ELSEVIER

Accident Analysis and Prevention 37 (2005) 85–92

ACCIDENT ANALYSIS & PREVENTION

www.elsevier.com/locate/aap

Individual and contextual effects in injury morbidity in Barcelona (Spain)

Josep Ferrando[a], Maica Rodríguez-Sanz[a], Carme Borrell[a,*], Vicenç Martínez[b], Antoni Plasència[a,c]

[a] *Agència de Salut Pública de Barcelona, Plaça Lesseps 1, Barcelona 08023, Spain*
[b] *Departament de Sanitat i Seguretat Social, Generalitat de Catalunya, Spain*
[c] *Universitat Autònoma de Barcelona, Spain*

Received 3 February 2004; received in revised form 10 May 2004; accepted 18 May 2004

Abstract

Objective: To determine the relationship between socioeconomic level (measured through individual educational level and material deprivation in the areas of residence) and injury morbidity in different age groups and in males as well as in females.
Design: Cross-sectional survey.
Setting: Barcelona (Spain).
Methods: The study population included all cases over the age of 19 who, as a result of an injury (motor vehicles injuries, falls, hits and cuts), were admitted to the emergency departments of the six main hospitals of the city during the years 1990–1991. Age- and sex-specific morbidity rates were calculated for each educational level and each cause of injury. The contextual variable included was the proportion of unemployment in each neighbourhood. Multilevel Poisson regression models were fitted.
Results: Morbidity rates were higher in males, in young people and for lower educational levels. Results from the multilevel models show that, at contextual level, neighbourhoods with more unemployment present a higher risk of injuries. At individual level, after adjusting for contextual variables, the risk of sustaining injuries was higher among young men and women for all injury causes except falls among women where the risk was higher in the elderly; among both men and women, the risk of sustaining injury was higher in the population with lower educational level (RR = 1.79, 95% CI = 1.73–1.86 in men; RR = 2.12, 95% CI = 2.04–2.21 in women). This trend was also observed separately for traffic injuries, falls, hits and cuts.
Conclusion: Our results provide information about individual and contextual social inequalities in injury morbidity, the highest risks of injury occur in individuals of lower educational level and who reside in the more privated neighbourhoods. These results underscore the need to implement injury prevention strategies not only at the individual level, but also to tailor them to the socioeconomic position of the population.

Keywords: Social inequalities; Injury morbidity; Contextual effects

1. Introduction

Relationships between social inequalities and health in Spain have been the object of several studies (Regidor et al., 1994; Navarro and Benach, 1996; Borrell and Benach, 2003), not only from an ecological perspective, but also, if less frequently, at individual level. All these studies have confirmed that people living in low socioeconomic level areas, or of less priviledged social class, have higher mortality and worse health status, in agreement with observations in other developed countries (Black et al., 1988; Feinstein, 1993).

Studies in several countries, with a variety of study designs, have shown that injuries are among the causes of illness and death which are most related with social and economic determinants (Beer et al., 1993; Reijneveld, 1995; Masson et al., 1997; Martinez et al., 1998; Söderlund and Zwi, 1995; Plitponkarnpim et al., 1999; Van Beek et al., 2000). Social inequalities and the occurrence of injuries have been studied using a variety of approaches to the concept

* Corresponding author. Tel.: +34 93 2384545; fax: +34 93 2173197.
E-mail address: cborrell@aspb.es (C. Borrell).

0001-4575/$ – see front matter © 2004 Elsevier Ltd. All rights reserved.
doi:10.1016/j.aap.2004.05.005

and measurement of social inequalities (Cubbin and Smith, 2002). Thus low socioeconomic levels, measured through indicators such as home ownership (Carey et al., 1993; Anderson et al., 1994; Durkin et al., 1994; Lyons et al., 1995; Stevenson et al., 1995; Navas Martinez et al., 1997; Addor, 1996; Wazana et al., 1997; Evans and Kohli, 1997; Lafflamme and Diderichsen, 2000), degree of deprivation of the area of residence (Sunderland, 1984; Kendrick, 1993; Arbós Galdón et al., 1995; Stevenson et al., 1996; Abdalla et al., 1997), less favoured social classes (Söderlund and Zwi, 1995; Dougherty et al., 1990; Gofin et al., 1993; Williams et al., 1996; Roberts and Power, 1996; Roberts, 1997), poverty (Towner et al., 1994), low educational levels (Vineis et al., 1994) and membership of particular ethnic groups (Roberts and Power, 1996; Bollini and Siem, 1995; Overpeck et al., 1997; Onwuachi-Saunders and Hawkins, 1993) have been related with more frequent occurrence of injuries.

Several explanations have been put forward for the higher risk of the less favoured social classes, or with lower socioeconomic level, to injury risk factors. Thus, differences in employment of safety measures, differences in knowledge and beliefs with respect to potential sources of injury or even in infrastructures to which the population is exposed, all appear as possible explanations of these inequalities (Lafflamme and Diderichsen, 2000; Sparks et al., 1994; West, 1997).

Urban areas often show important inequalities in health since some neighbourhoods have marginal populations (Middelkoop et al., 2001). Recent research, using multilevel modelling, has emphasised the role of residential environment: socioeconomic or deprivation characteristics of the neighbourhood influences health, independently of the socioeconomic position of its individuals (Pickett and Pearl, 2001; Bosma et al., 2001; Díez-Roux et al., 2000). Nevertheless, to our knowledge, only a few studies have focused on inequalities in injuries taking into account individual as well as contextual variables, all finding independent contextual effects (Cubbin et al., 2000; O'Campo et al., 2000; Borrell et al., 2002). Based on the reports mentioned above, we elaborated the hypothesis that, apart from an individual's socioeconomic level, age and gender, the deprivation level of the neighbourhood has an influence on the risk of suffering injury.

The aims of the present study were to determine, in Barcelona, the relationship between socioeconomic level measured through individual educational level, and socioeconomic deprivation of the neighbourhood, and injury morbidity (hits and cuts, falls and traffic injuries) in different age groups and in males as well as in females.

2. Methods

2.1. Design and study population

Barcelona, the second largest Spanish city (1,600,000 inhabitants), is located on the north-eastern coast. The study is based on a cross-sectional survey of Emergency Department (ED) admissions (Plasencia et al., 1995) in Barcelona. The study population included all cases over the age of 19 who, as a result of an injury sustained during the study period, were admitted to an ED in one of the six main hospitals of the city during the years 1990–1991. These hospitals account for almost 85% of the total hospital emergencies occurring in the city.

Sampling was performed in three stages. The first stage was stratified into four monthly periods (March to June, July to October and November to February). The second stage was stratified by day of the week, and the third stage according to the time of day, divided in three 8 h shifts (8 a.m. to 4 p.m., 4 p.m. to midnight, and midnight to 8 a.m.). Each selected day/shift unit produced a cluster of all cases admitted to the ED as a result of an injury. Altogether, for each of the four-monthly periods, a cluster was randomly selected from all day/shift units in each of the day of the week stratum, using a computerized system generating random numbers. For technical reasons, there were 6 days/shifts for which it was not possible to collect information in EDs; although these missing day/shifts did not show a systematic distribution pattern and no clear seasonality was observed, this was corrected in the data analysis by giving a greater weight to the same day/shifts in the rest of the sample, to keep the same proportion as in other day/shifts.

Information was collected by personal interviews conducted by non-staff trained interviewers while patients were at the ED. A questionnaire with closed questions was used to record data concerning the patients demographic characteristics, type of external injury cause and educational level. Socioeconomic characteristics of the residential neighbourhood were obtained from the Municipal Population Census of Barcelona.

In cases where interview was not possible, the questionnaire was administered to a proxy respondent, defined as a friend or a relative of the victim who witnessed the injury and who was present in the ED at the time of admission. Quality control procedures in the detection of cases and in the information collected were systematically carried out by reviewing all discharge data from the EDs of the selected hospitals. The type of the injury cause was E-coded in accordance with the International Classification of Diseases, 9th ed. (ICD-9) (Organización Mundial de la Salud–Organización Panamericana de la Salud, 1975). This study presents results concerning all injuries (ICD-9 codes: E800–E999), and specifically traffic injuries (E810–E829 codes), falls (including slips, trips and stumbles) (E880–E888 codes) and hits (struck by, struck against) and cuts (cutting and piercing) (E916–E920 codes).

2.2. Variables and indicators analysed

The individual variables studied were age, sex, neighbourhood of residence, and highest completed level of studies (educational level). Educational level was categorised as: illiterate, no education and with 0–4 years of schooling (no