

The Incidence of Injury Presentations to Emergency Departments: What We Don't Know Can Hurt Us

S Meaney, E Williamson, P Corcoran, E Arensman, IJ Perry
National Suicide Research Foundation, 1 Perrott Avenue, College Road, Cork

Abstract

The incidence of injury presentations to emergency departments in the Republic of Ireland has not been established. Data were collected relating to all injuries that presented on every eighth day in July-December 2005 to the three hospitals in Cork City. In total, 2,967 injury presentations were recorded. The total, male and female age-adjusted rate of injury presentations was 11,322, 13,933 and 8,550 per 100,000, respectively. The peak male rate was among 15-29 year-olds (26,735 per 100,000), 2.5 times the female rate in the same age range (10,719 per 100,000). The peak female rate was among over 85 year-olds (18,543 per 100,000). Place of injury, activity at time of injury and underlying substance/object causing injury were unspecified for 44%, 46% and 43% of recorded injuries. Improving the recording of injury data needs to be prioritised in Irish emergency departments ideally in conjunction with the development of a national injury surveillance system.

Introduction

Injury is the leading cause of death for individuals aged between 5 and 44 years¹. In the European Union, injuries represent the fourth major cause of death². In 2007 the European Council highlighted the need for injury surveillance systems³ and prevention strategies should be co-ordinated across EU member states. Better use of existing data is the key to meeting these needs⁴. In Ireland injury is the third leading cause of death⁵ and accounts for at least 8.5% of admissions to hospitals⁶. Unintentional injuries are the leading cause of death among young people in Ireland, causing 44.3% of deaths in 5-14 year olds and 70.0% of deaths in 15-24 year olds^{7,8}. In 2001 the Irish government recognised the need for an injury prevention strategy as injury prevention was acknowledged as a public health issue needing a co-ordinated approach⁹. Injury surveillance systems at both local and national levels provide valuable information on the burden of injury while adding to our understanding of specific patterns which can be used to both introduce and evaluate injury prevention strategies¹⁰⁻¹⁴.

This study aimed to establish an injury surveillance system, on a pilot basis, for the three hospitals in Cork city. The objectives were to establish the incidence of injury presentation to the emergency departments, the nature of the injuries involved and the completeness of the data recorded.

Methods

The EU Injury Database (IDB) is a surveillance system designed for the recording of all types of injury treated in hospital emergency departments using a standardised data set^{4,15}. Every eighth day in the six-month period 1 July - 31 December 2005 was selected as an injury surveillance day. All injury presentations made to the three Cork city hospitals during the 24 hours of these days were identified retrospectively from emergency department records. Anonymised data relating to these injury presentations were recorded. The recorded data included the sex and age of the patient, activity when injured, mechanism of injury, place of occurrence, direct object/substance producing injury and underlying object/substance causing injury. Ethical approval was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals. Administrative approval was obtained from each participating hospital and researchers signed confidentiality agreements.

The catchment area for the three Cork city hospitals is not well-defined geographically. It extends beyond the city and into Cork county thereby including suburban areas, satellite towns and rural areas. The catchment area population was estimated based on data from the National Registry of Deliberate Self Harm¹⁶ which registers all deliberate self harm presentations to hospital emergency departments in Ireland and records area of residence amongst its data. In the six-month study period, virtually all (98.1%) self harm presentations to the Cork city hospitals were made by residents of Cork city and county. In addition, 85.3% of the self harm presentations by Cork city and county residents in this period were made to the three Cork city hospitals. Assuming that this applied to all injury presentations, we estimated the catchment population to be 85.3% of the population of Cork city and county determined by the April 2006 National Census (i.e. 410,545). This catchment population estimate equated to approximately 10% (9.7%) of the national population.

Data that could potentially identify an individual patient, such as name and date of birth, were not recorded and therefore only event rates could be calculated. Age-sex-specific and age-standardised rates were calculated, the latter using the European standard population¹⁷. Exact Poisson 95% confidence intervals were calculated for the rates using StatsDirect version 2.7.7. These intervals are illustrated graphically using error bars. Chi-square tests were used to test whether activity when injured, mechanism of injury, place of occurrence, direct object/substance producing injury and underlying object/substance causing injury were associated with sex and age.

Results

The sampling strategy identified 2,967 injury presentations. Extrapolation indicates that almost 48,000 injury presentations were made to the Cork city emergency departments (EDs) in 2005, equating to 45% of the 107,000 presentations to these EDs that year. Applying this proportion to the national total of 1,100,000 ED presentations indicates that approximately 520,000 injury presentations were made to Irish EDs in 2005. Almost two thirds (63%, n=1857) of recorded cases involved male patients. Unintentional injuries, assault and intentional self harm accounted for 85%, 7% and 3% of the injury presentations. Soft tissue injuries (27%), fractures (20%) and open wounds (19%) were most common while the part of body injured was generally either the upper extremities (35%), lower extremities (28%) or head (19%).

The total, male and female age-adjusted rate of injuries leading to ED presentation was 11,322, 13,933 and 8,550 per 100,000, respectively. Thus, the male rate was 63% higher than the female rate. Incidence rates varied significantly by age, especially for men (Figure 1). The peak male rate was among 15-29 year-olds (26,735 per 100,000), 2.5 times the female rate in the same age range (10,719 per 100,000). While lower in magnitude, the male injury rate in 30-44 year-olds (12,307 per 100,000) was still more than double the equivalent female rate (5,614 per 100,000). The peak female rate of injury presentations to hospital was among over 85 year-olds (18,543 per 100,000).

Figure 1. Incidence of injury presentations to emergency departments by sex and age

Note: Error bars represent the 95% confidence intervals for the rates

Activity when injured, mechanism of injury, place of occurrence and both the direct and underlying object or substance producing injury varied significantly by both sex ($p < 0.001$) and age ($p < 0.001$; Table 1). Blunt force was the predominant mechanism of injury across all age-sex groups and especially among the youngest and oldest. Sport was relatively common as the activity related to young male injuries. The home was the most common place of occurrence except for the injuries of men aged 15-44 years. However, a high proportion of presentations lacked information on key variables. For almost half of the injuries, information was not specified regarding the activity when injured (46%), the place of occurrence (44%) and the underlying object or substance producing injury (43%).

Discussion

This study provides the first estimates of the incidence of injury presentations to hospital emergency departments in Ireland. Previous Irish studies have examined unintentional injury deaths⁵, hospital admissions⁸ and home and leisure injuries¹⁸. The findings indicate that 45% of all presentations to Irish emergency departments are due to injuries with a rate of 11,322 injury events per 100,000. This rate is significantly lower than that found by methodologically comparable studies⁹ of a rural area of Northern Ireland (22,000 per 100,000) and a town in Scotland (19,620 per 100,000)¹⁹. Separate Greek, Norwegian and Spanish studies have derived general population injury rates based primarily on emergency department data but with some methodological differences from our study. Our injury rate is higher than that of the Spanish study (7,470 per 100,000) but similar to that reported by the Greek (12,900 per 100,000) and Norwegian (11,400 per 100,000) studies although the latter included injuries treated by general practitioners²⁰. It may be suggested that the higher injury rate in the UK is related to the provision of free emergency healthcare. However in countries such as Spain which also provide free emergency healthcare lower injury rates are reported.

The European Union's Injury Database (IDB) reported similar age-sex variation in the incidence of injury presentations to hospital to that reported in this study. The peak rate of injuries was among young men aged 15-29. Young and middle-aged men had twice the rate of injury presentations as women. The peak female rate was among over 85 year-olds. The IDB also showed a secondary peak in the male rate of injury presentations in this age group which was not observed in the Irish data. A study comparing the disability adjusted life years (DALYs) of six European countries, including Ireland, reported a similar pattern of injury whereby the highest rate of DALYs was amongst men aged 15-24 whereas the highest burden of injury was amongst men aged 25-44²⁰.

This study had a number of limitations. The study catchment area was not well-defined geographically although data from a related health information system enabled us to estimate the catchment area population²¹. The surveillance of emergency department presentations in every eighth day of a six-month period yielded approximately 3,000 injury presentations which yielded incidence rates with an adequate degree of precision. However, the sampling approach and the lack of identifying patient data meant only event rates, as opposed to person-based rates, could be calculated and the rate of repeat presentations could not be estimated. We have shown a high level of unspecified data related to injury presentations in Ireland. Injury prevention policies need to be evidence based therefore an emphasis must be placed on data recording procedures when patients present to emergency departments. Standardised hospital IT systems which routinely extract, centralise and report the data in conjunction with staff training are required. In 2001, the Irish government's health strategy stated that a national injury prevention strategy will be prepared. Unfortunately this strategy has not yet been published. The findings from this study highlight the need for a comprehensive injury strategy and in particular the need to address data quality issues.

Acknowledgements

We thank Des O' Mahoney and Lisa Perry for their assistance with data collection. We are very grateful to the various hospital staff who facilitated the study.

Funding

EU Public Health Programme 2003 (EU DG Sanco Grant Agreement No. 7905862005), The National Suicide Research Foundation is in receipt of funding from the Health Service Executive's National Office for Suicide Prevention.

Correspondence: S Meaney

National Suicide Research Foundation, 1 Perrott Avenue, College Road, Cork

Email: Sarah.Meaney@nsrf.ie

References

1. Sethi D, Racioppi F, Frerick B, Frempong N. Progress in Preventing Injuries in the WHO Region: Implementing the WHO Regional Committee for Europe resolution EUR/RC55/R9 on prevention of injuries in the WHO European Region and Recommendation of the Council of the European Union on the prevention of injury and promotion of safety. Rome: World Health Organization, 2008.
2. Austrian Road Safety Board (KfV). Injuries in the European Union - a statistics summary 2005-2007. Vienna:KfV, 2009.
3. The European Council. Action for a safer Europe. Brussels: The Commission of the European Communities, 2007.
4. Kisser R, Latarjet J, Bauer R, Rogmans W. Injury data needs and opportunities in Europe. International Journal of Injury Control and Safety Promotion. 2009;16:103-112.
5. Scallan E, Staines A, Fitzpatrick P, Laffoy M, Kelly A. Injury in Ireland. Department of Public Health Medicine and Epidemiology. Dublin: University College Dublin, 2001.
6. Scallan E, Staines A, Fitzpatrick P, Laffoy M, Kelly A. Unintentional injury in Ireland: a comparison of mortality and morbidity data. Journal of Public Health. 2004;26:6-7.
7. Laffoy M, Igoe D, O'Herlihy BP. Accidental Injury in Ireland: Priorities for Prevention. Ireland: The Office for Health Gain, 1995.
8. Boland M, Staines A, Fitzpatrick P, Scallan E. Urban-rural variation in mortality and hospital

- admission rates for unintentional injury in Ireland. *Inj Prev*. 2005;11:38-42.
9. Department of Health and Children. Quality and Fairness: A Health System for You: Health Strategy. Dublin: Government of Ireland, 2001.
 10. Sethi D, Racioppi F, Baumgarten I, Bertoillini R. Reducing inequalities from injuries in Europe. *Lancet*. 2006;368:2243-2250.
 11. Hirshon JM. The Rationale for Developing Public Health Surveillance Systems Based on Emergency Department Data. *Academic Emergency Medicine*. 2000;7:1428-1432.
 12. Lyons R, Jones S, Kemp A, Sibert J, Sheperd J, Richmond P, Bartlett C, Palmer S. Development and use of a population based injury surveillance system: the All Wales Injury Surveillance System (AWISS). *Inj Prev* 2002; 8: 83-86
 13. Stone DH, Morrison A, Smith GS. Emergency department injury surveillance systems: the best use of limited resources? *Inj Prev* 1999;5:166-167.
 14. Warda L. Injury Surveillance and the Emergency Physician. *Clin Ped Emerg Med*. 2003;4:112-120
 15. National Suicide Research Foundation. National Registry of Deliberate Self Harm Ireland: Annual Report 2006-2007. Cork: National Suicide Research Foundation, 2008
 16. Waterhouse J, Muir C, Correa P, Powell J. Cancer incidence in five continents. Lyon: IARC, 1976
 17. European Injury Database. <https://webgate.ec.europa.eu/idb/> (accessed 21 May 2010)
 18. Department of Health and Children. European home and leisure accident surveillance system report for Ireland 2002. Dublin: Government of Ireland, 2003.
 19. Alexandrescu R, Oâ Brien SJ, Lecky F. A review of injury epidemiology in the UK and Europe: some methodological considerations in constructing rates. *BMC Public Health*. 2009; 9:226.
 20. Polinder S, Jan Meerdine W, Mulder S, Petridou E, Van Beek E, Eurocost Reference Group. Assessing the burden of injury in six European countries. *Bulletin World Health Organization*. 2007;85, 27-34.

Comments: