currently, the poor policy and governance context means that there is no central body focussing on injury prevention and concerted national action is absent. Police and hospital records have been the sole sources of information on RTIs, and are reported to miss an estimated 43–55% and 20.6% of injuries in Karachi, respectively.³⁵ However, work is being done in injury surveillance, prehospital emergency system, and strengthening hospital based trauma care. For example, since 2007 there has been an ongoing public sector surveillance project for RTIs in Karachi using geographical information systems which has allowed for regular estimates of the road injury burden in the largest urban centre and promises to provide valuable information on trends in RTIs that could be used for the purposes of prevention.³⁶ However, these data are based on data from five trauma centres, and likely represent an underestimate of the true burden of injuries.³⁷ Clinical units, being referred to as 'trauma centres' are being established in many parts of the country, namely Karachi, Peshawar, Islamabad and Nawabshah, but are in various stages of completion.

In some areas of the country, modern prehospital care services have been started and expanded. One such service being supported by the province of Punjab is Rescue 1122.³⁸ In other areas, NGOs run ambulance services in some cities with variable quality of service. The city of Karachi has over five (Edhi, Chippa, St. Johns, Aman, and Khidmat-e-Khalq) 'private' ambulance services but none have been accredited or evaluated for their impact. Similarly, trauma care courses in the form of Advanced Trauma Life Support and Primary Trauma Care are being offered to physicians, but are not mandatory for emergency care personnel in the country.

Overall, NGOs and the private sector are contributing to injury prevention programs in the country; yet their actions are ad-hoc and coverage limited.

Potential interventions

Recent analysis of health priorities for developing countries revealed injury prevention and emergency care to be some of the most cost effective approaches in the health sector.^{39,40} Traffic enforcement, speed control, helmets, child resistant containers, and trained emergency personnel were all estimated to be highly cost effective interventions globally.^{41,42} In fact, estimates for South Asia revealed them to be less than \$200 per disability adjusted life year (DALY) averted or life year saved (Table 2). At the same time, return on investment estimates indicate that for every dollar spent the following interventions return \$65 for smoke alarms, \$29 for child restraints and \$3 for road safety

improvements.¹ The public health burden and economic rationale for investing in injury prevention is clear for Pakistan. Further, better data is needed on the aetiology of injury among the elderly in Pakistan, who comprise a large proportion of injuries, so that appropriate prevention measures can be taken.

Injury prevention is not just theoretically important for LMICs like Pakistan but has been shown to have much success. Relevant examples for Pakistan come from the success of motorcycle safety programs in Malaysia, poisoning prevention intervention in South Africa, trauma care in Thailand, alcohol and violence reduction strategies in Colombia, and burn prevention innovations in Sri Lanka all demonstrate that population based impact is possible.^{1,29,41} In fact, the recent process of public-academic partnership in Malaysia for RTI prevention provides a model for further engagement in Pakistan.⁴³ What is also surprising is that other countries and region, even middle and high income countries, might be in similar situation to Pakistan.⁴⁴

Key challenges

It is critical for Pakistan to stop this loss of healthy life from injuries, especially since it involves the young, productive, and vulnerable portions of the population. Each sector of society has a role to play in confronting this burden of mortality and morbidity – a *sin qua non*- of a multi-sectoral approach for injury prevention and control. The public sector must provide the policy context and strong commitment for appropriate and evidence based programs. A focused national strategy for injury prevention and control inclusive of trauma care and rehabilitation is needed. With devolution of health to the provinces, building consensus on injury/trauma program has become even more challenging. The academic and research sectors need to play a significant role in intervention studies and operations research to both adapt and adopt scientific interventions for the Pakistani context. NGOs have a clear role in mobilizing Pakistani society and creating a strong demand for safety and a Pakistan free of injuries. The private for-profit sector can explore specific public-private partnerships for safety promotion in areas such as occupational injuries and road safety. Finally, strong leadership from the government is required to create political stability and security and prevent deaths and disability due to violence and terrorism. This paper calls for such concerted action in Pakistan to create a potential model for other developing countries.

Acknowledgements

We would like to thank Cyra Patel for editorial assistance with the paper.

Funding

Research reported in this publication was partly supported by the Fogarty International Center of the National Institutes of Health, USA under Award Number D43TW007292 through support of AAH and JAR. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

REFERENCES

1. Peden, M.; Oyegbite, K.; Ozanne-Smith, J.; Hyder, AA.; Branche, C.; Rahman, AKMF.; Rivara, F.; Bartolomeos, K. World report on child injury prevention. Geneva: World Health Organization; 2008.

2. World Health Organization. Injuries and violence – the facts. Geneva: World Health Organization; 2010.
3. World Health Organization. Eastern Mediterranean report on road safety: call for action. Cairo: World Health Organization; 2010.
4. Ghaffar A, Hyder AA, Mastoor MI, Shaikh I. Injuries in Pakistan: directions for future health policy. *Health Policy Plan.* 1999 Mar; 14(1):11–17. [PubMed: 10351465]
5. Razzak JA, Luby SP. Estimating deaths and injuries due to road traffic accidents in Karachi, Pakistan, through the capture-recapture method. *Int J Epidemiol.* 1998 Oct; 27(5):866–870. [PubMed: 9839745]
6. Hyder AA, Morrow RH. Applying burden of disease methods in developing countries: a case study from Pakistan. *Am J Public Health.* 2000 Aug; 90(8):1235–1240. [PubMed: 10937003]
7. Fatmi Z, Hadden WC, Razzak JA, Qureshi HI, Hyder AA, Pappas G. Incidence, patterns and severity of reported unintentional injuries in Pakistan for persons five years and older: results of the National Health Survey of Pakistan 1990–94. *BMC Public Health.* 2007 Jul 10.7:152. [PubMed: 17623066]
8. Ghaffar A, Hyder AA, Masud TI. The burden of road traffic injuries in developing countries: the 1st national injury survey of Pakistan. *Public Health.* 2004 Apr; 118(3):211–217. [PubMed: 15003410]
9. Lasi S, Rafique G, Peermohamed H. Childhood injuries in Pakistan: results from two communities. *J Health Popul Nutr.* 2010 Aug; 28(4):392–398. [PubMed: 20824983]
10. Razzak JA, Luby SP, Laflamme L, Chotani H. Injuries among children in Karachi, Pakistan – what, where and how. *Public Health.* 2004 Mar; 118(2):114–120. [PubMed: 15037041]
11. Pakistan Federal Bureau of Statistics. [accessed 19 April 2011] Pakistan Demographic survey – 2005. n.d. Available at: <http://www.statpak.gov.pk/fbs/content/pakistan-demographic-survey-2005>
12. Ali TS, Bustamante-Gavino I. Prevalence of and reasons for domestic violence among women from low socioeconomic communities of Karachi. *East Mediterr Health J.* 2007 Nov-Dec; 13(6): 1417–1426. [PubMed: 18341191]
13. Fikree FF, Bhatti L. Domestic violence and health of Pakistani women. *Int J Gynecol Obstet.* 1999; 65(2):195–201.
14. Fikree FF, Jafarey SN, Korejo R, Afshan A, Durocher JM. Intimate partner violence before and during pregnancy: experience of postpartum women in Karachi, Pakistan. *J Pakistan Med Assoc.* 2006; 56(6):252–256.
15. Karmaliani R, Irfan F, Bann CM, McClure EM, Moss N, Pasha O, Goldenberg RL. Domestic violence prior to and during pregnancy among Pakistani women. *Acta Obstet Gynecol Scand.* 2008; 87(11):1194–1201. [PubMed: 18951219]
16. Kapadia MZ, Saleem S, Karim MS. The hidden figure: sexual intimate partner violence among Pakistani women. *Eur J Public Health.* 2010 Apr; 20(2):164–168. [PubMed: 19666702]
17. Shaikh MA. Domestic violence against women – perspective from Pakistan. *J Pakistan Med Assoc.* 2000; 50(9):312–314.
18. Hyder AA, Malik FA. Violence against children: a challenge for public health in Pakistan. *J Health Popul Nutr.* 2007 Jun; 25(2):168–178. [PubMed: 17985818]
19. Jacobs G, Aeron-Thomas A, Astrop A. Estimating global road fatalities. 2000
20. Razzak JA, Bhatti JA, Ali M, Khan UR, Jooma R. Average out-of-pocket healthcare and work-loss costs of traffic injuries in Karachi, Pakistan. *Int J Inj Contr Saf Promot.* 2011 Apr.2:1–6.
21. Jamali AR, Ghulamullah S, Qureshi I, Mehboob G. Human cost of political violence. *J Pakistan Med Assoc.* 2000; 50(1):25–29.
22. Izhar N, Masood K, Hussain T, Bhatti MR. Post-traumatic stress disorder among the survivors of a bomb blast. *Pak J Med Sci.* 2003; 19(3):169–171.
23. Razzak JA, Hyder AA, Akhtar T, Khan M, Khan UR. Assessing emergency medical care in low income countries: a pilot study from Pakistan. *BMC Emerg Med.* 2008 Jul 3.8:8. [PubMed: 18598353]
24. Hyder AA, Sugerman DE, Puvanachandra P, Razzak J, El-Sayed H, Isaza A, Rahman F, Peden M. Global childhood unintentional injury surveillance in four cities in developing countries: a pilot study. *Bull World Health Organ.* 2009 May; 87(5):345–352. [PubMed: 19551252]

25. Ahmed B, Fatmi Z, Siddiqui AR, Sheikh AL. Predictors of unintentional poisoning among children under 5 years of age in Karachi: a matched case-control study. *Inj Prev*. 2011 Feb; 17(1):27–32. [PubMed: 20923985]
26. Human Rights Pakistan Commission. Pakistan – state of human rights in 2010. Islamabad: 2011.
27. Bhatti JA, Mehmood A, Shahid M, Bhatti SA, Akhtar U, Razzak JA. Epidemiological patterns of suicide terrorism in the civilian Pakistani population. *Int J Inj Contr Saf Promot*. 2011 Mar 30.:1–7. [PubMed: 21409675]
28. Nasir K, Hyder AA, Shahbaz CM. Injuries among Afghan refugees: review of evidence. *Prehosp Disaster Med*. 2004 Apr-Jun;19(2):169–173. [PubMed: 15506254]
29. Bishai D, Hyder AA, Ghaffar A, Morrow RH, Kobusingye O. Rates of public investment for road safety in developing countries: case studies of Uganda and Pakistan. *Health Policy Plan*. 2003; 18(2):232–235. [PubMed: 12740328]
30. Pakistan Ministry of Health. National health policy 1990: The Way Forward: Agenda for Health Sector Reform. 1990
31. Pakistan Ministry of Health. National health policy 2001: The Way Forward: Agenda for Health Sector Reform. 2001 Dec.
32. Pakistan Ministry of Health. National health policy 1997: The Way Forward: Agenda for Health Sector Reform. 1997
33. Society for Prevention of Abuse to Children. The state of Pakistan's children. Karachi: 2009.
34. Khan MM, Hyder AA. Suicides in the developing world: case study from Pakistan. *Suicide Life Threat Behav*. 2006 Feb; 36(1):76–81. [PubMed: 16676628]
35. Lateef MU. Estimation of fatalities due to road traffic crashes in Karachi, Pakistan, using capture-recapture method. *Asia Pac J Public Health*. 2010 Jul; 22(3):332–341. [PubMed: 21212049]
36. Road Traffic Injury Research and Prevention Center. Half yearly report: Jan to Jun 2010 and half yearly comparison of 2009 and 2010. Karachi: 2010.
37. Lateef MU. Spatial patterns monitoring of road traffic injuries in Karachi metropolis. *Int J Inj Contr Saf Promot*. 2010 Jun 17.:1–9. [PubMed: 20182935]
38. Waseem H, Naseer R, Razzak JA. Establishing a successful pre-hospital emergency service in a developing country: experience from Rescue 1122 service in Pakistan. *Emerg Med J*. 2010 Sep 15.
39. Ameratunga S, Hajar M, Norton R. Road-traffic injuries: confronting disparities to address a global-health problem. *Lancet*. 2006 May 6; 367(9521):1533–1540. [PubMed: 16679167]
40. Kobusingye, OC.; Hyder, AA.; Bishai, D.; Joshupura, M.; Hicks, ER.; Mock, C. Emergency medical services. In: World Bank. , editor. Disease control priorities in developing countries. 2nd edn.. New York, NY: Oxford University Press; 2006. p. 1261-1280.
41. Peden, M.; Scurfield, R.; Sleet, D.; Mohan, D.; Hyder, AA.; Jarawan, E.; Mathers, C. World report on road traffic injury prevention. Geneva: World Health Organization; 2004.
42. World Bank. Disease control priorities in developing countries. 2nd edn.. New York, NY: Oxford University Press; 2006.
43. Tran NT, Hyder AA, Kulanthayan S, Singh S, Umar RS. Engaging policy makers in road safety research in Malaysia: a theoretical and contextual analysis. *Health Policy*. 2009; 90(1):58–65. [PubMed: 18937995]
44. Hyder AA, Aggarwal A. The increasing burden of injuries in Eastern Europe and Eurasia: making the case for safety investments. *Health Policy*. 2009; 89(1):1–13. [PubMed: 18571277]

Table 1

Epidemiological Summary of Injuries in Pakistan, 2005.

Estimated number of deaths per year	60,862
Death rate	42 per 100,000
% of all deaths due to injuries	6%
Age distribution	
- 0–14 years	32%
- 15–59	57%
- >60	11%
Contribution to all deaths in the country by gender	
- Males	8%
- Females	4%
Contribution to all deaths in the country by domicile	
- Urban	5%
- Rural	8%

Source: Pakistan Demographic Survey 2005¹¹

Table 2

Cost effectiveness estimates for injury interventions for South Asia.

Intervention	\$/DALY averted	\$/life year gained
Traffic enforcement	5	
Speed bumps for the top 10% of most lethal junctions	1.93	
Trained lay first responders and volunteer paramedics		5
Staffed ambulances in urban areas		60
Staffed ambulances in rural areas		180

DALY: disability adjusted life year.

Source: Disease Control Priorities in Developing Countries – Second Edition⁴²