

Contemporary Themes

Consequences of assessment and intervention among elderly people: a three year randomised controlled trial

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Abstract

Over three years 285 randomly selected subjects aged 75 years or more and living in a suburb of Copenhagen were visited every three months in their own homes (the intervention group) to assess whether scheduled medically and socially preventive intervention would influence the number of admissions to hospitals or nursing homes, the number of contacts with general practice, or mortality. A randomly selected group of 287 people of the same age and sex were visited during the final three months of the study (the control group). Two hundred and nineteen admissions to hospitals (4884 bed days) were registered for the intervention group compared with 271 (6442 bed days) for the control group. Especially during the second half of the study, a significant reduction in the number of admissions to hospitals was seen in the intervention group. Twenty people in the intervention group and 29 in the control group moved into nursing homes ($p > 0.05$). The corresponding numbers of deaths were 56 and 75 ($p < 0.05$). No difference was seen in the number of contacts with general practice. Significantly fewer emergency medical calls, however, were registered for the intervention group.

Subjects in the intervention group benefited from the regular visits and the increased distribution of aids and modifications to their homes to which these led. The regular visits probably also produced an important increase in confidence.

Introduction

In 1982 the population of Denmark comprised 5.1 million inhabitants, of whom 765 000 (15%) were aged 65 or more. In the next century a considerable increase in the absolute and relative number of elderly people (especially the oldest) is expected.¹ Twenty six per cent of all patients admitted to Danish hospitals in 1982 were aged 65 or more and they used 47% of all bed days.² Seven per cent of the elderly were living in nursing homes.

Danish medical and social services for the elderly are both almost totally financed by public taxes. The primary aim of these services has been to help elderly people to stay in their own homes as long as they themselves want to and to "add life to their years—not only years to their life." Most of these services have, however, been introduced without primary investigations of their possible effect on

the current and future condition of the people who receive them. Furthermore, most of the services have been directed at people with manifest social and medical problems.

Screening studies from general practice have shown unrecognised and unreported morbidity among the elderly.³⁻⁵ In addition, elderly people are often admitted to acute medical wards because of unfulfilled social needs.⁶ Thus medically and socially preventive intervention should result in an improvement in the quality of life of the elderly and might even reduce demand for admission to hospitals or nursing homes.

The aim of the present prospective, controlled study was to evaluate the effect of preventive community measures for elderly people, gauged by mortality, number of admissions to hospitals and nursing homes, and number of contacts to general practitioners.

Subjects and methods

Roedovre municipality is a suburb of Copenhagen. It had 38 020 inhabitants in January 1980 and 37 673 in January 1981. The distribution by sex and marital state of people aged 75 or more did not differ from the rest of the country.⁷ When this study began on 1 October 1980, 1376 residents were aged 75 or more and, of them, 174 (13%) were living in nursing homes.

Data for all people in Roedovre aged 75 or more on 1 October 1980 were obtained from a register run by the municipal social welfare authorities. Six hundred elderly people living in their own homes were chosen at random and were further divided at random into two groups, an intervention group and a control group, with 300 subjects in each. Married couples were regarded as two subjects but always belonged to the same group.

The study covered three years, from 1 October 1980 to 30 September 1983.

INTERVENTION GROUP

The subjects in the intervention group were visited in their own homes having received written and verbal information about the purpose and methods of the study. (The study was planned in accordance with the Helsinki Declaration II.) An interview was carried out using a structured questionnaire, and information on social and health conditions was collected. Furthermore, both positive and negative circumstances of the participants' lives were discussed during the conversation to develop personal contact between the elderly person and the interviewer. When the elderly person and the interviewer mutually disclosed a need for social or medical services, or both, the interviewer applied for and coordinated the community services. The assessment did not include clinical examinations. Apart from assessing and advising, the interviewers did not interfere in the provision of services.

Corresponding visits were made every three months throughout the study (maximum 12 visits). Every visit lasted 0.5-1.5 hours. Between the visits the participants could contact the interviewers by telephone to arrange extra visits.

Of the 300 elderly people selected to be in the intervention group, 13 (4%) did not want to participate in the first interview and two were omitted. Table I shows the age, sex, and marital state of the remaining 285 subjects in the intervention group.

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CONTROL GROUP

The elderly people in the control group were not informed or contacted until three months before the end of the study, during which they had received the usual social and medical support from the community.

At the time of the last interviews in the intervention group the controls were visited at home. After they had given their informed consent they were interviewed using a questionnaire corresponding to the one used in the intervention group.

Two hundred and six controls were still living in their own homes in the municipality. Thirteen of these did not want to participate. All subjects who had moved into nursing homes or died during the three years were included in our findings. Table I shows the age, sex, and marital state, on 1 October 1980, of the 287 persons investigated in the control group. No differences were found in age, sex, and marital state between the two groups.

INTERVIEWERS

Each interview was performed by one of us. We first took part in a pilot study, during which six elderly people were visited in their own homes and an interview carried out by one of us while the other two listened. The pilot study did not elicit any changes in the questionnaire but permitted the exchange of information regarding useful knowledge, attitudes, and techniques of interviewing.

Each of us visited the same third of the intervention group throughout the study to maintain a steady personal contact. During the investigation we met every morning to discuss any problems of the study. Two of us (EL and ES) were nurses who had been working as home nurses for five and 21 years. They agreed to participate on request by the chief home nurse and had no experience of this sort of study.

COLLECTION OF DATA

The local community office delivered all current information on the two groups regarding admissions to hospitals, referrals or admissions to nursing homes, deaths, and provision of services (including home help and home nursing care). The general practitioners in Roedovre were informed that some of their patients had entered the study but were not told to which group any patient belonged. When a general practitioner was contacted during normal working hours by one of the participants he completed a questionnaire concerning the patient's complaint and state of health.

Eleven out of 17 general practitioners participated during the whole study period; three did not want to participate and three left the study after one and a half years. Only elderly people whose family doctor participated in the study (239 from the intervention group and 232 from the control group) were included when contacts with general practice were counted.

The use of emergency medical services during the afternoon or night was recorded (using data from the County Health Department) over 11 months (February, May, August, and November in 1981, 1982, and 1983; data for one month not available).

STATISTICAL ANALYSIS

The data were analysed using log linear Markov chain models to describe both the interdependence between events during a particular half year and the events of earlier half years and between the independent variables (sex, age, and intervention) of the study. A 5% level of probability was used to discriminate significant from non-significant relations. Only a small part of the collected information is reported here.

Results

An imperative precondition for completing the study was good participation by the intervention group. This condition was fulfilled considering that 285 (95%) of the elderly people agreed to participate. At the last visit 213 people in the intervention group were still living in their own homes in the community. Only two found that the 12 visits had been exhausting, and only five did not want to participate in a possible similar arrangement in the future. One hundred and eighty six (87%) stated that they had obtained important help, and only three found that they had not benefited from the visits.

Admissions to hospital—During the three years 219 hospital admissions were recorded for the intervention group and 271 for the control group. One hundred and forty seven (52%) subjects in the intervention group and 139 (48%) in the control group were not admitted during the three years. Table

II shows the incidence of admission per person for each period of six months. The mean risk was significantly higher in the control group ($p < 0.01$). The difference was most pronounced in the second half of the study. The intervention group represented 4884 bed days in hospital, whereas the control group represented 6442 ($p = 0.01$). The mean number of bed days per admission was 22.3 for subjects in the intervention group and 23.8 for those in the control group.

TABLE I—Age, sex, and marital state of elderly people visited regularly at home (intervention group) and elderly people receiving usual social and medical support (control group)

	No (%) of participants	Median (range) age, in years	No (%) married
<i>Intervention group</i>			
Women	178 (62)	78.6 (75-94)	39 (22)
Men	107 (38)	78.1 (75-96)	65 (61)
Total	285	78.4 (75-96)	103 (36)
<i>Control group</i>			
Women	177 (62)	78.8 (75-95)	50 (28)
Men	110 (38)	78.4 (75-91)	73 (66)
Total	287	78.6 (75-95)	123 (43)

TABLE II—Number of subjects in each group being admitted to hospital once or more than once during each half year together with incidence per person (%) in parentheses

Half years	Intervention group		Control group	
	Admitted once	Admitted more than once	Admitted once	Admitted more than once
1	32 (11.2)	6 (2.1)	38 (13.2)	6 (2.1)
2	29 (10.7)	3 (1.1)	24 (8.8)	8 (2.9)
3	31 (11.8)	2 (0.8)	33 (12.5)	5 (1.9)
4	22 (8.7)	3 (1.2)	27 (10.8)	8 (3.2)
5	32 (13.2)	5 (2.1)	30 (12.7)	7 (3.0)
6	22 (9.2)	6 (2.5)	29 (13.3)	7 (3.2)
Total	168 (10.3)	25 (1.6)	181 (11.8)	41 (2.7)

Admissions to nursing homes—Before 1 October 1980, seven people in both groups had been recommended for a nursing home vacancy. During the study a further 30 subjects in the intervention group and 38 in the control group were recommended. The mean half year risk of being recommended for a nursing home was 1.99% in the intervention group and 2.59% in the control group, the difference not being significant. Table III shows the half year risk of moving into a nursing home for each half year. The tendency to fewer admissions in the intervention group, especially over the final year, was not significant. The total number of months living in nursing homes over the three years was 263 for people in the intervention group and 293 for people in the control group.

Mortality—Table IV shows half year mortality for both groups. Lower mortality was found in the intervention group ($p < 0.05$).

Contacts to general practitioners—No difference was found between the two groups in the number of contacts to general practitioners during the three years. During the 11 months of recording the use of the emergency medical service 30 calls from the intervention group and 60 from the control group were recorded ($p < 0.05$).

Home nursing care—During the three years 116 subjects in the intervention group and 106 in the control group received home nursing care. There was no difference in the number of visits by home nurses.

Social services—Home help was provided for 46 elderly people in the intervention group and 29 in the control group during the three years. The mean number of home help weeks per half year was 10.9 in the intervention group and 9.3 in the control group ($p < 0.05$). The total number of hours of

TABLE III—Number of subjects in each group admitted to nursing homes, together with the half year incidence of admission per person (%) in parentheses, for each half year

Half year	Intervention group	Control group
1	2 (0.7)	2 (0.7)
2	5 (1.9)	7 (2.6)
3	5 (2.0)	4 (1.6)
4	3 (1.2)	3 (1.2)
5	2 (0.9)	6 (2.6)
6	3 (1.3)	7 (3.4)
Total	20 (1.3)	29 (1.9)

home help during the three years was 133 671 among subjects in the intervention group and 114 262 among controls ($p < 0.05$). Table V shows the number of subjects receiving aids, modification of homes, meals on wheels, occupational or physical therapy, or attending day care centres.

TABLE IV—Number of patients in each group dying, and risk of death per person (%) in parentheses, for each half year

Half year	Intervention group	Control group
1	14 (4.9)	14 (4.9)
2	9 (3.3)	8 (2.9)
3	9 (3.4)	12 (4.6)
4	10 (4.0)	15 (6.0)
5	7 (2.9)	17 (7.2)
6	7 (3.0)	9 (4.2)
Total	56 (3.6)	75 (4.2)

TABLE V—Numbers of elderly people in each group receiving social services over three years

	Intervention group	Control group
Home nurse	116	106
Home help	46	29
Aids (equipment)	101	65
Modification of home	40	25
Grant for false teeth, glasses, hearing aid, shoes	99	88
Meals on wheels	28	29
Occupational and physical therapy	41	47
Day care home	12	16

Discussion

Fifty per cent of all elderly people aged 75 years or more and living in their own homes participated in the study. The population studied was considered to be representative of the total age group in the municipality. The distribution of people aged 75 or more in Roedovre municipality by sex and marital state did not differ from the rest of the country. There were, however, more men and women aged 75-79, but fewer aged 84 or more, compared with the rest of the country.⁷ In 1981 Roedovre municipality offered more social services per 100 pensioners than in the rest of the country.⁸ This information suggests, but does not confirm, that intervention would not have an equally great effect in other parts of the country.

The results show that preventive visits reduced mortality, the number of admissions to hospital, and the number of bed days and that they tended to reduce the number of admissions to nursing homes. An effect was noticeable after one and a half years, confirming that the final result was obtained by the study procedures. The reduction in the total number of admissions for the intervention group was mainly due to a reduction in the number of readmissions. The lack of significance in the difference in the number of admissions to nursing homes between the two groups may be explained by the poor basis of calculation for this specific variable.

The exact conditions causing the favourable results are impossible to specify. Several factors should presumably be considered. The regular visits by the same person combined with a growing confidence undoubtedly encouraged elderly people in the intervention group to be more active. Increased home help service, more aids, and modification of homes may have intensified this tendency. The results may also have been influenced by one person coordinating the medical and social support. The drop in mortality in the intervention group may have delayed the use of hospitals and nursing homes for a few years, but this hypothesis cannot be analysed from the present data.

The results must be viewed in relation to the living conditions of the elderly people in question. Very few of the participants in the intervention group thought that their personal privacy had been violated. On the contrary, a high degree of motivation was shown by the high incidence of participation, among both healthy and incapacitated elderly subjects. The participants were especially satisfied by meeting the same person as a contact person and coordinator and they also appreciated being able to telephone the

interviewers. A feeling of confidence was the main impression of the participants' attitudes.

Relatively modest social and human offers to the elderly subjects seem to have been decisive in reducing admissions to hospitals and nursing homes. The result was positive both for elderly people and for society. Even among very old people we were able to achieve an effect through preventive effort. This has wide implications with regard to future medical and social planning for the elderly.

Very few intervention studies have so far been described. In two, two year controlled studies of general practice, with visits to people aged over 70 and living in their own homes, lower mortality and a tendency to a higher quality of life⁹ as well as a reduction in the expected bed days in hospitals was found in the intervention groups.¹⁰ In a controlled 18 month intervention study among people in Norway aged 80 or more no improved functional ability could be related to intervention, but a 25% reduction in hospital bed days was found in the intervention group.¹¹ Despite several methodological differences these studies support the assumption of a favourable effect of prevention among the elderly.

Cost of prophylactic activities—Table VI shows a rough calculation of expenses and gains. The salaries for the three interviewers and

TABLE VI—Expenditure and gains in running an intervention scheme over three years

	Danish kroner*
Expenditure:	
Salary (three people half time)	720 000
Office running costs	15 000
Home help (19 409 hours)	1 319 812
Aids and modification of homes	26 000
Pensions (more deaths in control group)	400 000
Gains:	
Bed days (2750 kr per day)	4 284 500
Number of months in nursing homes (800 kr per day)	720 000
Emergency medical services at home	14 300

*Exchange rate in 1982: 1 pound sterling = 14.50 Danish kroner.

social expenditure are included. Gross prices were used, and an average price was calculated for the individual expenses over the three years. The balance should be considered in short and long perspective. The gains probably did not result in empty hospital beds as these would have been used by other patients, yet in the long term prophylactic activities reduced the demand for admission to hospitals or nursing homes.

Preventive visiting is a feasible way for the community to meet the demands of elderly people who want to stay in their own homes as long as possible. For this method to work one person must coordinate the multi-interdisciplinary activities, be available every day, have a thorough knowledge of social and medical systems, and have an understanding of and a devoted interest in elderly people. A noticeable effect is likely to be delayed.

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