Functional decline and survival in dependent elderly people

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SUMMARY

A survey of dependency levels was carried out in 1985 and 1989 in 41 residents of old peoples homes and 25 patients in geriatric continuing care wards. There was an increase in all levels of dependency for those in both types of care. In the hospital patients surveyed in 1985, mortality was greatest in the most dependent, particularly those with impaired mental function. There was a positive correlation between length of survival and mental function. The results of this study emphasise the important role of dementia in the health and survival of old people.

INTRODUCTION

In order to plan for the needs of elderly people in the future it is not only necessary to predict the number of people in the oldest age groups but also to examine how the most dependent of old people make use of institutional care. This study measured the changes in dependency levels that occurred over a four year period in a group of elderly people who were in residential or hospital care, and related these changes to survival. The results emphasise the importance of impaired mental function in prognosis.

METHODS

In 1985 the disability level of all the residents of the residential homes and continuing care wards in the South Belfast district was measured using the survey questionnaire of the Clifton Assessment Procedure for the Elderly (CAPE). The questionnaire comprises 12 questions on information/orientation (I/O) and six questions relating to physical disability (Pd). The survey score is calculated by subtracting the Pd from the I/O score and applying the result to a five point dependency grading system. In this system each subject is assigned a disability score from A (independent) to E (most dependent). A further survey, using the same methods, took place in these institutions in 1989. It was...
therefore possible to compare the results for those who were resident on both occasions, and to assess the predictive value of the 1985 measurements on survival.

Statistical analysis: after testing for skewness the samples were analysed using an independent samples t-test which compared the measurements between the outcome groups. A two-tailed t-test was used to examine the relationship between total dependency score and length of survival.

RESULTS
Sixty six subjects were tested in both 1985 and 1989, 41 in residential accommodation (15 men, mean age 73.1, range 62–83 and 26 women, mean age 81.6, range 66–94), and 25 in the geriatric medical unit (5 men, mean age 79.4, range 74–83 and 20 women, mean age 81.0, range 72–92). In each case there was a significant decrease in the level of information/orientation, increase in physical disability, worsening of mobility and continence, and an increase in the total disability score. Thus, over a four year period there was a significant increase in dependency in the residents of both institutions (Table).

|                          | 1985          | 1989          |
|--------------------------|---------------|---------------|
| **Residential Accommodation (n = 41)** |               |               |
| Information/Orientation* | 9.10 ± 0.48   | 6.95 ± 0.68   |
| Physical disability +    | 3.12 ± 0.36   | 4.49 ± 0.44   |
| Mobility +               | 0.37 ± 0.09   | 1.20 ± 0.12   |
| Continence +             | 0.10 ± 0.05   | 0.59 ± 0.11   |
| Dependency score*        | 5.98 ± 0.73   | 2.49 ± 1.00   |
| **Geriatric Medical Unit (n = 25)** |               |               |
| Information/Orientation* | 6.54 ± 0.68   | 3.62 ± 0.91   |
| Physical disability +    | 7.00 ± 0.58   | 8.40 ± 0.48   |
| Mobility +               | 1.56 ± 0.12   | 2.00 ± 0.00   |
| Continence +             | 1.12 ± 0.17   | 1.59 ± 0.15   |
| Dependency score*        | −0.33 ± 1.18  | −4.75 ± 1.31  |

*Lower value indicates increased dependency.
+Higher value indicates increased dependency.

Using the 1985 results, a comparison was made of the 78 patients who died in hospital before the 1989 assessment with the 25 who survived and were reassessed. Those who died were significantly more dependent in the survey score (p = 0.04) and in information/orientation (p = 0.028) but not in physical disability score, compared with those who survived. There was a significant correlation between the total dependency score and survival (r = 0.263, p = 0.033), the least dependent surviving the longest. When the dependency
score was broken down to its two components, the information/orientation score was positively correlated with length of survival \((r = 0.328, p = 0.007)\), (Figure) whereas there was no significant relationship between the physical disability score and length of survival. Age and sex were not related to survival or length of stay.

![Graph](image)

**Figure.** Relation between the information/orientation (I/O) score and length of survival of patients in the geriatric medical unit \((r = 0.328; p = 0.007)\)

**DISCUSSION**

As might be expected, there were significant increases in all measures of dependency in institutionalised old people surviving over a four year period. As those in the geriatric wards were already very dependent in 1985, it is not possible to compare the rate of change in dependency in the two types of care. This group of elderly people in hospital or residential care is not typical of the elderly population as a whole as it represents the most disabled old people. A recent survey of elderly people in the community, using a slightly different survey instrument, has reported that cognitive impairment is associated with early death in these people.\(^4\) Thus, it is likely that a relation between cognitive function and survival is a general feature of old age.

Since this study was completed, questions have been asked about the accuracy of the CAPE method in diagnosing dementia.\(^5\), \(^6\) It seems that an information/orientation score of 7 or less has a low sensitivity but high specificity in that it accurately identifies severe dementia, but mild dementia is under-diagnosed. However, the linear relation between information/orientation score and survival found in the present study does not depend on an arbitrary cut-point. It must also be accepted that the CAPE system provides a measure of the degree of mental or physical disability, but does not identify the cause of the disability.

The results of this study emphasise the important role of dementia in the health of elderly people. People with dementia were disproportionately represented among the residents of residential homes and the patients in long stay wards.\(^2\), \(^7\) Thus,
dementia is a major contributor to the development of severe dependency in elderly people and the need for institutional care. The present study shows that dementia also predicts mortality of dependent elderly people. Previous studies have shown a higher death rate among institutionalised elderly people with impaired mental function.\textsuperscript{8,9} The present study directly relates survival to mental capacity.

Although there has been an increase in the age of admission and length of stay of old people requiring continuing hospital care in the last three decades,\textsuperscript{1} with many of these people suffering from dementia,\textsuperscript{7} this and other studies show that people with dementia have diminished survival. Therefore it is difficult to calculate whether the need for services for the increasing number of frail elderly people will be balanced by the reduced survival of those with dementia.

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