The mortality experience of people admitted to nursing homes

Julia E. Raines and Jeremy Wight

Abstract

Background: The objective of the study was to use routinely collected data to compare the mortality experience of people admitted to nursing homes from hospital and the community; and to describe changes in mortality over a 5 year period.

Methods: A retrospective cohort study and survival analysis were carried out. The subjects were 841 people admitted as Local Authority funded long-stay residents to Wakefield nursing homes between April 1993 and December 1997. Of these, 535 were admitted from hospital and 306 from the community. Subjects were divided into five admission year cohorts for analysis. The main outcome measures were comparison of survival curves for admissions from hospital and the community within each admission year cohort, comparison of survival curves for different admission year cohorts, and standardized mortality ratios (SMR) for all admissions (comparison with the population aged 65 years and over in England and Wales in 1995).

Results: Survival curves for admissions from hospital and the community were statistically significantly different for the 1993 admission cohort only. From 1993 to 1997, survival curves for all admissions demonstrate a steady improvement in mortality experience. SMR for all admissions from hospital was 606 per cent (95 per cent confidence interval (CI) 535.5–676.4 per cent). The difference between this and the SMR of 546.3 per cent (95 per cent CI: 457.7–634.9 per cent) for admissions from the community is not statistically significant.

Conclusions: This study shows that the mortality experience of nursing home admissions from hospital was no worse than that of admissions from the community. Survival of people admitted to nursing homes in Wakefield has improved over the last 5 years. Possible reasons for these findings are discussed.

Keywords: nursing homes, mortality rates, admissions, local authority

Key messages

Routinely collected data on Wakefield nursing home admissions demonstrate improvements in survival over the last 5 years.

The same data demonstrate that the mortality experience of those admitted to nursing homes is not related to source of admission.

Without data on health status and dependence, the reasons for these findings are purely speculative.
We set out to investigate the mortality experience of elderly patients admitted to Wakefield nursing homes, using routinely collected information. We also sought to make some assessment of the usefulness of such routinely collected data in answering questions of this nature.

Wakefield District in West Yorkshire has an overall population of approximately 320,000. It includes Wakefield City, as well as a number of smaller towns and villages, many of which have suffered as a result of the collapse of the mining industry. The Health and Local Authorities were co-terminous at the time of this study.

### Methods

The social services database was used to study nursing home clients, admitted between April 1993 (when the Community Care Act was implemented) and December 1997 inclusive. There were insufficient data on privately funded admissions. These were excluded from the sample and will be discussed further later. In addition, short-term placements (defined as any placement planned to last no longer than 4 weeks) were excluded, as these patients are likely to differ from long-stay nursing home patients in dependence and co-morbidity. The sample was divided into five cohorts related to year of admission (1993–1997). As data were collected only from April in 1993, that year was not a full cohort of admissions.

The following data were collected on all admissions: date of admission; age at admission; source of admission (hospital or community, i.e. all those not admitted from hospital, but from another ‘community’ source (hospice, own home, residential home, etc.)); gender; length of stay; status at end of stay (dead or alive).

### Survival analysis

Individuals in each admission year cohort were grouped by source of admission (hospital or community). Tests were performed for comparability in terms of gender distribution and age between groups within each cohort (unpaired t-tests for age and \( \chi^2 \) test for gender) and between cohorts (ANOVA test for age and \( \chi^2 \) for gender).

Survival curves were plotted for each cohort, and for the admission source groups within each cohort. Differences between survival curves were tested using the log rank test.

Standardized mortality ratios (SMRs) for the first year of admission were calculated for all admissions aged 65 years and over from hospital and again for those from the community, using the population of adults aged 65 years and over in England and Wales (1995) as baseline (data source: Office for National Statistics (ONS) 1998).

### Results

A total of 841 persons were admitted as Local Authority funded long-stay residents to Wakefield nursing homes between April 1993 and December 1997. In the sample as a whole, and all sub-samples analysed, there were more females than males. In none of the comparisons did differences in gender distribution between groups reach statistical significance (\( p > 0.05 \)) (Table 1).

There were no statistically significant differences in admission age between any of the yearly cohorts (\( p = 0.6 \)) or between the different admission source groups within each cohort (Table 2).

Figures 1–5 show the survival curves for each cohort (1993–1997) for each admission source group separately. The only year in which the survival curves for admissions from hospital and the community were statistically significantly different was 1993 (\( p < 0.05 \)), when admissions from the community had a better survival experience than those from hospital.

Compared with the mortality rate for the population aged 65 years and over in England and Wales in 1995, the SMR for all admissions from hospital was 606.0 per cent (95 per cent confidence interval (CI) 535.5–676.4 per cent), and for all admissions from the community was 546.3 per cent (95 per cent CI 457.7–634.9 per cent). The difference between these SMRs is not statistically significant.

Figure 6 shows the survival curves for each cohort of admissions (hospital and community admissions combined) from 1993 to 1997. It shows a steady improvement in the survival experience of admissions as a whole (\( p < 0.01 \)), which cannot be explained by differences in mean age or gender distribution of each cohort.

### Table 1 Gender distribution of the sample and sub-groups

<table>
<thead>
<tr>
<th>Year</th>
<th>No. admitted from hospital</th>
<th>No. admitted from community</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>1993</td>
<td>28</td>
<td>40</td>
</tr>
<tr>
<td>1994</td>
<td>60</td>
<td>61</td>
</tr>
<tr>
<td>1995</td>
<td>51</td>
<td>81</td>
</tr>
<tr>
<td>1996</td>
<td>45</td>
<td>71</td>
</tr>
<tr>
<td>1997</td>
<td>45</td>
<td>71</td>
</tr>
<tr>
<td>Totals</td>
<td>229</td>
<td>306</td>
</tr>
<tr>
<td></td>
<td>535</td>
<td>306</td>
</tr>
</tbody>
</table>

### Table 2 Mean age of the sample and sub-groups

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean age at admission from hospital (years)</th>
<th>Mean age at admission from the community (years)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>80.1</td>
<td>79.2</td>
<td>0.7</td>
</tr>
<tr>
<td>1994</td>
<td>78.5</td>
<td>77.6</td>
<td>0.5</td>
</tr>
<tr>
<td>1995</td>
<td>78.6</td>
<td>79.8</td>
<td>0.4</td>
</tr>
<tr>
<td>1996</td>
<td>79.1</td>
<td>81.0</td>
<td>0.1</td>
</tr>
<tr>
<td>1997</td>
<td>80.9</td>
<td>78.8</td>
<td>0.3</td>
</tr>
</tbody>
</table>
Discussion

We have shown that elderly people admitted to nursing homes are at a substantially higher risk of dying than the same age groups in the general population. One reasonable explanation for this difference lies in the fact that nursing home patients are a frail, dependent group with a high prevalence of co-morbidity, and are thus at increased risk of death. In addition, it has been suggested that the nursing home environment itself may have a detrimental effect on survival. One US study of over 5000 elderly people found that being in a nursing home increased the risk of dying by a factor of 2.74, independent of demographic, psychosocial, health and dependence characteristics. Although it would not be legitimate to generalize these results to the UK nursing home population, we must not be complacent about possible remedial causes of excess mortality.

On the whole, the mortality experience of nursing home admissions appears from this analysis not to be related to source of admission. Poorer survival of people admitted from hospital as compared with those admitted from the community was seen in the 1993 cohort only. The 95 per cent confidence interval of the SMR for hospital admissions (all years combined) includes the SMR for admissions from the community, and vice versa, demonstrating that the difference in these SMRs is not statistically significant.

If dependence and co-morbidity are related to risk of death, it is tempting to suggest that the hospital and community admission groups were similar in terms of these variables, and that the mandatory assessment process was successful in applying admissions criteria objectively regardless of admission source. There is at least some support for this in the literature. Newnham et
al.\textsuperscript{11} found no difference in average dependence scores between
groups of patients admitted from hospital or the community,
suggesting that, in that geographical area at least, the outcome
of the assessment process was not biased by source of admis-
sion. In contrast, Williams et al.\textsuperscript{12} found in their cross-sectional
survey that dependence and need for care were related to source
of admission, with those admitted from hospital generally being
more dependent than those admitted from their own homes.
That study, however, pre-dates the implementation of the Com-
munity Care Act 1990, which was designed to eradicate such
bias. If data on dependence and co-morbidity were routinely
collected in Wakefield, then we would be in a position to explore
this issue further.

Some may find it surprising that we did not find a higher
mortality rate in those admitted from hospital, who might be
expected to have a higher prevalence of co-morbidity, if not
dependence. Again, the lack of data on such variables is a
hindrance to fully explaining the results.

It is possible that combining admissions from residential
homes, other nursing homes, hospices and own homes in the
‘community’ group has masked real differences in mortality
rates between admissions from these sources and those from
hospital. In a Dutch study of nursing home patients with
dementia, the 2 year survival rate for those admitted from hos-
pital was 49 per cent, compared with 59 per cent and 60 per cent
respectively in those admitted from another nursing home and
those admitted from home.\textsuperscript{6} In the same study, however, the
2 year survival rate for those admitted from a residential home
was 46 per cent. This study may have little generalizability to the
UK nursing home population, but does suggest that it is worth
collecting more detail on source of admission.

Our study demonstrated similar-shaped survival curves for
each admission cohort, indicating a high risk of death in the first
few weeks of placement (16.5 per cent in 1 month). It is impos-
sible to compare this with other estimates in the literature,
although the general pattern of a high early mortality rate has
been found in other studies.\textsuperscript{6,8} It is possible that this is related
to the trauma of relocation of elderly people out of a known
environment. Opinion is divided on whether this is a real phen-
omenon, and, if so, whether it is avoidable through careful
planning.\textsuperscript{13}

Another possible explanation for the high early mortality
rate is that it is related to acute events, which often precipitate
a nursing home admission.\textsuperscript{6} As acute medical problems are
brought under control, the risk of death falls. Again, the routine
collection of health and dependence data on admission would
help understanding of this phenomenon.

Finally, we showed a steady improvement in mortality expe-
rience over this 5 year period. It could be argued that the inclu-
sion of 1993 in this comparison is invalid as a result of its being

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{overall_survival.png}
\caption{Overall survival.}
\end{figure}
an incomplete year. However, the exclusion of the winter months of early 1993 would serve to underestimate the mortality in 1993, making it less, rather than more, likely that a survival improvement would be seen in subsequent years.

It is possible that our results are not generalizable to the whole nursing home population in Wakefield, as they exclude privately funded places. Although exact data on the numbers of privately funded clients admitted to nursing homes are not readily available (such information is considered by some homes to be commercially sensitive), it is estimated that the study population made up more than 65 per cent of admissions. In Scotland, Newnham et al. found that privately funded patients have on average lower levels of dependence than those funded by the Local Authority. If this were generally true, then our study population would be on average more dependent than the overall Wakefield nursing home population, and would be expected to experience higher mortality rates.

Despite the fact that one of the prime aims of the Community Care Act 1990 was to ensure that only the most dependent were offered Local Authority funded nursing home care, it has been argued in the literature that the success of the Act in this regard remains unknown. In our study, the fall in mortality rates over subsequent years raises the possibility that the patients admitted to nursing homes are becoming increasingly less dependent. The routine collection of data on variables known to influence mortality such as co-morbidity, dependence and other psychosocial variables is necessary to help us understand the reasons for improved survival.

Another possible explanation for these results is that the NHS has become a ‘dumping ground’ for the most dependent nursing home residents. This has certainly been a fairly widely held view, although it is challenged by the results of a survey of English private nursing homes. That study, which pre-dated the implementation of the Community Care Act 1990, demonstrated a fairly constant low hospital admission rate (5 per cent of discharges), over a 3 year period. Our study cannot exclude the possibility that a progressive lowering of the threshold for hospital admission over the 5 years resulted in an apparent reduction in mortality. In the future, details of deaths after discharge within an agreed time should be recorded.

In the absence of data on dependence, co-morbidity and outcome following discharge, analysis of mortality rates such as ours could be variously interpreted and used unjustifiably to support preconceived policies or refute unwelcome arguments. Care must be taken to avoid such over-interpretation, and data collection must improve to prevent this happening, and to allow legitimate analysis, which will help us gain understanding of the mortality experience of this vulnerable group of people.

Conclusion

Analysis of a routinely collected dataset shows that patients admitted from hospital to a nursing home in Wakefield do not experience poorer survival than those admitted from the community, although the SMRs for these two groups are significantly higher than those for the general population. Mortality of these people has steadily decreased over the five years of observation.

We can only speculate for the explanations for these results. Further research and understanding would be greatly facilitated by national agreement on a dataset for routine collection in all nursing homes. This would also allow comparisons between districts and even individual nursing homes.

Any such database should include actual source of admission (residential home, nursing home, hospice, hospital, own home, etc.), and data on factors known to be related to mortality such as co-morbidity and dependence. Place of discharge, and date and place of death for all long-stay nursing home admissions should also be routinely collected.

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References


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