

Use of national health interview data to measure the burden of disease and injuries

F J Basterra-Gortari, M Seguí-Gomez

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See end of article for authors' affiliations

Correspondence to:
Dr M Seguí-Gómez,
Departamento de Medicina Preventiva y Salud Pública, Edificio de Investigación, Universidad de Navarra, Irunlarrea 1, Pamplona 31080, Spain; msegui@unav.es

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Background: Although it is acknowledged that injuries place a substantial burden on populations throughout the world, few studies have measured the burden of non-fatal injuries and compared it with that of other health conditions.

Methods: Data for the adult population were obtained from the 2001 Spanish National Health Interview, a household telephone survey of the Spanish population. Differences in six measures of burden were compared for up to 11 conditions by age and gender. Proportions and their 95% CIs are reported.

Results: Injuries contribute 11–23% of the total health burden of the adult Spanish population, depending on which of the six indicators is used. They rank first and second out of the 11 conditions with regard to emergency visits and hospital admission, respectively. They rank third to sixth when other measures are chosen (ie, reduction in leisure activities, reduction in main activities, consulting a doctor, bedridden for half a day). Rheumatological, cardiovascular, and respiratory conditions are the only other conditions with a burden of comparable magnitude.

Conclusion: In the adult Spanish population, injuries are an important cause of burden, regardless of the specific indicator used to define burden. These findings are likely to be equally applicable in similar countries. This type of comparison may raise the profile of injuries among health professionals and policy makers.

Injury prevention has become increasingly important around the world, not only because of the related mortality but also because of its associated morbidity, short- and long-term impairment, impact on quality of life, and cost.¹ It is estimated that in the European Union alone, 80 000 people die every year from injuries, and 40 million more are affected in some way.² In Spain, 17 044 people died as the result of injuries in 2004, representing 4.6% of all deaths in that year (www.ine.es). This problem is exacerbated by the fact that injuries mostly affect younger people, who rarely die or are disabled as a result of other illnesses or disease.

Fatal injuries are only “the tip of the iceberg”. For example, in the US in 2000, for every fatal case, there were 13 hospitalizations and 323 non-hospitalized cases requiring treatment.³ Yet the epidemiology of non-fatal injuries and the burden they impose on our societies beyond hospitalization or emergency care visits is largely unknown in Spain as elsewhere.⁴ How to measure the burden of injuries more effectively is unclear. Issues that need to be considered include whether injury-specific or general health-related databases should be used, and which burden indicators should be computed.

National health interviews, also known as household interviews or surveys, are a potential source of injury burden indicators. National surveys are population-based, cover a range of health and lifestyle conditions, and are conducted at regular intervals. They avoid the biases inherent in health-service-related databases by including in the sample people with different patterns of health service use. These surveys have been used to investigate the frequency, distribution, trend, and risk factors for many health conditions.^{5–12} They have been used to measure injury rates or the impact of injuries in relation to other conditions in many studies.^{13–24} A least nine other European countries with national health interviews now include injury-related questions (European Union funded project APOLLO contract 2004119, unpublished data). The definition of injury used in these surveys tends to capture a broader spectrum of cases than hospital-based or police-based

databases.²⁵ In recent years there has been a growing interest in developing reliable methods for conducting national surveys,^{5 26 27} and a European-wide health survey is under development.

Our aim was to investigate the usefulness of national health interview data, using the Spanish example, in assessing the burden of injuries, and comparing that burden with other, more prominent, health conditions.

METHODS

Study design

We used the 2001 Spanish National Health Interview, a telephone-based survey performed every other year.²⁸ The survey was conducted on behalf of the Spanish Ministry of Health, and the sampling strategy includes a multistage, clustered, stratified sampling frame, the goal of which is to secure individual-level representativity for all age categories and both genders.

Population and participants

We restricted our analysis to the adult survey which was designed to have a sampling error of ± 0.69 for 95.5% CIs. Sampling weights are provided for each interview to allow population-based calculations. All adult interviews were only completed by the eligible subject. The response rate was 67%, and, with an additional 31% replacements, the final response rate was 98%.²⁹

Variables

Six of the 70 questions in the adult survey were used to define the burden of injury. Four of them were related to experience over the preceding 2 weeks: (1) reduction in or limitation of leisure activities; (2) reduction in main activities; (3) having to be in bed for more than half a day; (4) having consulted a doctor. The other two were related to experience over the preceding 12 months: (1) having to be hospitalized; (2) having been to an emergency department.

Table 1 Number and type of conditions experienced over 1 year in the adult Spanish population (≥16 years old): 2001 Spanish National Health Interview

Number and type of condition	Sample size	Percentage of the population (95% CI)
None	10963	52.2 (51.5 to 52.9)
One condition only	5712	27.2 (26.6 to 27.8)
Cardiac	1237	5.9 (5.6 to 6.2)
Injuries	1189	5.7 (5.4 to 6.0)
Endocrinological	977	4.7 (4.4 to 4.9)
Respiratory	739	3.5 (3.3 to 3.8)
Rheumatological	525	2.5 (2.3 to 2.7)
Digestive	369	1.8 (1.6 to 1.9)
Psychiatric	366	1.7 (1.6 to 1.9)
Neurologic	109	0.5 (0.4 to 0.6)
Genitourinary	92	0.4 (0.4 to 0.5)
Ophthalmologic	72	0.3 (0.3 to 0.4)
Dermatologic	37	0.2 (0.1 to 0.2)
One injury and some other condition(s)	1243	5.9 (5.6 to 6.2)
One other condition	652	3.1 (2.9 to 3.3)
Two other conditions	345	1.6 (1.5 to 1.8)
Three to five other conditions	246	1.2 (1.0 to 1.3)
No injury but more than 1 other condition	3090	14.7 (14.2 to 15.2)
Two conditions	1961	9.3 (8.9 to 9.7)
Three to six conditions	1129	5.4 (5.1 to 5.7)

To characterize the cumulative incidence of disease or injuries in the individual subjects, we created 11 dummy variables to summarize whether each subject had any of the following conditions: (a) cardiovascular, (b) respiratory, (c) rheumatological, (d) psychiatric, (e) neurologic, (f) digestive, (g) genitourinary, (h) endocrinological, (i) ophthalmologic, (j) dermatologic, and (k) injuries. These dummy variables synthesized the information of up to six variables on the questionnaire, including the four related to burden and two others related to having an acute or chronic condition diagnosed or having been injured. The four burden-related questions were each followed by other questions to further characterize the condition that prompted consultation with a doctor or reduced activity. A subject was characterized as being injured if he or she responded affirmatively to at least one of the following items: (1) having sustained fractures, trauma, luxations, injuries in ligaments or bones that restricted activity for 10 days or more over the 12 months before the interview; (2) having sustained contusions or injuries that restricted either leisure or main activities over the preceding 2 weeks; (3) having visited a traumatologist over the preceding 2 weeks; or (4) having reported any type of injury, including any sustained as the result of aggression, intoxication, or burns, over the preceding 12 months.

Data management and analytic strategy

We classified subjects into three age categories (16–34, 35–64, and 65+ years old) and gender to investigate differences in the impact of disease and injury. We used descriptive statistics to quantify the amount of disease and injury in the population and then identified how many of the different definitions of burden were present. This process allowed us to rank all conditions by burden. All analyses were performed using SPSS (SPSS Inc, Chicago, Illinois, USA).

RESULTS

Of the 21 067 interviewees, 51.7% were women, 35.5% were 16–34 years old, 44.4% were 35–64 years old, and the remaining 20.1% were 65 or older.

Most interviewees had not had any disease or injury in the preceding year. However, 27.2% had had only one health

Table 2 Injury relevance for Spaniards aged ≥16 across six measures of burden: rank position as compared with 10 other conditions, * by all ages and genders, by gender, and by age group: Spanish National Health Interview 2001.

	All ages (≥16) and all genders												
	Injuries by gender						Injuries by age group						
	Injuries	Cardiovascular	Respiratory	Rheumatological	Psychiatric	Neurologic	Digestive	Endocrinological	Men	Women	16–34	35–64	65+
During the post 2weeks	4	2	3	1	5	7	6	4	4	6	2	4	6
Reduced leisure activity	4	2	3	1	5	7	6	4	4	6	2	4	5
Reduced main activity	5	2	3	1	4	8	7	6	4	6	2	6	6
More than half a day in bed	4	1	5	3	6	8	7	2	3	4	1	4	5
Consulted a doctor	2	1	5	4	6	8	7	3	2	2	1	2	5
During the post year	1	2	5	3	6	8	7	4	1	1	1	1	4
Hospitalized overnight	1	2	5	3	6	8	7	4	1	1	1	1	4
Visit to ED	1	2	5	3	6	8	7	4	1	1	1	1	4

ED, emergency department. *Genitourinary, ophthalmologic and dermatologic conditions excluded from table because they each represent less than 10% of burden across any burden metric.

problem, and the rest (20.6%) had had more than one condition. Among those with only one condition, injuries were the second most commonly reported (20.8% 95% CI 19.8 to 21.9). Of those with more than one condition, 28.7% had an injury in addition to a disease. Thus, alone or in combination with other diseases, injuries were sustained by 11.6% (95% CI 11.1 to 12.0) of the adult Spanish population interviewed, a rate of 115.5 per 1000 (table 1).

Most Spaniards reported no health burden during the preceding year, although 21.5% (95% CI 20.9 to 22.0) reported some burden in one of the six measures available, and the remaining 21.2% (95% CI 20.6 to 21.7) reported some burden in two or more of the measures. The type of condition reported differed significantly according to whether the person had sustained an injury. Injured individuals were more likely to suffer more burden than those with another condition but no injury. Injured subjects were significantly more likely than those not injured to report that within the preceding 2 weeks they had been forced to reduce their main activities or had visited a doctor, or in the preceding year they had been hospitalized at least overnight or had been to an emergency department.

Table 2 presents the distribution of causes (diseases or injuries) related to burden by burden type, excluding those that amounted to less than 10% of the burden across any of the six burden metrics.

Of the 11 conditions under comparison, injuries consistently rank among the five top conditions leading to burden. Injuries to the adult Spanish population rank fifth out of 11 as the reason for being bedridden for at least half a day within the preceding 2 weeks, fourth as the cause of reduced main and leisure activities and reason for consulting a doctor over the preceding 2 weeks, second as the cause of hospitalization, and they are the leading cause of emergency department visits.

Table 2 also examines whether the rankings differ by age and sex. Even among older people, injuries rank prominently as a cause of burden.

DISCUSSION

National health interviews allow us to measure the burden of several non-fatal conditions for a particular geographical area with population representative estimates. This is an unusual opportunity because few other databases meet these requirements. Our use of the Spanish National Health Interview indicates that injuries represent 11–23% of the total burden of the adult Spanish population, depending on the choice of burden measure. This is similar in magnitude to that of rheumatological, cardiovascular, or respiratory diseases.

The findings show that injuries are a leading source of non-fatal burden across ages and genders. Compared with 10 diseases, injuries are the primary cause of emergency

department visits and are the first or second cause of hospital admissions. Injuries are also within the top six of 11 reasons for consulting a doctor, spending half a day in bed, and being forced to reduce leisure and main activities.

Whether our findings for the adult Spanish population are generalizable to other countries is questionable, although the methodological framework used for this interview is similar to other such surveys.²⁶ Other studies usually report injury rates based on answers to one specific question, most commonly whether the respondent sustained an injury requiring some form of medical treatment.²⁶ Our broader definition results in a similar rate to that reported by Warner *et al*¹⁴ in the US in 1997. In our study, recall periods were 1 year for hospitalization and emergency department visits and 2 weeks for the four other burden metrics. A recently published study recommends a maximum 5-week recall time frame for minor injuries.

The 11% injury prevalence in the Spanish population is slightly above the 7.8% reported for Spain using the 1993 National Health Interview data. However, in the earlier study the analysis was not restricted to the adult population.²¹

One limitation of our analysis relates to the fact that we used previously collected data to define conditions and burden. Although this implies that our definitions of disease and burden are somewhat intertwined, we believe this to be a minor problem, as the proportion of subjects with only one condition (disease or injury) and only one burden metric was minimal. In fact, less than 1% of respondents only had injuries that affected only one of the four burden metrics that included the answer “injury”.

Our use of the Spanish National Health Interview provides valuable information on the burden of disease and injury on the Spanish adult population. Our comparisons highlight the impact of non-fatal injuries on the health of this population relative to other conditions that attract public attention, research funding, and policy initiatives.

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Authors' affiliations

F J Basterra-Gortari, M Segui-Gomez, Department of Preventive Medicine and Public Health, Universidad de Navarra, Spain

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Key points

- Approximately 11% of the Spanish population sustain injuries each year.
- These injuries are leading causes of visits to an emergency department and hospital admission across age and gender.
- They represent one of the top six (of 11) causes of burden when other metrics are evaluated.
- Only rheumatological, cardiovascular, and respiratory conditions exceed injuries in the burden they impose on the population.

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LACUNAE

Baby Bubba gets a gun permit

“Bubba” Ludwig can’t walk, talk, or open the refrigerator door—but he does have his very own Illinois gun permit. The 10-month-old, whose given name is Howard David Ludwig, was issued a firearm owner’s identification card after his father, Howard Ludwig, paid the US\$5 fee and filled out the application, not expecting to actually get one. The card lists the baby’s height (2 feet, 3 inches), weight (20 pounds), and has a scribble where the signature should be. With some exceptions, the cards are required of any Illinois residents purchasing or possessing firearms or ammunition within the state. There are no age restrictions on the cards, an official said. Illinois State Police oversee the application process. Their purpose, said Lt Scott Compton, is to keep guns out of the hands of convicted felons, those under an order of protection, and those convicted of domestic violence. “Does a 10-month-old need a FOID [firearm owner’s identification] card? No, but there are no restrictions under the Act regarding age of applicants,” he said. Ludwig, 30, of Chicago, applied for the card after his own father bought Bubba a 12-gauge Beretta shotgun as a gift. The weapon will probably be kept at Ludwig’s father’s house until the boy is at least 14.

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