Relation between cognitive impairment and early death in the elderly

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Abstract

Study objective—To study the association between cognitive impairment and early death in elderly patients living in the community.

Design—Case-control study of 410 patients assessed by the mental status questionnaire and followed up after three years.

Setting—A general practice in Inverurie, Aberdeenshire, with 14 000 patients.

Patients—205 Patients aged ≥ 65 with cognitive impairment according to the mental status questionnaire (score ≤ 8) and 205 patients scoring > 8 on the questionnaire matched for age and sex.

Main outcome measure—Death.

Results—The relative risk of death in the cognitively impaired patients overall was 3.5. Those patients who scored ≤ 7 on the mental status questionnaire were five times more likely to die than their controls. There was no difference in risk of death between those with severe or moderate cognitive impairment.

Conclusions—Cognitive impairment is associated with early death.

Introduction

Old people with dementia are known not to live as long as their non-demented contemporaries, and this seems to be associated with their increased susceptibility to a wide range of physical disorders.^{1,2} The extent of this excess mortality among elderly demented patients has been examined in several studies.³⁻¹⁶ Most of these studies have been of patients who had been referred to psychiatric or general hospitals,^{3,14} and these patients are unlikely to be typical of the elderly with dementia.^{17,18} In addition, many of these studies did not use controls^{3,9} or the controls were inappropriate.¹³ Three of the studies compared mortality among demented patients with that of census populations.¹⁰⁻¹² Only two studies of sufficient size derived demented patients and control groups from community samples. Gilmore did not quantify the excess mortality in the cognitively impaired group,¹⁵ and

Gurland *et al*, who conducted a large, detailed community survey of over 1000 people in New York and London, found that the demented were over four times more likely to die in the following year than those who were not demented. Gurland *et al*'s study was complicated, however, by the fact that a quarter of the original sample did not participate.

There is little information on the natural course of dementia in the elderly living outside institutions. This information is clearly important for planning a service for the rising number of demented elderly patients during the next two decades. We conducted a three year follow up study of a general practice population aged 65 and over who were screened with the mental status questionnaire.^{19,20}

Patients and methods

The study was conducted in a general practice in Aberdeenshire, which has about 14 000 patients. About half of these patients live in Inverurie and the remainder in the surrounding area. The base population comprised all patients aged 65 and over on 1 April 1981. There were 1794 such patients, of whom 16 were unable or unwilling to participate in the initial screening, leaving a total of 1778 subjects (99.1%). The patients in the practice were divided geographically into small areas and were visited at fairly constant intervals over 18 months from November 1980 to April 1982.

The patients were assessed by the mental status questionnaire^{19,20}; further details have been given elsewhere.¹⁷ Wilson and Brass found a mean score of 7.84 in patients independently assessed as having mild dementia and we therefore considered a score of ≤ 8 to indicate possible dementia. All patients with a score ≤ 8 were matched for age and sex with a control patient who had scored 9 or 10. We recorded all deaths that had occurred in the two groups by a mean of 36 months after the initial screening. The confidence interval for the relative risk of death of the two groups was estimated and tested for significance.²¹

Results

Table I shows that the crude mortality was more than three times higher among the patients who were cognitively impaired than among the controls. It also suggests that the difference was greater in patients whose score was ≤ 7 ; the mortality in this group was more than 50%—nearly five times higher than that of their controls. We compared the outcome for each patient with cognitive impairment with that for his or her matched control (table II). For the complete data set of 205 matched pairs the estimated risk ratio was 3.5 (95% confidence interval 2.37 to 5.17). Thus cognitively impaired patients had a significantly higher mortality than their controls.

TABLE I—Numbers of patients aged ≥ 65 with cognitive impairment on mental status questionnaire (score ≤ 8) and matched controls who died within three years of assessment

Score of patients with cognitive impairment	Patients with cognitive impairment		Matched controls		Risk ratio
	Alive	Dead	Alive	Dead	
8	58	17	65	10	1.7
7	15	17	30	2	8.5
6	8	10	16	2	5.0
4 or 5	14	12	24	2	6.0
1, 2, or 3	10	10	17	3	3.3
0	16	18	29	5	3.6
Total	121	84	181	24	3.5

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TABLE 11—Paired analysis showing numbers of patients aged ≥ 65 with cognitive impairment (score ≤ 8) on mental status questionnaire (index patients) and matched controls who died within three years of assessment

Score of patients with cognitive impairment	Patients with cognitive impairment alive		Patients with cognitive impairment dead		Risk ratio (95% confidence interval)
	Control alive	Control dead	Control alive	Control dead	
8	50	8	15	2	1.7 (0.83 to 3.50)
7	15		15	2	8.5*** (2.31 to 31.25)
6	8		8	2	5.0* (1.45 to 17.27)
4 or 5	14		10	2	6.0** (1.69 to 21.26)
1, 2, or 3	9	1	8	2	3.3* (1.13 to 9.65)
0	15	1	14	4	3.6** (1.62 to 8.01)
≤ 8	111	10	70	14	3.50*** (2.37 to 5.17)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Discussion

The principal disadvantage of this study was the use of the mental status questionnaire because impairment (score ≤ 8) is not synonymous with dementia. Factors that may produce scores indicating impairment when the questionnaire is used on patients who do not have a dementing illness include depression, confusional states, low intelligence quotient, and low levels of formal education.²²⁻²⁶ There is increasing evidence, however, that brief tests of cognitive impairment are only slightly less discriminatory than similar, lengthier tests²⁶⁻²⁹ and that they yield results that agree satisfactorily with clinical diagnoses of dementia.^{19, 29, 30} In addition, it is exceptionally difficult to mount a detailed community screening programme for dementia without incurring an unacceptably high rate of non-participation.¹⁶ Our study cannot, however, claim to be a follow up of elderly patients in whom dementia had been diagnosed.

Our study does have several advantages over others on the same subject. The acceptance rate was remarkably high (99%), and the population had a low geographical mobility, which allowed a high rate of follow up. In addition, patients who were in hospital or had been admitted to other forms of institutional care almost invariably remained on the general practice's list and so were not lost to the study; this is clearly important in establishing the natural course of dementia.³¹ Unlike many previous studies ours compared mortality in the patients with that in a control group matched for age and sex.

It is interesting that patients who scored 8 with the mental status questionnaire did not experience a significantly increased mortality whereas those with scores of 7 or less were about five times more likely to die early. Studies of elderly patients living in institutions have found a positive relation between early mortality and severity of dementia.³²⁻³⁴ Mölsä *et al* followed up a community sample and found that survival rates decreased with increased severity of Alzheimer type dementia but that no such relation existed for multi-infarct dementia. Elderly demented patients living in hospital now live longer than they did 30 years ago,^{11, 35, 36} and these patients are most likely to be those whose dementia is furthest advanced. The uniformity in the mortality across the levels of cognitive impairment may therefore indicate that enhanced survival of elderly demented patients is confined to those in institutions. We are currently investigating this.

The scale of the psychogeriatric problem over the next 20 years is difficult to predict accurately.³⁷ Most demented patients are cared for in the community^{38, 39} where mortality, an essential piece of information, is difficult to obtain. Further studies of mortality in

elderly patients with dementia living in the community are required.

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