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Rural habitat and risk of death in small areas of Southern Spain

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Abstract

The purpose of this paper is to study the linkage between type of habitat and mortality from all causes in small areas of Southern Spain. An ecological study was conducted on 99,870 people who died between 1985 and 1999. The municipality was taken as the unit of analysis. Data analysis was carried out through hierarchical spatio-temporal bayesian models. Results show a 13.3% reduction in mortality rates among men and 14.1% among women in the most rural areas compared to more urban environments. The study demonstrates the usefulness of socio-demographic indices in small-area geographical analyses.

Keywords: Southern Spain; Rural health; Mortality; Small-area analysis; Socioeconomic factors; Bayesian analysis

Introduction

At present, perhaps one of the most frequent applications of spatial analysis in Public Health is the study of the geographical distribution of disease in small areas, both in terms of mortality and incidence, i.e. what is known in scientific literature as *disease mapping* (Bithell, 2000; Lawson, Biggeri, & Boehning, 2000). The methods used in this area of expertise enable scientists to tap provincial, municipal or census sections of a region for analysis to forge a visual image of the geographical pattern for a given health indicator in that region. The methods developed have been successfully applied in different countries to create Incidence and Mortality Atlases. These have allowed scientists to detect geographical patterns for the most common diseases, to identify case clusters and to establish aetiological hypotheses (Elliott, Cuzick, English, & Stern, 1992; Gundersen, 2000).

As a complement to geographical maps, in recent years there has been growing interest in identifying contextual variables to account, in part, for the variability observed in small areas. Specifically, these studies aim to investigate the relationship between the demographic, economic, healthcare and social characteristics of the region in which the population under study lives and the risk of death or disease. Such studies have benefited enormously from the development of generalised linear mixed models (Breslow & Clayton, 1993).

Among the contextual variables, the rural or urban nature of the geographic area plays an important role in variability studies on health indicators in small areas. Population aging,

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economic resources, lifestyle, access to healthcare and nutritional habits, among others, are distinguishing factors between rural and large metropolitan areas. At the same time, all these factors are related to mortality and morbidity rates, indicating that some of the differences in community health may be due in part to the rural or urban nature of the population's habitat (Niggebrugge, Haynes, Jones, Lovett, & Harvey, 2005; Wilkinson & Blue, 2002).

In general terms, there is a perceived notion that health outcomes in urban areas are worse than in rural settings. In an excellent review on urban–rural variations in health published by Verheij (1996), it was found that most of the mental health studies show higher rates of psychiatric morbidity in urban areas. The stress-hypothesis is frequently used to explain this result in mental health, assuming that people in urban areas are more exposed to stressors than rural residents. Global cancer incidence seems to be higher in urban areas (Doll, 1991) and most sites analysed in several studies presented higher incidence rates than in rural setting (Verheij, 1996). In part, this may be due to the differences between both habitats as regards diet, smoking, lifestyles, occupation, social class and other socio-economic variables related to cancer risk (Pukkala, 1995). High levels of pollution could explain that chronic bronchitis, allergic rhinitis and other respiratory problems are more prevalent in the urban areas of USA and some European countries (Verheij, 1996). Most sexually transmitted disease have higher incidence in urban areas, specially in the case of HIV and AIDS, where diffusion may be partly due to urban emigration of HIV-infected persons, substance abuse, promiscuity and other modes of transmission (Verheij, 1996). Several researchers around the world have showed that the prevalence of diabetes and overweight is higher in urban settings (Dong et al., 2005; Sidhu, Kaur, & Prabhjot, 2005). The perceived general health seems to be worse in urban areas, especially in women. According to some authors, this result may be due to the weakness of supportive networks in cities. However there is not a consensus about this subject (Verheij, 1996).

Concerning mortality, some studies in Europe and North America have also showed differences in risk between rural and urban areas. In general, all cause mortality rates are higher in urban areas than in rural settings (Higgs, 1999). However, this result is not uniform around the world. Moreover, analyses of cause specific mortality rates display higher rural mortality for cardiovascular diseases (Grimaud, Bayat, & Chaperon, 2004), external causes of death (Boland, Staines, Fitzpatrick, & Scallan, 2005; Grimaud et al., 2004) and some cancer sites (Coory & Baade, 2005; Grimaud et al., 2004). Thus, lip cancer is the site that systematically shows higher mortality and incidence rates in rural settings. This may be accounted for by the association between this kind of tumour and outdoor working conditions (farmers or fishermen) that are prevalent in rural areas (Pukkala, 1995). Hospital admission rates of asthma, the frequency of suicide and motor vehicle crash injury hospitalisation rates also seems to be higher in rural populations (Boland et al., 2005; Kmet & McArthur, 2006; Taylor, Page, Morrell, Harrison, & Carter, 2005;Tong & Drake, 1999), so the widespread notion of healthier rural communities could be questioned taking into account that rural health status could depend on both the health outcome measure and the geographical characteristics of the areas in which the research have been developed (Higgs, 1999; Verheij, 1996).

These findings suggest the potential importance of habitat on health and justify the need for research on urban–rural differences in health outcomes in order to develop specific public health programmes in each country.

Traditionally, studies conducted on morbidity or mortality differentials between rural and urban habitats have used either the number of inhabitants or population density to classify areas. Some examples can be seen in the fields of Clinical Epidemiology (Boon & Kok, 2004), Public Health (Bourgeois, Berger, Hescot, Leclercq, & Doury, 1999; Saunderson, Haynes, & Langford, 1998), Health Policy (Ricketts, Johnson-Webb, & Taylor, 1998) or Community Health (Thurston & Meadows, 2003). Despite its popularity, this variable poses two types of problems, namely the difficulty involved in describing the concept of rurality with a single variable; and reducing this concept to a rural/urban dichotomy by setting a single non-universal endpoint which in general terms does not provide an accurate reflection of reality (Martin, Brigham, Roderick, Barnett, & Diamond, 2000).

Rural areas are not distinguished from urban areas only according to the inhabitants forming the core population, but also through variables reflecting their economic, health, social and cultural circumstances. As a result, rural and urban would be the two opposite ends of a continuum that describes the geographical areas in a region or country (Hewitt, 1989).