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Place of death in metropolitan regions: Metropolitan versus non-metropolitan variation in place of death in Belgium, The Netherlands and England ☆

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ABSTRACT

Place of death is an important societal indicator of end-of-life quality for the terminally ill. Using death certificate data, we examined metropolitan/non-metropolitan variation in place of death of patients with life-limiting conditions in Belgium, The Netherlands and England. Metropolitan patients were less likely to die at home and, in England, less likely to die in care homes, than non-metropolitan terminally ill. We found a lesser degree of social support and lower availability of care home beds as partial explanations of the metropolitan/non-metropolitan discrepancy. These findings warrant specific approaches to end-of-life care in metropolitan areas.

1. Introduction

Respecting the wishes of the dying is a fundamental characteristic of good end-of-life care. As most terminally ill patients prefer to die at home (Beccaro et al., 2006; Brazil et al., 2005; Higginson and Sen-Gupta, 2000; Stajduhar et al., 2008; Tang et al., 2005), and relatives often want their loved ones' death to occur at home, the place of death is considered an important aspect of the quality of end-of-life care (Teno et al., 2004). While home is not always the most appropriate place of death, the discrepancy between the proportion of terminally ill patients preferring to die at home and those actually doing so is striking (Cohen, 2007). Place of death is also related to the cost of end-of-life care, as institutionalised death is mostly more expensive than home death (Chochinov and Kristjanson, 1998; Enguidanos et al., 2005; Serra-Prat et al., 2001; Witteveen et al., 1999). These motives have incited public health policy to support more people in dying at home where that is their wish (House of Commons Health Committee, 2004).

Previous research revealed that residents of urban areas had less chance than their rural counterparts of dying in their own homes (Catalan-Fernandez et al., 1991; Cohen et al., 2006; Costantini et al., 2000; Gomes and Higginson, 2006; Sorlie et al., 2004), particularly if they live in a metropolitan region. Death seemed to occur substantially more often in hospitals and in care homes and less often at home in the metropolitan population of Brussels (Houttekier et al., 2009) than in the more rural population of Flanders, the northern part of Belgium (Cohen et al., 2006). Similar contrasts can be deduced from data for London (Decker and Higginson, 2007), as compared to separate data for England as a whole (Higginson et al., 1998) (respectively, about 20% versus 27% of cancer patients dying at home) and even more from data for New York (Decker and Higginson, 2007) and the whole of the USA (Gruneir et al., 2007) (respectively, about 20% versus 40% of cancer patients died at home).

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This metropolitan/non-metropolitan variation seems to warrant more attention, particularly as in 2008, for the first time in history, more than half the human population lived in urban areas. Although the metropolitan regions of the developing world will be growing faster in the coming decades, the cities of Europe and North America are also growing at 0.75% a year on average through 2030, reaching urbanisation levels of 78.3% and 86.7%, respectively (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2008; UN-HABITAT, 2003).

Until now, place of death has been studied in single metropolitan populations (Bruera et al., 2003; Cardenas-Turanzas et al., 2007; Houttekier et al., 2009) or compared between metropolitan populations (Decker and Higginson, 2007). Never before have metropolitan populations been compared with non-metropolitan populations. Within the context of growing urbanisation, and given the apparently high degree of hospital and care home deaths found in some metropolitan populations, it is relevant to study place of death systematically in metropolitan populations compared to non-metropolitan populations. Furthermore, it is also relevant to examine whether the expected contrast between metropolitan and non-metropolitan populations could be explained by differences in factors known to have an effect on place of death: the cause of death, the social composition of the populations, the characteristics of the health care input, and the degree of social support (Gomes and Higginson, 2006). The objective of this article is therefore to compare the place of death of patients with life-limiting conditions residing in the metropolitan and non-metropolitan regions of Belgium (Brussels Capital Region and Flanders), The Netherlands, and England using death certificate data. Two research questions are addressed. (1) Are there differences in place of death between metropolitan and non-metropolitan residents with life-limiting conditions in Belgium, The Netherlands, and England? (2) What factors, related to illness, personal characteristics, social support and health services, can explain possible metropolitan/non-metropolitan variation in place of death in Belgium, The Netherlands and England?

2. Methods

We used a common European database of death certificate data established by the partners of the European collaborative research project 'Dying well in Europe'. This database contains death certificate data from 2003 of the populations of seven European countries (Denmark, The Netherlands, Norway, Sweden, England, Wales and Scotland), two regions in Belgium (Flanders and Brussels Capital Region), and three regions in Italy (Emilia Romagna, Tuscany and Milan). More information on this database can be found elsewhere (Cohen et al., 2007). For this study we used the death certificate data from England, The Netherlands and Belgium because these countries have matching categories of place of death. For each country, the death certificate data were linked to census data and data on health services availability.

The population studied consists of patients who died after life-limiting conditions, the so-called palliative subset, as identified by Rosenwax et al. (McNamara and Rosenwax, 2007; Rosenwax et al., 2005). These patients could benefit most from receiving palliative care and had more chance to express their preferences about end-of-life care and place of death. This palliative subset consists of people who died from one or more of the following conditions: neoplasm, heart failure, renal failure, liver failure, respiratory disease, neurodegenerative disease and HIV/aids.

We considered deaths of patients who resided in metropolitan regions with a minimum of 400,000 inhabitants and a minimum population density of 2000 inhabitants/km^2 to be metropolitan. Deaths of patients who resided in the remaining parts of England, The Netherlands and Belgium were considered non-metropolitan. In accordance with these criteria, the deaths of patients who died from life-limiting conditions and resided in six English metropolitan regions were considered metropolitan: Greater London, West Midlands metropolitan county, Greater Manchester metropolitan county, Merseyside metropolitan county, Tyneside metropolitan county and the City of Bristol. For Belgium, the deaths of patients who died from life-limiting conditions and lived in Brussels Capital Region or the city of Antwerp were considered metropolitan. For The Netherlands we considered as metropolitan the deaths of patients who died from life-limiting conditions and lived in one of the three major cities: Amsterdam, Rotterdam and The Hague (Table 1).

The dependent variable in our analyses is the place of death as indicated on the death certificate, recoded into five categories: home death, hospital death, death in care home or nursing home, death in another institution (hospice in England, and mostly hospice in The Netherlands), and death elsewhere (public road, work, etc.). In The Netherlands, death in a care home and death in a nursing home form two distinct categories on the death certificate. Nursing homes hold a special position, providing more specialised geriatric care as they have specialised nursing home physicians whereas in care homes (and nursing homes in other countries) the attending physician is generally the general practitioner.

The independent variables include variables according with the factors known to affect the place of death: illness (underlying cause of death), personal factors (sex, age, and income) and environmental factors (available hospital beds, available beds in care home or nursing home, and social support available to the patient) (Gomes and Higginson, 2006). The variable cause of death consists of 7 categories of life-limiting conditions (neoplasm, heart failure, renal failure, liver failure, respiratory disease, neurodegenerative disease, and HIV/aids) and was recoded into two categories (neoplasm, and other life-limiting conditions) for logistic regression analysis. The personal variables included in analysis are: sex, age, and income. As there was no information on the death certificates on the income of the deceased, we included an aggregated variable measuring the percentage difference between the average income of the municipality of residence of the deceased and the national average income, to have a comparable measure in all countries. The variables relating to the environment are the number of hospital beds and care home/nursing home beds available per 1000 inhabitants in the health care region (health catchment area) and the social support available to the patient. For the latter we used an aggregated variable, measuring the percentage difference of the proportion of one-person households of 65 years or older in the municipality of residence of the deceased as compared to the national percentage of one-person households of 65 and above. The geographical units we used for the measures of average income and social support were the local authority area in England and the local municipality area in The Netherlands and Belgium. Their average size was 564.1 km^2 in England, 69.1 km^2 in The Netherlands and 41.8 km^2 in Belgium. The average area size of a metropolitan region, either a local authority (Bristol), a municipality (Rotterdam, Amsterdam, The Hague, Antwerp), a metropolitan county (ie a cluster of local authorities), or the Brussels Capital Region (i.e. a cluster of 19 municipalities) was 840.7 km^2 in England, 151.5 km^2 in The Netherlands and 183.0 km^2 in Belgium.

Pearson χ^2-tests were used to test differences between and within metropolitan and non-metropolitan populations. Statistical significance was set at $p < 0.001$, because of the large sample size. For each country, two separate multivariate binomial logistic regression analyses were performed to estimate the odds of