

Medical-social intervention in a 70-year-old Swedish population

A general presentation of methodological experience

**Bo G. Eriksson, Dan Mellström and
Alvar Svanborg**

Departments of Geriatric and Long-Term Care
Medicine and of Sociology, University of
Gothenburg, Sweden

Abstract – The possibilities of improving physical, mental and social functioning or retarding the development of handicap and reducing the need for medical and social services were investigated in an interdisciplinary intervention study in a representative population sample of 1206 70-year-olds. The assessments concerned cognitive function and mental health, earlier and current social interaction and living conditions, state of health including dental status, muscular strength and performance, pulmonary and cardiovascular function, bone mineral content, ADL and dietary habits. The intervention (response rate 76.8%) concerned social, psychological, environmental and medical aspects in 400 and medical aspects only in 406 probands. 400 register controls were sampled for comparison. The intervention period was 2 years, and a follow-up study will be performed at the age of 75. The interventions were guided by the life-style and the activity hypotheses within the resource perspective to promote everyday activities. The study allows comparisons with two previous 70-year-old cohorts investigated with similar methods in Gothenburg.

Key words: longitudinal population study; aging; interdisciplinary; intervention; functional capacities; socio-economic factors.

Assistant Professor Bo G. Eriksson, University of Göteborg, Dept. of Sociology, Brogatan 4, S-413 01 Göteborg, Sweden

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Several epidemiological studies have shown relationships between environmental conditions, life-style factors and state of health in old age (1-3). Previous experiences from the longitudinal gerontological study in Gothenburg, Sweden (4), showed that life-style factors, such as smoking (5), alcohol abuse (6), and environmental factors, such as social isolation (7) and bereavement (8) influenced not only the occurrence of definable medical disorders but apparently also the rate and functional consequences of ageing. Further evidence of ecological influences was obtained by the comparison of two cohorts with similar genetic composition, namely observed cohort differences between 70-year-olds born either in 1901/02 or in 1906/07 (9-12). These studies also showed that both under- and overdiagnosis are common at these ages (13) and that more adequate health screening aimed at early diagnosis and

treatment is urgently needed, especially at ages when the functional reserve capacity is limited. Further, development of muscular strength (14) and bone mineral density (15) has been demonstrated at high ages.

An intervention study was started in 1981/82 to find possible causative relationships between environmental or life-style factors, medical care and ageing and state of health at ages over 70. Earlier population-based intervention studies in Scandinavia have mainly focused on ischaemic heart disease and its risk factors (16-21). The aim of this study was to make interventions in a representative sample of 70-year-olds in order to see to what extent dysfunctions of ageing and poor health could be postponed or prevented by improving the quality of life. The present sample constituted a third 70-year-old cohort investigated in Gothenburg with identical methods, thus allowing cohort comparison of ageing and state of health at the age of 70 (9). The present paper is mainly restricted to design, procedural, methodological and intervention aspects with a multidisciplinary approach.

The intervention study engaged a team comprising architects, dentists, dieticians,

economists, historians, a variety of medical disciplines, occupational-therapists, physio-therapists, psychologists, sociologists, statisticians and representatives of government agencies (The Swedish Council for Planning and Coordination of Research), local authorities (the dental, leisure, medical and social services boards) and volunteer organizations (pensioners' organizations).

Procedure

The intervention study was governed by three main concepts: the Activity Hypothesis, the Life-style Hypothesis and the Resource Perspective. The Activity Hypothesis assumes that an adequate functional loading in such diverse areas as physical functions, psychological performance and social integration increases the functional capacity or, in the ageing person, decreases the rate of functional decline. The Life-style Hypothesis assumes that the kind of everyday life led by the individual has consequences not only for his social performance but also for his physical and mental well-being and functional ability. Thus, the Life-style is the conceptual link between the individual's past life situation, his current

This intervention study was performed in collaboration with the Departments of Economics, History, Psychology, Prosthetic Dentistry, Rehabilitation Medicine of the University of Gothenburg and Department of Architecture, Chalmers University of Technology, Gothenburg, Sweden.

condition and his future pattern of living. The analysis of Life-style is therefore the pivotal concept for the choice of intervention efforts. The Resource Perspective focuses on the individual's capacities and how these could be developed in social interaction and productivity in the widest sense. Societal resources are also invested in social organizations. Intervention in these was motivated in order to increase the opportunities for the aged to interact in accordance with their chosen Life-style and by this interaction comply with the Activity Hypothesis.

A fundamental concept of this programme was that the activity habits could be altered by our intervention efforts, and that the proverb "You can't teach an old dog new tricks" does not necessarily apply to elderly people.

The intervention programme was constructed according to these hypotheses and four aims were formulated:

- 1) to maintain, or improve the physical and mental functioning of the aged probands; or alternatively, to retard the development of disablement,
- 2) to increase their sense of well-being, i.e. to improve their subjective quality of life,
- 3) to reduce the need for social service and
- 4) to offer more appropriate health screening and treatment and thereby reduce the need for medical service.

Study population and methods

The epidemiological design and procedure were generally identical with that of the population study of 70-year-old people in Gothenburg (13, 22, 23), in order to allow another age cohort comparison and longitudinal comparisons. The areas for the interventions necessitated adjustments to the sampling technique (24).

The study design comprised three samples: the medical control sample, the register control sample and the intervention sample (Table 1).

Sampling

All permanent Swedish residents are registered in local and central population registers under their date of birth and a four digit number. The medical control sample consisted of 406 from the cohort living in Gothenburg and born in 1911/

Table 1. General basic investigations and interventions

| | Sample intervention | Medical control | Register control |
|-------------------------------|---------------------|-----------------|------------------|
| Assessment at age 70 | | | |
| Home call | P | P | - |
| Clinic day | P | P | - |
| Group meeting | P | - | - |
| Intervention period age 70-72 | P | - | - |
| Assessment at age 72 | | | |
| Home call | P | P | - |
| Clinic day | P | P | - |
| Assessment at age 76 | | | |
| Home call | P | P | P |
| Clinic day | P | P | P |

P = sample was exposed to the activity.

- = sample was not exposed to the activity.

12 on the 5th, 15th or 25th of each month. The register control sample consisted of 400 probands from the same cohort born on the 6th, 16th or 26th of each month.

The intervention sample was drawn in two steps. First, 10 target areas were selected by demographic and social investigations of the city's prime areas according to the distribution of type of housing, degree of service, the age structure and marital status (24). Within the target areas, the local population register was used, excluding those persons born on days with 5 or 6 as the last digit, to select a random intervention sample of 400 probands.

To minimize the non-response due to deaths between the date of sampling and the date of investigation and to obtain an even distribution of birth dates over time (22), the sampling was performed four times during the year. By consecutive numbering, four subsamples were constructed within each of the samples.

The general study plan

The study includes three major examinations ("basic investigation"); one before the start of the intervention, one 2 years later at the end of the intervention period and one 5 years after the first examination (Table 1).

In the first two of these three investigations, the intervention sample and the medical control sample were assessed and in the third also the register control sample.

The basic investigation included a detailed study of the manifestations of ageing, state of health, physical and intellec-

tual performance, social background and present living conditions. These analyses were performed by a visit to the probands' homes and one or several visits by the proband to the clinic. Official register data on financial situation, marital status, year and form of retirement, utilization of social and medical services, cancer morbidity and cause of death were collected for all probands.

Between these wide and carefully structured basic investigations, a number of other medical or psycho-social measurements were made during the intervention period in order to register possible effects and guarantee the safety of the probands as far as possible.

Basic examination

The probands in the intervention and medical control samples were invited by letter to participate in the investigation. They were informed that a home call would be made and they would be required to attend a 1-day investigation at the clinic. Appointments were made by telephone.

The home call was usually made by a research assistant from a group of occupational therapists or architects. The call lasted about 1.5-2 h and comprised about 200 precoded questions and an assessment of the activities of daily living (ADL) functions of the probands. In some instances, this home call led to immediate intervention in the form of ADL-supporting arrangements, e.g. hygiene assistance. The interview covered such living conditions as housing, migration, ADL, social services, social net-

work, education, interests, and earlier life-styles.

In a subsample, another home call was made by an historian in order to analyse the history of earlier life events. The in-depth interview also covered geographical and social mobility as well as social network and life-style factors. A third home call on a subsample was made by the dietician to cover dietary habits, recorded by 24 h recall and dietary history (25).

Investigation at the clinic

At the end of the home call, the appointment for the hospital examination was confirmed. Instructions were given regarding collection of urine and faeces samples for testing. It was also stressed that subjects should attend the clinical examination without having eaten, drunk or smoked since 10 p.m. the preceding day.

General medical examination

The examination started at 7.45 a.m. with an introductory conversation with a nurse. The examinations during the day are summarized in Table 2. Anamnestic data and clinical observations were recorded on a pre-coded form.

Intervention

Both the medical control probands and the intervention probands were given

proper medical care and were thus assumed to be influenced by the investigation. One of the objectives of the intervention was to avoid both underdiagnosis and undertreatment and overdiagnosis and overtreatment. An example is the systematic withdrawal of certain cardiovascular drugs.

The research team met weekly to develop a multidisciplinary concept for the individual intervention programmes. A rough estimate of the proband's risks and resources was made according to life-style in order to decide what intervention the individual needed.

Most of the intervention were planned at the start of the study. Others were based on experience from the weekly meetings and supported by information obtained in postal surveys and in discussions with representatives from co-operating organizations.

Modes of intervention

Intervention was directed towards the intervention sample or a subsample and was given individually or in group activities. The criteria for intervention were membership of either a sample or subsample, or a risk or resource group. Societal intervention was also directed towards organizations, bureaucracies and institutions.

Intervention directed towards the total intervention sample was

- A) given individually
 - examination and proper care

- invitation to pensioners' organizations
- or
- B) given through group activities
 - health promotion (main group intervention).

Main group intervention

After the clinical investigation, all intervention probands were invited by letter to the first of three group meetings, and at that meeting they were invited to the following meeting and so on. The letter was followed up by a telephone call. The three meetings had a coherent message founded on the Activity Hypothesis, the Life-style Hypothesis and the Resource Perspective. About eight probands participated per meeting. During the meetings the probands were encouraged to ask questions or contradict the research team officers, or to give examples from their own experience for further discussion. The aim of the meetings was to give the probands more knowledge about ageing and health factors and to influence them to lead a more active life at all levels.

At the first meeting the physician covered a large area of health and normal medical ageing aspects and physiological issues, e.g. trainability of muscle strength and psycho-motoric speed, all with practical references, e.g. crossing of streets. Most questions were of the type: Is it dangerous to go hill walking, mow the lawn, etc. At this meeting the psychologist informed about normal psychological ageing and the value of intellectual work and training, with discussion of life satisfaction and problems during ageing, e.g. widowhood and mourning.

The second meeting was devoted to topics covered by the physiotherapist, dietician and dentist. Special emphasis was placed on joint mobility and body weight in relation to hip and knee problems. Invitations to participate in a physical training group were issued. The possibilities of controlling weight by dietary measures were discussed as well as the composition of meals and the importance of eating as a social activity. The dentist developed the theme that it is not part of normal ageing to lose one's teeth or to have mouth disorders. It is possible for the proband to influence these three areas.

The third meeting took place in the

Table 2. Clinic day

| Examination | Procedure | All or subsamples | Reference |
|----------------------|---|-------------------|-----------|
| Somatic | Described in earlier studies | A | 22 |
| Blood | Standard, samples stored -18°C | A | 27 |
| Faeces | Test for haemoglobin | A | 26 |
| Urine | Standard | A | 22 |
| ECG | Six-channel ECG; Minnesota code | A | 28 |
| Echocardiography | Echocardiography including ECG | S | 29 |
| Body composition | Body Mass Index, skinfold measurements | A | 30 |
| Bone mineral content | Dual photon absorpmetry in heel bone | A | 31 |
| Roentgenological | Relative heart volume and pulmonary status, spine | A | 32 |
| | | S | 22 |
| Cerebral blood flow | 32 detector ¹³³ Xenon inhalation clearance | S | 33 |
| Visual tests | Visus and Jaeger's tests | A | 22 |
| Physical performance | Bicycle load performance test. Dynavit at 30w and 50w women and 50w and 75w men | A | 34 |
| Walking speed | Normal and highest speed | A | 35 |
| Stair problems | Step test | A | 35 |
| Muscle strength | Quadriceps by dynamometer | A | 34 |
| Fine motorics | Hand manometer and grip tests | A | 22 |
| Respiratory function | Vitalograph | A | 22 |
| Psychological tests | SRB 1, SRB 2, SRB 3 and standard tests | A | |
| | Life Satisfaction Scale | A | |

intervention area and covered ADL support, lighting, furniture, housing adaptation, and aspects of city planning for ageing persons and populations. The main advisors were the occupational therapist and architect. The sociologist informed the probands about social services, associations and other activities in the area. The historian and economist were present at many of the meetings. The main theme was activity possibilities in the widest sense from domestic to occupational.

Intervention directed to subsamples was given individually:

- calcium supplementation (1 g/day)
- withdrawal of certain cardiovascular active drugs
- training programmes for bad backs and joints
- dietary advice
- ADL and housing support
- oral health promotion
- psychological counsel or support

or through groups:

- physical training
- walking
- city history
- theatre visits
- dietary and cooking advice, and physical training for the overweights
- help in giving up smoking.

Societal intervention

The main procedure for societal intervention was to match an individual life-style or structural problem with people and resources capable of handling the suggested improvements, and to ensure continuity to assume responsibility for them. The societal interventions were:

- Education of officers in pensioners' organizations, home care staff, health service staff and leisure time staff.
- City planning such as traffic regulation and information.
- Rebuilding plans for large and small houses and parts of the city, and organizing city services in cooperation with the inhabitants.
- Influencing organizations and authorities to start new life-style adapted activities.
- A home call scheme by pensioners' organizations.
- A reciprocal service for newly be-reaved persons.

- A support group of pensioner volunteers serving a hospital ward.
- Experiment with a more active treatment of hip fracture patients.
- Promoting dental health in cooperation with home care staff.
- A walking-group programme.

Results

Comparison of responders and non-responders

Table 3 shows the total non-response rate, in the intervention and control samples. In both samples, the non-response rate was significantly higher among women. A comparison between the 23.2% non-responders and the 76.8% responders concerning marital status, income and housing conditions showed no significant differences apart from the gross annual income which was approximately 10,000 Swedish crowns lower among the non-responders. A detailed comparison of the responders was then made between the intervention and the control samples. The differences were tested against 82 variables obtained at the home call, covering housing conditions, economic resources, earlier occupation, social network, attitudes to leisure activities and mass media consumption. Four differences were significant according to the chi-square test: floor level of dwelling $p < 0.005$, perception of security $p < 0.027$, attitude to sports $p < 0.045$ and possession of pets $p < 0.015$. The distribution of p-values was therefore also tested and was found to be even, indicating that the above-mentioned significant differences were spurious and due to the amount of tested variables.

The reasons for non-participation

among the 88 probands from the intervention sample and the 99 from the medical control sample were obtained from the telephone call following the letter of invitation. In both samples 43 gave as first or second reason that they had their own doctor and thus were not willing to participate. 23 and 25 from the two samples gave no reasons, while one in the intervention sample and 23 in the medical control sample stated they disliked investigations. Other reasons were given by 9 and 10, respectively and 7 and 9, respectively had died.

The response rate to the main group interventions is illustrated in Table 4. Of 312 probands in the intervention group, 26 were not invited because of poor health or language problems discovered at the basic examination. Of the 286 invited, 42 did not participate in the first meeting, 18 more dropped out after the first meeting and 16 after the second meeting. Thus, 67.3% of the intervention group probands attended all three group meetings. The reasons for not accepting the invitation to the first group meeting were poor health 18, unwilling 11, ad mortem 7, fatigue 6, demands from relatives 5, foreign language or aphasia 5, migrated or living too far away 5, psychological disturbances 4, and shortage of time 3. No reasons were obtained from 4 probands.

Experiences from the interdisciplinary team work

During the intervention team's weekly discussions, it became obvious that both probands and investigators were inclined to concentrate on complaints, lack of functions and probable future risks rather than on the capacity and pro-

Table 3. Non-response rate to the first basic investigation distributed by sample and sex. Row percentage

| | | Non responders | | Responders | | Total | |
|------------------------|-------|----------------|------|------------|------|-------|-----|
| | | % | | % | | % | |
| Intervention sample | Men | 32 | 17.8 | 148 | 82.2 | 180 | 100 |
| | Women | 56 | 25.4 | 164 | 74.6 | 220 | 100 |
| | Total | 88 | 22.0 | 312 | 78.0 | 400 | 100 |
| Medical control sample | Men | 31 | 16.8 | 154 | 83.2 | 185 | 100 |
| | Women | 68 | 30.8 | 153 | 69.2 | 221 | 100 |
| | Total | 99 | 24.4 | 307 | 75.6 | 406 | 100 |
| Both samples | Men | 63 | 17.3 | 302 | 82.7 | 365 | 100 |
| | Women | 124 | 28.1 | 317 | 71.9 | 441 | 100 |
| Total | | 187 | 23.2 | 619 | 76.8 | 806 | 100 |

Table 4. Participation in the three intervention group meetings

| No. meeting | Invited | Participants | % Response rate of all: | | |
|-------------|---------|--------------|-------------------------|-------------------|--------------------|
| | | | invited | probands n=312 | propositi n=400 |
| First | 286 | 244 | 85.3 | 78.2 | 61.0 |
| Second | 244 | 226 | 93.6 | 72.4 | 55.5 |
| Third | 226 | 210 | 92.9 | 67.3 | 52.0 |

ductive resources of the probands. The individual interventions were thus generally directed towards solving problems rather than to using and stimulating productivity according to the Resource Perspective and the Activity Hypothesis. This was one of the reasons why the intervention team found it necessary to meet once a week in order to balance the traditional risk thinking with the more positive ideas of the Resource Perspective.

Within a few weeks the intervention team had become a functional interdisciplinary group with a common responsibility for intervention at an individual level. An example was the historian's observation made during the in-depth interviews that some of the probands felt that their neighbourhood favoured the women. This prevented the men from participating in the physical training programmes as they considered such group activity as typical housewife affairs. They refused to join what they considered "housewife gymnastics", but accepted to participate when male physical training groups were formed.

Apart from the weekly meetings, the intervention team found it necessary to extend the group and invite representatives of the cooperating parties (Table 5), as many of the resources needed for the intervention were provided by these organizations. This group extension, however, involved certain difficulties as it was necessary to preserve the personal integrity of the probands. The extended meetings therefore were not very frequent, instead the method was to have specific contacts, most often at the cooperating parties' premises.

Individual and group intervention

Most of the presentation and evaluation of the intervention results has to be postponed until the third investigation at the age of 75-76. However, two intermediate observations are already possible.

We know from previous health studies of 70-year-olds in Gothenburg that the non-response rate has been low even at the longitudinal follow ups (36). This has been taken as an indication that broad health surveys are appreciated by the elderly probands. The present study, which included both health screening and medico-social intervention, showed (Fig. 1) that this combination was significantly more appreciated by the intervention group ($p < 0.999$) than health screening alone.

The probands in the two highest deciles of body mass index were invited to group intervention to reduce their overweight. Participation in the highest decile was 42% and in the second highest 18%. An evaluation of this intervention must take into account the general loss of weight in the age group, the influence from information given in the main group intervention, the individual dietary advice, and the participation

compared to that achieved by alternative intervention methods.

Societal intervention

As the team developed or received a suggestion for intervention, the idea was presented at meetings and in educational programmes to the cooperating party. The main problem was to get the idea and plan for the intervention accepted. After acceptance, it was possible to implement the programme. If the idea and plan were proposed by the cooperating party then acceptance was of course a fact. This was the case with the dental care programme in cooperation with the home care staff. Acceptance could differ between the various hierarchical levels of the cooperating party, which caused some problems. A typical experience was that an idea was presented to the intended partner and rejected; later the idea was redeveloped by the partner and accepted. There was thus a time-lag between presentation and acceptance. The new plans were presented to the intervention probands in a letter inviting participation together with a questionnaire.

Some ideas and plans were never accepted, e.g. the reciprocal part of the newly bereaved persons' programme; some were accepted but implemented

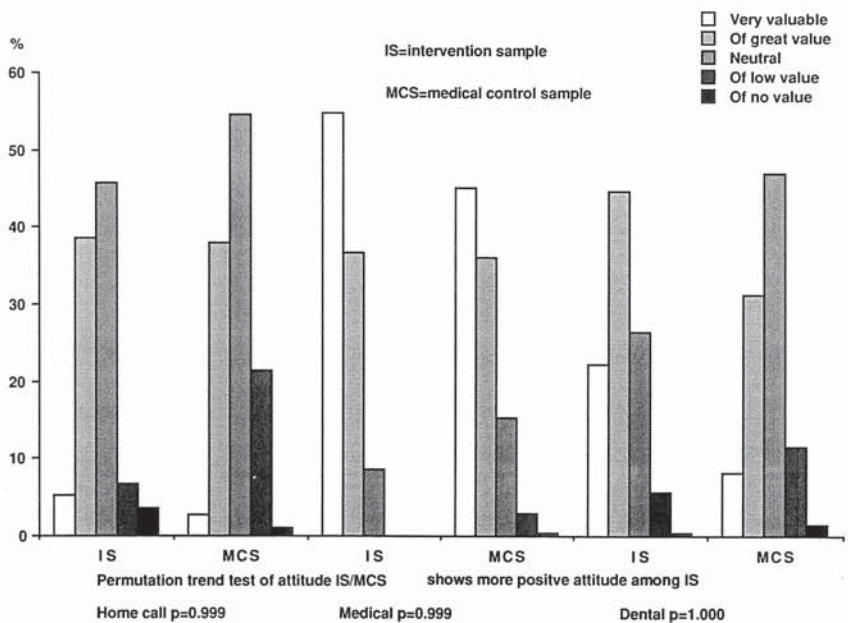


Fig. 1. Attitudes to home call, medical- and dental examinations.

only in some of the intervention areas, e.g. the home call scheme by pensioners' organizations. This has resulted in the programme being extended beyond the 2-year limit of intervention.

There were several differences between cooperation with volunteer organizations, mostly pensioners' organizations, and cooperation with authorities. The most relevant was that acceptance and personal motivation were of great importance. In voluntary cooperation Resource Perspective and the Life-style analysis were used practically. It is very important to have a working example of the programme. It took a great deal of work to start the first group, pensioners serving a hospital ward, but once that group had gained experience and presented themselves to other pensioners, it led to more groups being started at other hospitals. Table 5 shows the parties engaged in intervention cooperation and whether the intervention was successfully implemented or not.

Discussion

That the basic epidemiology of this intervention study was similar or identical to the methods used in the longitudinal study of 70-year-olds indirectly indicates that the present sample is representative of the total population of 70-year-olds in Gothenburg. Representativity was shown in the earlier cohorts by careful comparison of non-responders and responders (22, 37) and recently supported

by the similar mortality rate up to 79 (36). This conclusion concerning representativity is also generally supported by the present comparison of responders and non-responders, although a difference in income was observed. The comparison between the intervention and the medical control samples also showed some differences which were to be expected within a random distribution. In general, our evaluation of representativity and comparability indicates that any differences are accounted for in the evaluation of the intervention results.

Even though geographical proximity necessitated differences in technique between intervention and medical control samples, as well as from all the previous samples, it was encouraging to find that these two samples allowed comparisons.

Not until 1988 will a global evaluation of the effects of this intervention be possible, i.e. when a comparison can be made between all three groups. However, we considered it important to present a preliminary report on this broad intervention in the lives of the elderly.

To our knowledge, no similar combination of medical, psychological and social intervention programmes has previously been performed and reported. There have been numerous reports in the literature on risk factors and intervention in cardiovascular morbidity (see reviews 38, 39). Somewhat controversial results have been presented in recent studies of the possibilities of preventing or postponing the development of handicaps requiring nursing (40, 41). Several recent

articles have dealt with the need for and the methodological difficulties of broad intervention studies of the elderly (42-48).

Our first conclusion is that such a broad combined intervention programme is possible. Most of the elderly probands have been willing to participate and have been informed about the importance of regular health visits, certain changes in life-style and exposure risks.

The secondary non-response, i.e. the non-response during the 2-year intervention period, is difficult to define and measure. Certain probands already had a good social network, a reasonable level of physical and intellectual activity, and acceptable health attitudes and habits and therefore did not find our group activities meaningful. In some instances, these "non-responders" became resource persons in our programme. In 8%, participation was prevented owing to physical or mental disablement. Among the other secondary non-responders were those less actively inclined (approx. 3%) who refused to allow us to influence their life-style. More detailed descriptions of these groups will be published separately.

The interdisciplinary work met several problems and conflicts during the planning stage, but these were overcome as the study progressed, employing daily routines based on methods from the two earlier cohort studies. The weekly case discussions gave insight into and respect for other disciplines' contributions. Usually, this mutual understanding was more easily achieved in discussions about

Table 5. Parties engaged in intervention cooperation

| Intervention cooperating partners | Type of intervention | | | | | | | | | |
|-----------------------------------|----------------------|----------------|-------------------|-------------------------|---------------------------|-------------------------|---------------------------------|-----------|--------------------------|-----------------------------|
| | Home call | Walking groups | Physical training | Special interest groups | City and traffic planning | Dental health promotion | Group support of newly bereaved | Education | Hospital ward volunteers | Hip fracture rehabilitation |
| Volunteers: | | | | | | | | | | |
| Pensioner clubs | P | P | P | P | P | F | - | P | S | - |
| Athletic clubs | - | P | S | - | - | - | - | - | - | - |
| Churches | P | P | - | - | - | - | - | - | - | - |
| City authorities: | | | | | | | | | | |
| Leisure service | S | S | S | P | S | - | - | P | S | - |
| Medical service | - | F | P | P | P | - | S | P | S | S |
| Dental service | - | - | - | - | - | S | - | S | - | - |
| Social service | - | P | P | P | P | P | F | P | S | S |
| City planning | - | P | - | - | S | - | - | S | - | - |
| Libraries | - | - | - | P | - | - | - | - | - | - |
| Museums | - | P | - | P | - | - | - | - | - | - |

Entries are assessments of the degree of success in accomplishment of intervention plans. S=successful compliance, P=partial compliance, F=failure to comply, and -=no intervention plan. The plans varied in complexity thus partial compliance could imply a greater achievement than a complete success.

probands' problems than about resources and is probably one of the reasons why it was much harder to use the resource perspective.

As no individual's social environment is random but depends on neighbourhood, clubs, etc., and as the interventions were directed towards such entities, it was important to increase their probability of exposure within social organizations.

Cooperation with the authorities and volunteer organizations was largely as planned, despite the failure of many initiatives, which though unspecified had been tacitly anticipated. The main hope for effective societal intervention must be broad agreement between the relevant official and volunteer organizations as to activity and life-style hypotheses. This was evident from the successful programmes which were implemented jointly by the authorities and volunteer organizations.

Unlike most other intervention studies in Scandinavia (16–19), this study mainly concerns measures to reduce risks of increased functional ageing and morbidity from many diseases. This can be accomplished by easy routine techniques although the change over may be hard. As functional capacities are thought to be dependent on activity, a structural approach has been used to establish or enlarge areas of routine activities to suit different life-styles. Efforts have also been made to reduce such harmful habits as tobacco smoking and unsuitable diet. A description of the specific interventions and an evaluation will be published separately.

Functional capacity was assessed in all probands and in most cases with such accuracy that the intervention effects would be measurable. However, the sample is too small for mortality or morbidity differences to be evaluated, at least over the 5-year observation period. Although it is difficult to find significant differences in morbidity, the tendencies are used to formulate new hypotheses about specific diseases or malfunctions for further study, as has been done for hip fracture rehabilitation programmes, peptic ulcers, urinary incontinence, and programmes for the newly bereaved.

This study utilized an interdisciplinary approach with methods for describing longitudinal and cohort functional comparisons. Special efforts were made to

analyse social interaction and isolation, marital status, occupational status, and the relationships between these variables and functional capacities, morbidity and mortality. It is possible that these combined population and case-control methods produce the most practicable ideas for further societal intervention.

Surprisingly many of the invited 70-year-olds accepted the intervention programme, and reported the combination of socio-medical intervention to be more satisfactory than health survey alone. The view that it is difficult to "teach an old dog new tricks" is, generally, not supported in our experience. It was possible to implement the intervention according to plan. In general, it was accepted, but the possible effects of such interventions only emerge at the follow-up when full inter-group comparisons can be made.

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