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Short Communication

Trends in disasters in Spain and their impact on public health: 1950–2005

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During the decade 1994–2005 an average of 570 disasters affecting 260 million people with 67 000 deaths occurred worldwide each year.¹ Along with the direct impact of mortality and morbidity on the affected populations, the disasters have also resulted in extensive and long-lasting economic damage. For natural disasters alone, the United Nations has estimated that during the 1980s this amounted to approximately 120 000 million dollars annually, a figure that has been growing ever since.^{2–5} The current available evidence on disaster trends shows that their impact on different populations is not only growing but will also be considerably worse in future decades, mainly due to the effects of climate change⁶ and complex emergencies.^{7,8}

A disaster is a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses, which exceed the ability of the affected community or society to cope using its own resources.⁹ We undertook our research in order to analyse the episodes of disaster that occurred in Spain between 1950 and 2005, and to analyse their

trends, as well as to estimate their impact on Public Health in terms of mortality and morbidity. With regard to inclusion criteria, we adapted those used by the Disaster Epidemiology Research Centre (Louvain University, Belgium):¹⁰ a disaster is classified as an episode of catastrophic nature, natural or technological, which has caused more than 15 deaths and/or more than 50 injured. Environmental disasters and epidemic phenomena were excluded from our research.

Between 1950 and 2005 there were 133 disaster episodes in Spain. Of these, 109 (82%) were a technological type of disaster and 24 (18%) were a natural type of disaster. Fig. 1 shows that the frequency of disasters in Spain increased over this period and adjusts to a model of linear regression of the type $y = -87.8 + 0.004x$ ($P = 0.0033$). In these disasters, 6886 people were killed, an average of 51.8 deceased per episode. At the same time, 8829 were injured, an average of 66.4 injured per disaster, giving a morbidity–mortality ratio for the period of 1.28. Mortality has remained relatively stable in our country without showing any statistically significant trends over this period, giving an equation of the type $y = 444.8 - 0.16x$ ($P = 0.92$). However, morbidity due to disasters has increased, giving an equation of the type $y =$

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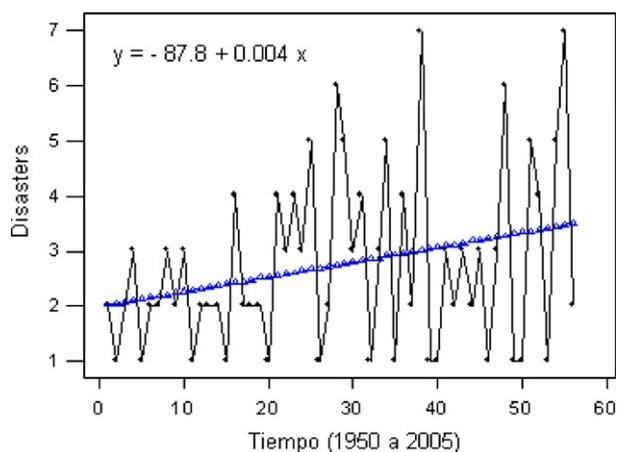


Fig. 1 Trend in the frequency of disasters in Spain, 1950–2005.

–11384 + 5.83x ($P = 0.004$). In our country, most disasters (81.2%) cause less than 50 fatalities and the disasters that kill more than 50 people represent 18.9% of the total number of episodes. In terms of impact on mortality, more than half of the disasters in our country (57.9%) have a mortality of between 16 and 50 people.

Spain has a mixed disaster pattern (natural and technological), with floods (31.5%) and air accidents (30.2%) being the types of disaster with the highest mortality. Together, during the period of investigation, these two types of disaster were responsible for 61.7% of the total deaths; an average of 144.5 people per flood episode and 83.2 people per air accident episode. In terms of morbidity, the pattern continues to be of a mixed type because the disasters with the highest number of injured in our country continue to be terrorist attacks (24.5% of the total and 361.2 injured per episode) and floods (18.7% of the total and 110 injured per episode).

Natural disasters, both climatological and geological, are relatively frequent in Spain. Seven out of the twenty disasters with the highest mortality that occurred between 1950 and 2005 were natural disasters. Nevertheless, the trend of natural disaster impact on our country, in terms of the number of people affected (deceased and injured), does not show a significant pattern and has remained stable adjusting to an equation of regression of the type $y = 341 - 0.13x$ ($P = 0.95$).

Spain is a country with a high risk of floods with a fluvial network that has more than 1400 black points and not a single hydrographic catchment area completely safe from this type of disaster. Of the 24 natural disasters that occurred in Spain between 1950 and 2005, 15 (62.5%) were floods in which 2168 people died (31.5% of all mortality due

to disasters). Floods are the type of natural disaster resulting in the greatest financial losses; catastrophes due to water represented more than 85% of the disaster compensation reimbursed by the Spanish insurance system between 1971 and 2002. Therefore, in Spain, for the period 1986–2016, it has been estimated that floods will make the largest financial and social impacts.

Disasters as a result of episodes of extreme temperatures are on the increase, and are related to climate change. In Spain they represent 16.7% of natural disasters and 3.0% of the total number of disasters. Four important episodes of heatwave with a total of 237 registered deaths occurred during the period of investigation; however, the National Epidemiology Centre has estimated a real mortality of 6500 people, which would make this disaster the worst in terms of mortality of all those investigated. There have also been two cold spells, with 55 resulting deaths.

Geological disasters represented 8.3% of the natural disasters and 1.5% of the total number of disasters that occurred in our country during the period of investigation, and we have only identified a subtype of them.

The impact of technological disasters, in terms of the total number of people affected (injured and deceased), has increased in our country over the period 1950–2005, and its distribution adjusts to an equation of regression of the type $y = -11276 + 5.81x$ ($P = 0.042$). Different types of technological disaster have occurred (industrial accidents, accidents of transit, terrorist attacks, collapses and fires), with the accidents of transit (air, terrestrial and maritime) being the group with the greatest specific importance and mortality. Seventy-eight (71.6%) of the 109 technological disasters were accidents of transit in which a total of 3841 died (55.9% of the total of mortality due to disasters). Classifying into subtypes, these were aquatic (24.4%), air (32.1%) and terrestrial episodes (43.6%). Of the 19 aquatic accidents, nine (0.5%) occurred in big ships at sea, between 1970 and 1993. Of the remaining 10, nine (0.5%) were small boat wrecks and one happened in a lake, between 1997 and 2005. Of the 25 air accidents, 18 (72.0%) occurred during the flight and seven (28.0%) in airports (five (20.0%) during take-off and two (8.0%) during landing).

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