Variation in care home admission across areas of Northern Ireland

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Abstract

Background: much has been written about the demographic and health characteristics which act as risk factors for care home admission in the UK. However, few studies have examined variation in care home admission rates across areas, whilst controlling for the demographic and health characteristics of the individuals living within these areas. This is surprising given that decisions which affect admission are often taken at the local level. The aim of the study was to determine if there were variations in care home admission rates across trusts in Northern Ireland, once adjustment had been made for the demographic and health characteristics of the individuals residing within these areas.

Methods: a retrospective cohort study was undertaken, using data from the Data Retrieval in General Practice (DRGP) project in Northern Ireland, to identify a cohort of individuals aged 65 and over and living in the community at the outset of the study. A total of 28,064 individuals were followed up for 5 years to identify those who subsequently entered a nursing or residential care home. Controlling for the demographic, household composition and health characteristics of individuals, Poisson regression was used to estimate the incidence rate ratios of care home admission for 10 trusts.

Results: a total of 24,691 of the initial cohort had complete information for all variables and were included in the final analysis; 1,313 (5.3%) had entered a care home at the end of the 5 years of follow-up. Admission increased significantly with age, and diagnoses of dementia and stroke. Controlling for the age, sex and health composition of individuals, some variations in admission rates were found across trusts.

Conclusions: the study has highlighted the importance of age and clinical conditions as risk factors for care home admission. In addition, it appears that the area of residence might be important in determining a person’s risk of care home admission. Such differences may be attributable to particular characteristics of the trust, such as the level of deprivation or degree of rurality, or to differing policies in relation to services for older people. More work is required to identify the causes of the differences to allow policies to be implemented to ensure equitable access to care homes across Northern Ireland.

Keywords: admission, nursing home, residential home, elderly

Introduction

The number and proportion of older people are increasing, and with it concerns about the best method of providing and financing their health and social care needs. The preference of most older people is to remain independent in their own home as long as possible, and this has been acknowledged in various Government strategies [1]. Nonetheless, there are a significant proportion of older people resident in nursing and residential care homes throughout the UK, and given projected demographic trends this is likely to increase further in the future.

In England and Northern Ireland,[1] there are two distinct groups of potential care home entrants—those who can afford their own residential care and those who require financial assistance. For those who can afford to pay, negotiations are made between the individual and the care home provider. However, for those who require financial assistance, an assessment of the individual’s need for residential care will be made. Assuming that a need is established, the individual resources will then be examined to assess their entitlement to financial assistance. However, the criteria used to allocate funding for NHS care vary both within and across regions [2], while within care home assessment procedures also differ [3]. Further, a group of self-funded, low-dependence nursing home entrants have been identified [4].

A number of studies have highlighted both the socio-demographic and health characteristics that act as risk factors for care home entry. Along with increasing age, clinical
conditions are important, with one study finding that 90% of care home entrants had an identifiable medical condition which led to their admission [5]. Dementia is strongly predictive of subsequent care home admission [4–8], as are stroke [4, 5, 7] and hip fracture [6, 7]. Social and demographic factors, such as living in rented accommodation, living alone and being unmarried, are also associated with care home admission once adjustment has been made for variations in health status [9–11].

Most studies in the UK that have examined predictors for care home admission have focused on the health and socio-demographic characteristics of the individual entrant; few have examined whether the area in which an individual lives affects their likelihood of admission. However, one recent British study has shown variations in the proportion of older people living in care homes across local authorities with different levels of deprivation and urban/rural composition [12], with higher proportions of people living in care homes in rural and more affluent areas, although it is not known how much of this variation was due to the characteristics of the people within these areas. This dearth of knowledge about the magnitude of variations in care home admissions across areas is surprising given that factors which affect the likelihood of admission, such as the allocation of funding between community and residential care, are generally decided upon at the local level.

A higher proportion of the over 75 population live in care homes in Northern Ireland than in the other three countries of the UK [12]. Until April 2007, there were 11 Health and Social Services Trusts in Northern Ireland with responsibility for care management and arranging domiciliary care packages or placement in residential and nursing homes for its older people. They differ from each other not only in the balance of care they provide but also in terms of the character of the area that they cover with some including predominantly urban areas and others predominantly rural areas.

The aim of this study was to follow up a cohort of people aged 65 and over for 5 years, between 2000 and 2005, to determine whether there were variations in care home admissions between trusts once the individual’s demographic and health characteristics were controlled for.

Methodology

The study cohort was based on the patient lists of general practitioners' (GPs) practices participating in the Data Retrieval in General Practice (DRGP) project. This was a network of general practices distributed across Northern Ireland, trained to record the incidence and the prevalence of selected conditions on their practice computer systems [13]. Forty of 41 practices agreed to participate, producing a combined population of 255,403 people (15% of the Northern Ireland population). A total of 31,202 (12%) were aged 65 and over and not living in a care home at the outset of the study. Although the practices were self-selected on the basis of their ability to produce high-quality data, previous analyses have demonstrated a close correspondence between their demographic profiles and that for Northern Ireland as a whole [13].

The GP’s computer records provided information on the demographic and health characteristics of the study population at the outset of the study. A summary measure of health status was constructed for each patient by summing up the number of significant medical conditions they had been diagnosed with from a list of 12 conditions (neoplasm, diseases of the thyroid gland, diabetes, anaemia, Parkinson’s disease, epilepsy, blindness and low vision, hypertensive disease, ischaemic heart disease, heart failure, COPD and renal failure). Only diagnoses made within the 5 years before the start of the study were counted, as more longstanding conditions were arguably less pertinent to the patient’s current health status. These were then regrouped as 0, 1, 2 and 3 or more conditions. The literature has shown that dementia, stroke and falls [4, 6–8, 14] are significant risk factors for care home admission and to this end these conditions were analysed separately.

The Central Services Agency (CSA) is the Northern Ireland equivalent to the National Health Service Central Register in England and Wales and maintains a computerised record [the central health index (CHI)] of all people registered with a GP in Northern Ireland. A list of all care homes was supplied by the Regulation and Quality Improvement Authority, the body which has responsibility for the official registration of care homes in Northern Ireland, and added to the CHI. These combined datasets were then used to define the cohort of patients not residing in a care home at the outset of the study, and because they are updated by GPs who inform the CSA whenever a patient changes address, they were also used to indicate admission to a nursing or residential home during the 5 years of follow-up. The CHI index also includes information about the number of adults living at the same address as the older person, and this was included in the current analysis.

The GP records and CHI were linked by the CSA using the patient’s full name, address, sex and date of birth. This was a two-stage process, to ensure the anonymity of the clinically sensitive patient information. The linkage process was approved by the local medical research ethics committee and undertaken by the CSA. The final dataset made available to the authors did not contain any identifiable demographic information. A match rate of 90% was achieved, leaving 28,064 individuals aged 65 or over for analysis.

The electoral ward in which the cohort member lived at the start of the study was used to assign each person to one of the 11 trusts. Poisson regression, using years of follow-up as the exposure variable, was used to calculate

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2From the 1 April 2007, the 19 trusts (11 communities and 8 hospitals) were merged to become 6 Health and Social Care Trusts (each of which will manage staff and services on the ground and control their own budgets).

3Poisson regression is appropriate for rate data, where the rate is a count of events occurring to a particular unit of observation (in this case, whether an individual entered a nursing home) divided by some measure of that unit's...
the incidence rate ratios (IRRs) for trusts while controlling for the characteristics of the individuals who reside in these areas. Analysis was undertaken in STATA with robust estimation to account for the clustering of patients within practices.

Results

Of the 28,064 cohort members aged 65 or over, followed over the 5 years, there was complete information for 24,691 (87.9%) people. All 11 cohort members from one trust were dropped from the final analysis as these were insufficient to characterise that trust’s rate of admission. By the end of the study, 1,313 (5.3%) people had entered a care home; of whom 611 (46.5%) subsequently died (Figure 1). Of the 23,378 individuals who did not enter a nursing home, 4,768 (20.4%) died.

Table 1 shows the individual, household and health characteristics of cohort members at the start of the study period, as well as their relationship with care home admission between 2000 and 2005. The demographic and health factors associated with admission here are in keeping with findings from earlier studies. A steep age gradient was observed, while females were more likely than males to have been admitted; by the end of the follow-up period, 14% of males and 22% of females aged 85 and over had been admitted to a care home. The likelihood of admission generally increased with the number of health conditions; the lower risk of admission for patients with three or more conditions was probably an aberration due to small numbers. In addition, after adjustment for the number of medical conditions, the three specific conditions—dementia, stroke and falls—were all found to be independently associated with increased admission rates. Household composition was also shown to be an important predictor of care home admission with those living alone significantly more likely to be admitted than those living with other people, although those in households with four or more people had higher admission rates than those living in households with two or three others. This may reflect some sort of communal living, other than nursing or residential home care, at the outset of the study which reflects poor health or frailty.

Table 2 shows that the percentage of people admitted to a care home varied from a low of 3.5 in one trust to a high of 7.2 in another. After adjusting for the age and sex composition (Table 2, model 1), admission rates continued to vary across trusts being significantly lower in two of the trusts compared to the largest trust (trust 1), which served as a reference. These differences continued to exist after further adjustment for variation in household composition and health (Table 2, model 2).

Discussion

This large study has confirmed the importance of age and clinical conditions, especially dementia, in determining an individual’s likelihood of admission to a care home. In addition, it has been shown that after controlling for the individual’s own characteristics, where they live may exert an independent influence on their likelihood of being admitted to a care home. These results are generally in keeping with previous studies from the UK which have examined the demographic and health characteristics which predict care home admission [4, 5, 9]. However, the major strength of this analysis is the examination of differences in admission rates across areas, whilst adjusting for the characteristics of the individuals who live within these areas. While in other jurisdictions
researchers have found important differences in admission at the health care region even after adjusting for individual characteristics [15], little work has been done in this area in the UK.

There are a number of potential explanations for the observed differences in admission rates across the trusts. They may be related to some unmeasured characteristic of the individual such as ability to pay or variations in levels of informal support from family or friends which affect the demand for care home beds; alternatively, the variations could be attributed to the supply of care home beds or policies at the trust level, especially the allocation of funding between residential and community care. It seems unlikely that the differences are due to unmeasured characteristics of the individual, as factors previously shown to influence demand have been included. One exception is an indicator of socio-economic status or income. Unfortunately, the GP data did not provide any information on the individual’s socio-economic status; while an indicator of deprivation of the area of residence was available and could potentially be used as a proxy for the socio-economic status of the individual, it was not possible to include it in this analysis given the high degree of collinearity between the trust and area-based deprivation variables. Similarly, the urban–rural composition of the trust may have an impact on the availability of social support [16] and therefore demand for care home beds, but it was not possible to include an indicator of rurality given that some trusts were predominantly urban and other predominantly rural.

It seems likely that some of the variation across trusts is attributable to policies and funding at this level. Few studies, in the UK at least, have looked at how local policies affect admission to care homes; however, in Scotland, an inverse relationship between amounts of home-based care and care home placements has been shown [17]. In Canada, it has been shown that increased availability of nursing home beds increased the hazard of admission, while an increase in physicians decreased it [15]. In the USA, Muramatsu [18] showed that states with a higher home and community-based services expenditure were associated with lower risk of nursing home admission among childless older people. In addition, even if the amount of resources directed towards various services are identical across areas, differences in assessment procedures and interpretations of ‘need’ of a care home placement can result in differences in admission rates. Variations in admission thresholds are likely to lead to an inappropriate care home placement as well as inequities in access, and are likely to receive increasing attention given the projected increases in the number of older people and increasing pressure on public funds.

Some limitations of the work should be acknowledged. Firstly, other than the number of people within the household, there was no information on social support. In addition, the relationship of the people in the household with the care home entrant was not available. Previous work has shown that men living with a spouse have a lower risk of institutionalisation than those living with other people [19], though part of this difference was due to higher levels of chronic conditions in men living with people other than their spouse, and such conditions were adjusted for in the current analysis. Secondly, there may be bias in the 10% of older people

Table 1. Individual, household and health characteristics of those admitted to a nursing or residential home in Northern Ireland between 2000 and 2005

<table>
<thead>
<tr>
<th>Age group</th>
<th>Numbers (%)</th>
<th>Number (%) admitted to care home</th>
<th>Incidence rate ratios (IRR's of care home admission) (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>65–69</td>
<td>7,423 (30.1%)</td>
<td>67 (0.9%)</td>
<td>1.00</td>
</tr>
<tr>
<td>70–74</td>
<td>6,550 (26.5%)</td>
<td>143 (2.2%)</td>
<td>2.35 (1.79–3.08)</td>
</tr>
<tr>
<td>75–79</td>
<td>5,304 (21.5%)</td>
<td>310 (5.8%)</td>
<td>6.14 (4.71–7.99)</td>
</tr>
<tr>
<td>80–84</td>
<td>3,137 (12.7%)</td>
<td>321 (10.2%)</td>
<td>10.84 (8.03–14.62)</td>
</tr>
<tr>
<td>85+</td>
<td>2,277 (9.2%)</td>
<td>472 (20.7%)</td>
<td>24.64 (18.20–33.36)</td>
</tr>
</tbody>
</table>

Significant conditions
0 17,832 (72.2%) 689 (4.9%) 1.00
1 5,251 (21.3%) 340 (6.5%) 1.23 (1.08–1.41)
2 1,273 (5.2%) 89 (7.0%) 1.38 (1.09–1.75)
3 or more 335 (1.4%) 15 (4.5%) 0.77 (0.44–1.33)

Specific conditions
No dementia 24,372 (98.7%) 1198 (4.9%) 1.00
Dementia 319 (1.3%) 115 (36.1%) 6.06 (4.87–7.54)
No stroke 24,296 (98.4%) 1,254 (5.2%) 1.00
Stroke 395 (1.6%) 59 (14.9%) 2.55 (1.97–3.29)
No fall 22,806 (92.4%) 1,103 (4.8%) 1.00
Fall 1,885 (7.6%) 210 (11.1%) 1.54 (1.31–1.82)

Household composition
Single-person household 7,024 (28.4%) 610 (8.7%) 1.00
2 9,994 (40.1%) 393 (3.9%) 0.70 (0.64–0.78)
3 4,056 (16.4%) 136 (3.4%) 0.63 (0.52–0.76)
4 or more 3,481 (14.1%) 174 (5.0%) 0.85 (0.66–1.09)

*Fully adjusted for all individual, household and health characteristics.

Table 2. Numbers and rates of admission to nursing and residential homes in Northern Ireland between 2000 and 2005

<table>
<thead>
<tr>
<th>Trust</th>
<th>Numbers (95% CI)</th>
<th>Model 1: incidence rate (IRR) of care home admission (P-values)</th>
<th>Model 2: incidence rate (IRR) of care home admission (P-values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5,758 (5.5%)</td>
<td>1.00 (0.95–1.39)</td>
<td>1.00 (0.95–1.39)</td>
</tr>
<tr>
<td>2</td>
<td>526 (3.6%)</td>
<td>0.66 (0.55–0.79)</td>
<td>0.72 (0.59–0.87)</td>
</tr>
<tr>
<td>3</td>
<td>3,718 (3.5%)</td>
<td>0.68 (0.55–0.85)</td>
<td>0.67 (0.52–0.86)</td>
</tr>
<tr>
<td>4</td>
<td>2,021 (3.9%)</td>
<td>0.81 (0.52–1.24)</td>
<td>0.86 (0.54–1.36)</td>
</tr>
<tr>
<td>5</td>
<td>1,406 (4.1%)</td>
<td>0.80 (0.54–1.18)</td>
<td>0.77 (0.55–1.07)</td>
</tr>
<tr>
<td>6</td>
<td>708 (5.1%)</td>
<td>0.97 (0.83–1.13)</td>
<td>1.08 (0.97–1.21)</td>
</tr>
<tr>
<td>7</td>
<td>1,637 (5.3%)</td>
<td>0.95 (0.67–1.33)</td>
<td>0.96 (0.67–1.39)</td>
</tr>
<tr>
<td>8</td>
<td>3,334 (6.2%)</td>
<td>1.11 (0.99–1.24)</td>
<td>1.04 (0.92–1.18)</td>
</tr>
<tr>
<td>9</td>
<td>855 (4.9%)</td>
<td>0.87 (0.38–1.97)</td>
<td>0.81 (0.36–1.80)</td>
</tr>
<tr>
<td>10</td>
<td>4,728 (7.2%)</td>
<td>1.15 (0.95–1.39)</td>
<td>1.23 (1.03–1.48)</td>
</tr>
</tbody>
</table>

Model 1 adjusts for age and sex.
Model 2 adjusts for age, sex, health and household composition.
that could not be linked to the CSA central dataset and were therefore not included in this study. About half of this 10% likely relates to list inflation [20], though it is also likely that some of the non-linkage is due to address changes, which will include movements into nursing or residential homes. However, the 10% were found to be similar to the rest of the cohort in terms of age, sex and health status. Finally, there was no information on the supply of services for older people at the trust level.

The finding that specific medical conditions are associated with increased admission to care homes is an important consideration when identifying methods of reducing care home usage in the future, as it points to the possibility of implementing disease-specific interventions. In addition, knowledge about the conditions which increase the risk of admission is useful in predicting potential care home usage in the future based on estimated changes in the incidence of these conditions. The study also highlighted important differences in admission across areas. Further work is required to identify the causes of such differences so that appropriate policies can be implemented to ensure equitable access to care homes across Northern Ireland.

**Key points**
- Increasing age and a diagnosis of dementia or stroke are strong predictors of care home admission.
- Some variations in care home admission rates were found across trusts in Northern Ireland, even after controlling for the demographic and health characteristics of the individuals within these trusts.
- More work is required to identify why some areas have higher admission rates than others.

**Conflict of interest**
None of the authors have any conflict of interest.

**Funding**
Sheelah Connolly is funded by the Health Research Board in Dublin, Ireland.

**References**

Received 28 November 2008; accepted in revised form 19 March 2009