Problems of the Elderly: an Epidemiological Perspective

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The term ‘population pyramid’ appropriately described, in terms of age and sex, the constitution of the population at the beginning of this century. Large numbers of infants and children contrasted with a relatively small number of people in their seventies and eighties. Today that pyramid has been replaced by a shape which is more akin to a high-rise block and which clearly demonstrates the enormous benefits resulting from the virtual elimination of the fatal infectious diseases of childhood and early adult life. These very successes of the first half of the century have given rise to the problems we face now and will continue to face in the century to come.

Taking an epidemiological perspective, this article describes the characteristics of geographically defined populations, in contrast to the institutional populations of hospitals or old people’s homes. First it describes the size of the elderly populations and some recent projections of future size. The size of the problem is then identified from the Health Service resources used and those possibly needed in the future. A community study of the health and social needs of the elderly is briefly described. Finally, the possible ways ahead are suggested; although not solutions, the suggestions are the nearest thing we have to something of that kind. A ‘pragmatic’[1] population view has been taken in making suggestions, in contrast to the more usual ‘explanatory’, or what Fletcher and his colleagues[2] have called ‘mechanistic’, approach of clinical research in its usual form. Such a view is not in conflict with the usual clinical approach but complements it in a way that is ultimately beneficial to the public health.

Size of the Problem: Population at Risk

In the age groups 60-65 years and over there will be little change between 1981 and 2001 (Table 1). But there will be a steady increase in the age groups 75 and over (up to 41 per cent) and 85 and over (up to an enormous 120 per cent). The educational system of the country has just recovered from the post-war population boom; plans for the geriatric services for that same population now need to be made.

Table 2 shows one of the Leicestershire 1981 Census tabulations for marital status and how this varies quite markedly with age. While two-thirds of people are married in the 65-74 year old age group, only 42 per cent are married in the 75-84 age group. In the over 85 years of age group only one person in six is married. Table 3 shows how marital status relates to mean durations of stay for all discharges and deaths in hospitals in England and Wales. At each age, and in each marital status group, women have mean durations of stay that are longer than those of men, and the older stay longer than the younger, but in every age/sex group married people have markedly shorter durations of stay than unmarried. From Table 2 it can be seen that unmarried women aged 75 and over made up some 50 per cent of this age group which, as can be seen from Table 3, had a mean duration of stay of some 48 days. The consequences for the hospital and social services of large increases in the population of very old, unmarried women become apparent.

Projected Bed Use

It is therefore appropriate to estimate the number of additional hospital beds needed for such an increase in population. Table 4 shows the results of such a calculation as applied to the Leicestershire population of 1981. In these estimates national values for mean durations of stay have been used so that the results are similar to the usual situation in England and Wales; Leicestershire data have not been used, as mean durations of stay are somewhat lower in the county. Table 4 shows that some 1,500 beds were used in the course of the year by those over the age of 65, and also includes the results of the analysis of the population projections for 2001. There is no change in the bed requirements of those aged 65 to 74, but more than 300 additional beds are needed for the increase in the population over the age of 75. Various estimates of this kind suggest that an increase of 10-15 per cent in the number of beds currently used or available for use by the elderly will be needed to take account of demographic change. All these projections assume a future bed use and morbidity profile in the population, which are the same as that occurring at the present time.

General Practice

Similar estimates using data from the National Morbidity Survey[5] suggest that in Leicestershire the 400 or so general practitioners will need to be increased by at least a further 50 (12 per cent) in order to take account of the increased medical care needs of older people. It is of interest to note that the National Morbidity Survey
Table 1. The elderly population of England and Wales by broad age groups, 1981-2021[3.]

| Population (by-age) at mid-year | Estimates based on population census (millions) | Mid-1981 based projections (millions) | 1981-2021 change |
|-------------------------------|-----------------------------------------------|------------------------------------|-----------------|
|                               | 1981                                       | 1991 | 2001 | 2011 | 2021 | %     | Total (millions) |
| Women 60-64                   | 1.4                                        | 1.3  | 1.3  | 1.6  | 1.6  | 15    | 0.2           |
| Persons 65-74                 | 4.6                                        | 4.5  | 4.2  | 4.5  | 5.1  | 11    | 0.5           |
| Persons 75-84                 | 2.4                                        | 2.8  | 2.8  | 2.6  | 2.9  | 21    | 0.5           |
| Persons 85 and over           | 0.5                                        | 0.8  | 1.0  | 1.1  | 1.1  | 120   | 0.6           |
| Total 60-85 and over          | 9.0                                        | 9.4  | 9.2  | 9.8  | 10.8 | 20    | 1.8           |
| Total 75 and over             | 2.9                                        | 3.5  | 3.8  | 3.7  | 4.1  | 41    | 1.2           |
| Total 85 and over             | 0.5                                        | 0.8  | 1.0  | 1.1  | 1.1  | 120   | 0.6           |

Table 2. Leicestershire residents in private households: 65 and over by marital status and sex (Census 1981, Leicestershire County Report—Table 7). SWD = single, widowed or divorced.

|       | Age (years) | 65-74 | 75-84 | 85+ |
|-------|-------------|-------|-------|-----|
| Males | Married     | 25,066| 8,344 | 712 |
|       | SWD         | 5,700 | 4,194 | 917 |
| Females| Married    | 20,653| 6,092 | 447 |
|       | SWD         | 17,466| 15,667| 4,334|
| Total  |             | 68,885| 34,297| 6,410|

Table 3. Mean duration of stay for all hospitals in England and Wales, excluding psychiatry and maternity, by age, sex and marital status, 1978[4]. SWD = single, widowed or divorced.

|       | Mean duration of stay (days) at ages 65-74 | 75+ |
|-------|--------------------------------------------|-----|
| Male   | Married                                   | 15.2 | 20.9 |
|        | SWD                                       | 22.2 | 32.2 |
|        | All                                       | 17.0 | 26.3 |
| Female | Married                                   | 17.1 | 32.1 |
|        | SWD                                       | 25.1 | 47.7 |
|        | All                                       | 21.3 | 44.9 |

Table 4. Estimates and projections of bed use by the elderly, 1981 and 2001, Leicestershire (excluding psychiatry)[4].

| Age     | Discharge rates per 1,000 pop | Mean duration of stay (Days) | Population 1,000s | Bed years | Population 1,000s | Bed years | Change (bed years) |
|---------|------------------------------|-------------------------------|--------------------|-----------|--------------------|-----------|-------------------|
| 65-74   |                              |                               |                    |           |                    |           |                   |
| Male    | 169.7                        | 17.0                          | 30.9               | 244       | 31.8               | 251       | 7+                |
| Female  | 117.7                        | 21.3                          | 38.7               | 266       | 37.7               | 299       | 7-                |
| 75+     |                              |                               |                    |           |                    |           |                   |
| Male    | 278.7                        | 26.3                          | 14.2               | 285       | 19.3               | 388       | 103+              |
| Female  | 207.8                        | 44.9                          | 26.9               | 688       | 35.2               | 900       | 212+              |
| Total   |                              |                               |                    |           |                    |           |                   |
|         |                              |                               |                    |           |                    |           |                   |
|         |                              |                               |                    |           |                    |           |                   |

Table 5 shows the number of elderly people in various types of care in Leicestershire in 1976 and 1979. These results are derived from two censuses of all elderly patients in any form of institutional care[6,7]. During the three years there was a major increase in the number of patients being cared for in acute hospital beds, but this merely reflects an increase in provision at the Leicester Royal Infirmary between the dates on which the two censuses were undertaken. These figures highlight the underlying poverty of such data because they mirror provision of, rather than need for, such facilities. There was, for example, virtually no increase in patients being cared for in homes for the elderly, simply because there was no increase in Part III accommodation. The increase in acute hospital care facilities did not appear to lead to the admission of patients with less severe disabilities; if anything, in all settings, levels of disability had increased over the three years[7]. Finally, such studies only reflect the status of the 4 per cent of the elderly in institutional care.

While acknowledging the limited value of such data, we decided to undertake a study of the health and social needs of those over the age of 75 in a defined geographical area.

Population Study

The study was undertaken in Melton Mowbray, Leicestershire, where an unusual situation exists in that virtually all of the town and most of the surrounding district are served by a twelve-doctor general practice, all the partners working from the same premises. A computerised age/sex register of the total population registered with the doctors (approximately 32,000) was established by the university department prior to the survey which provided...
the sampling frame. The study population was drawn from this register and comprised all those who were 75 years and over on 31st December 1980. This gave a total sample of 1,329 people living in and around Melton Mowbray. The data were obtained by personal interview with the elderly people concerned. In the small number of cases in which they were not well enough to take part, the interview was conducted with a relative or caring person. Training of the interviewers used role-play and video-recording techniques.

Physical capacity was assessed by a method similar to that used by other workers[6,8], in which ability to perform the activities of daily living was tested. The activities assessed were mobility, bathing, dressing, feeding, transfer (from bed and chair), getting to and from the toilet and incontinence of urine and/or faeces. Information was also collected on the use of, or need for, help and/or aids to perform these tasks. Mental impairment was assessed by means of the information orientation scale developed by Pattie and Gillear[9] and the investigation of social networks included a measurement of social contact similar to that developed by Townsend[10] and Tunstall[11].

The study population comprised 1,329 people known to be alive and living in the area, of whom 50 (4 per cent) died before they could be interviewed, and 13 (1 per cent) could not be contacted. Of the 1,266 people contacted, 65 (5 per cent) refused to be interviewed, leaving 1,201 to be interviewed. 1,073 in their own homes, 76 in hospital or homes for the elderly and 52 in the pilot study[12]. Table 6 shows the household composition by age group of those interviewed at home. In each age group, approximately half of the sample lived alone. The major difference between age groups was that in the group aged 75-79 some 50 per cent lived with a spouse, and 9 per cent with another relative, but, by the time the age of 90 was reached, only 2 per cent were living with a spouse, and some 49 per cent were living with another relative.

Table 7 shows the proportion of the sample who were able to perform the basic activities of daily living independently, together with the proportion who were able to undertake the activities with the help of aids, or of another person. Perhaps what is most remarkable is that, given help, almost the entire sample was able to perform all of the listed activities.

Mental impairment was identified by means of the information/orientation sub-test of the cognitive assessment scale taken from Pattie and Gillear[9]. The brevity of the test and its robust nature make the scale an attractive choice for the assessment of mental impairment in large community surveys. Another advantage is that a wide range of health and social service personnel can, with minimal training, administer the test. The sub-test consists of 12 questions, and the authors maintain that scores of 7 or less are usually found in elderly people with a diagnosis of either dementia or an acute organic brain syndrome, while scores of 8 or more generally denote absence of such impairment. Using these cut-off points, 1,016 elderly people (98.4 per cent) were deemed to show no mental impairment, and only 17 people (1.6 per cent) had scores of 7 or less. Of these 17 people 16 were women, nine of whom were aged 85 and over; 12 lived with their

| Type of institution                      | 1976 | 1979 | % change 1976-79 |
|-----------------------------------------|------|------|------------------|
| NHS geriatric hospital beds             | 764  | 805  | +5.4             |
| NHS psychiatric hospital beds           | 722  | 698  | -3.3             |
| NHS acute hospital beds                 | 393  | 485  | +23.4            |
| Homes for the elderly                   | 2,236| 2,258| +1.0             |
| Homes for the handicapped               | 83   | 85   | +1.0             |
| Private nursing homes                   | 292  | 347  | +18.8            |
| All types                               | 4,490| 4,678| +4.2             |

| Composition of household | Age Group | 75-79 | 80-84 | 85-89 | 90+ | All 75+ |
|--------------------------|-----------|-------|-------|-------|-----|--------|
| No. interviewed          |           | 596   | 317   | 119   | 41  | 1,073  |
| Living alone             |           | 41    | 54    | 50    | 49  | 46     |
| Living with spouse       |           | 50    | 28    | 18    | 2   | 38     |
| Living with child, other |           | 9     | 18    | 32    | 49  | 16     |

Table 6. Household composition by age (%).

Table 7. Activities of daily living—Independence and the use of help or aids of those interviewed at home.

|                                | Uses | Uses | Uses | Uses | Not | Uses | Uses | Uses | Uses |
|--------------------------------|------|------|------|------|-----|------|------|------|------|
|                                | aids | helps| aids | helps| tested| aids | helps| aids | helps| tested|
| Bathing                        | 64.0 | 18.8 | 11.3 | 5.5  | 0.4 | 13.5 | 9.7  | 4.6  | 1.0  |
| Able to get to and from toilet at night | 68.2 | 29.9 | 0.3  | 1.2  | 0.4 | 9.2  | 9.2  | 1.2  | 0.4  |
| Able to get around dwelling    | 81.1 | 17.0 | 0.7  | 0.6  | 0.7 | 9.1  | 8.1  | 0.7  | 0.1  |
| Able to get in and out of chair| 89.7 | 8.1  | 1.3  | 0.5  | 0.5 | 9.1  | 8.1  | 1.3  | 0.5  |
| Able to get in and out of bed  | 93.0 | 3.2  | 2.8  | 0.8  | 0.1 | 9.1  | 3.2  | 2.8  | 0.8  |
| Able to dress                  | 93.8 | 0.9  | 4.6  | 0.0  | 0.6 | 9.1  | 0.9  | 4.6  | 0.0  |

Table 5. Numbers of elderly people in different types of care in Leicestershire: 1976 compared to 1979.
spouse or with their son or daughter, and the remaining five lived alone.

The social contacts made by our sample predictably diminished with age. However, the most important finding was that, of those living alone, some 50 per cent of men or women in each age group would have been described by previous authors as being socially isolated, as they had social contact scores of 20 or less in the week before the interview.

In order to assess the use of general practitioner and community nursing services, each elderly person was asked when they had last seen their own doctor, the district nurse, or health visitor. Some 80 per cent of all the elderly in our sample had seen their family doctor sometime during the previous year, and a further 10 per cent had been to their doctor within the previous two years. It is of interest that there were no age, sex or social class differences in these attendance patterns.

In contrast, 16 per cent of the sample said they had seen a district nurse within the last year, whereas only 0.8 per cent of the sample (three individuals) had seen a health visitor during the year.

Comparison of our findings with those of other surveys suggests that the Melton population is in no way unusual. Nearly half the sample lived alone, and, of those who did so, half were said to be socially isolated. The majority of the respondents were able to undertake the basic activities of daily living without any assistance, and, with help in the form of aids or other people, almost the entire sample was able to undertake these activities.

Future Prospects

It has already been suggested that, in the next 30-40 years, Leicestershire will need some 400 additional hospital beds to accommodate the increased proportion of very elderly people. This estimate excludes increased provision by social service departments and other non-NHS organisations for the care of the elderly, and in a previous article[6] we have suggested the possibility of 1,000 additional places being needed in Leicestershire in the future to cater for the institutional needs of the elderly population. These targets will obviously be impossible to achieve and it is therefore important to reassess the way in which care and cure is provided for this population.

Our community study suggests that the majority of the very old are able, with the help of others, to maintain themselves in the community. It therefore seems appropriate to concentrate our efforts in the next few years on developing programmes to increase the chances of old people remaining, as independently as possible, in the community. How can this be done? It seems to me that the structure and organisation of our primary health care services provide a unique opportunity of ensuring that everything possible is done to enable the very old to maintain themselves within their own community. The general practitioner, who, in Rosemary Stevens[13] words 'retains the patient', has a list of the names and addresses of all those whom he has contracted to provide with primary medical care. Such lists can now be easily maintained on computer files. With the addition of minimal social and demographic data it should be simple to identify, for example, those over the age of 75 who live alone and are relatively isolated, whom one might hypothesise to be in need of social support[14]. The patient’s address and post code could be used to obtain a spatial distribution of such patients. It would then be possible for the general practitioner to list the names and addresses of all adolescents, of say 16-19, who live in the post code area of each elderly, isolated person. As an example, there are approximately two people aged 15-19 for every one person over the age of 75 years in the Melton population and therefore eight such teenagers for each isolated person over 75 years old who lives alone. The opportunity for general practice to become the centre of an organisation to develop and establish services for old people, provided by the friends and neighbours of these same people, is considerable. I hesitate to make such a suggestion, because it might appear to be an excuse for turning people back into their own communities to fend for themselves, whereas, in my opinion, general practitioners, physicians and surgeons working in the NHS need to create imaginative community-based programmes for the prevention of disease and disability in the elderly. Such programmes are urgently needed, and of course they will need evaluation, but the cost of failing to develop them is likely to be high.

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