Effects of preventive home visits to the elderly

Citation for published version (APA):

van Rossum, H. J. L. (1993). *Effects of preventive home visits to the elderly*. [Doctoral Thesis, Maastricht University]. Rijksuniversiteit Limburg. <https://doi.org/10.26481/dis.19930325hr>

Document status and date:

Published: 01/01/1993

DOI:

[10.26481/dis.19930325hr](https://doi.org/10.26481/dis.19930325hr)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Effects of preventive home visits to the elderly

Effects of preventive home visits to the elderly

PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Rijksuniversiteit Limburg te Maastricht,
op gezag van de Rector Magnificus, Prof. Mr. M.J. Cohen,
volgens het besluit van het College van Dekanen,
in het openbaar te verdedigen
op donderdag 25 maart 1993 om 14.00 uur

door

Henricus Johannes Leonardus van Rossum

Promotores: Prof. dr. P.G. Knipschild
Prof. dr. H. Philipsen

Co-promotor: Dr. C.M.A. Frederiks

Beoordelingscommissie: Prof. dr. H. Huijer-Abu Saad (voorzitter)
Prof. dr. H.F.J.M. Crebolder
Dr. A. Kerkstra, Nivel
Prof. dr. G.J. Kok
Prof. dr. P.J. van der Maas, Erasmus Universiteit
Rotterdam

CIP-GEGEVENS KONINKLIJKE BIBLIOTHEEK, DEN HAAG

Rossum, Henricus Johannes Leonardus van

Effects of preventive home visits to the elderly /
Henricus Johannes Leonardus van Rossum. - [S.l. : s.n.].
- III.

Proefschrift Maastricht. - Met lit. opg. - Met
samenvatting in het Nederlands.
ISBN 90-9005844-3

Trefw.: ouderenzorg / huisbezoek.

Lay out: Thum Aarts, Epidemiologie RL, Maastricht
Omslag: Renée van Rossum, Eindhoven ©
Productie: Datawyse | Universitaire Pers Maastricht

Het onderzoek waarop dit proefschrift is gebaseerd werd verricht met financiële steun van het Ministerie van WVC, de Stichting Onderzoek en Ontwikkeling Maatschappelijke Gezondheidszorg (STOOM) en het Praeventiefonds.

In de drukkosten van het proefschrift werd bijgedragen door de Stichting Het Scholten-Cordes Fonds.

Contents

---

	page
Chapter 1	
Introduction	7
Chapter 2	
Design of a Dutch study to test preventive home visits to the elderly	9
Chapter 3	
The home visits	21
Chapter 4	
Effects of preventive home visits on the health status of elderly people	35
Chapter 5	
Effects of preventive home visits on the use of services by elderly people	51
Chapter 6	
Postal questionnaires sent to elderly people living at home: a comparison with results obtained from personal interviews	73
Chapter 7	
Self-rated health as a predictor of mortality among elderly people	87
Chapter 8	
Discussion	99
Summary	115
Uitgebreide samenvatting	119
Dankwoord	147
Curriculum Vitae	149

Chapter 1

Introduction

This dissertation reports on a study of the usefulness of a prevention programme for the elderly. The central question is whether regular home visits by public health nurses can improve the health status of aged persons and reduce their use of institutional care.

The first impulse towards undertaking the study was a report on a Danish experiment which will be referred to quite often in the following chapters (Hendriksen et al. 1984). In this study the home visits appeared to have reduced mortality, hospital admissions, and, to a lesser degree, nursing home admissions. Furthermore, this reduction of institutional care saved health care expenditures in the visited group, despite an increase in the use of community care.

At first sight this report seemed like a fairy tale by Hans Christian Andersen. It was hard to believe that a regular visit by trained nurses alone could accomplish such astonishing benefits. After a second controlled study on this topic had again shown some beneficial effects of the visits (Vetter et al. 1984), we seriously started to study the possibilities of performing a new experiment.

One has to have good reasons to conduct a long and expensive study. The main considerations to restudy the effects of preventive home visits were the following.

- The evidence from the two previous studies was promising, though not entirely convincing. Some methodological issues in these studies remained unclear and the studies had been performed in different health care settings.
- There was debate among Dutch home nurses as regards the usefulness of home visits (van Rossum and Frederiks 1988).
- Various researchers had advocated the need for programmes for the elderly which focussed on (regular) assessment and follow-up of functional abilities, instead of screening for specific diseases (Frederiks 1986, Buckley and Williamson 1988, Rubenstein 1988, Kane 1988, Solomon 1988). Home visits by public health nurses reflect such a programme.
- A prerequisite of this study was the cooperation of both home nursing practice and other relevant services for the elderly. An area was found in which all relevant organizations were interested in the study.

Chapters 2 to 5 deal with the study of the home visits. The design of the study is described in chapter 2 and chapter 3 elaborates on the intervention of interest, viz. the home visits. The results of the study are presented in chapters 4 and 5, dealing with the two main questions of the study. The effects of the visits on the health status are presented in chapter 4 and the impact on the use of health care services is described in chapter 5.

The next two chapters (6 and 7) present some spin-off of the main study. Chapter 6 discusses the use of postal questionnaires as a method of data collection among aged subjects. Is this a feasible method and can data obtained by this method compete with those gathered in personal interviews (which are commonly

used for this age group)? Next, chapter 7 explores whether a simple and easily obtainable measure of health, viz. self-rated health, can predict mortality. To answer this question we used mainly information on those subjects who participated in the baseline measurement for the main study, but were subsequently not selected for this study.

Chapter 8 discusses the findings related to the main study. The methods that were used to assess the merits of the home visits are examined. A comparison of the outcomes of the study with those reported from other studies on this topic is included in this final chapter, as part of this information became available after this study had already started. Finally, the implications of the study for nursing practice and future research are discussed.

The chapters in this thesis have been published or submitted for publication separately. Although this will inevitably lead to 'déjà vu experiences', it has the advantage that, as I hope, chapters can be read separately. For those Dutch readers who are interested in the study, but who cannot find the time to read the complete manuscript, a comprehensive summary in Dutch is included.

References

- Buckley EG, Williamson J. What sort of 'health checks' for older people? *British Medical Journal* 1988; 296: 1144-5.
- Frederiks CMA. Preventief geneeskundig onderzoek bij ouderen: pro's en contra's. *Tijdschrift voor Gerontologie en Geriatrie* 1986; 17: 205-8.
- Hendriksen C, Lund E, Stromgård E. Consequences of assessment and intervention among elderly: a three year randomised controlled trial. *British Medical Journal* 1984; 289: 1522-4.
- Kane RL. Beyond caring: the challenge to geriatrics. *Journal of the American Geriatrics Society* 1988; 36: 467-72.
- Rossum HJL van, Frederiks CMA. Heeft preventief ouderenbezoek door wijkverpleegkundigen zin? De Nederlandse discussie en buitenlands onderzoek. *Tijdschrift voor Gerontologie en Geriatrie* 1988; 19: 3-6.
- Rubenstein LZ. Comprehensive geriatric assessment. In: Solomon DH, moderator. New issues in geriatric care. *Annals of Internal Medicine* 1988; 108: 724-7.
- Solomon D. National Institutes of Health consensus development conference statement: geriatric assessment methods for clinical decision-making. *American Geriatrics Society* 1988; 36: 342-7.
- Vetter NJ, Jones DA, Victor CR. Effect of health visitors working with elderly patients in general practice: a randomised controlled trial. *British Medical Journal* 1984; 288: 369-72.

Chapter 2

Design of a Dutch study to test preventive home visits to the elderly*

Erik van Rossum,¹ Carla MA Frederiks,¹ Hans Philipsen,² Jeanette Kil-van Lierop,³
Anton Mantel,⁴ Jacob Portengen,⁴ Paul Knipschild¹

- 1 University of Limburg, Department of Epidemiology
- 2 University of Limburg, Department of Medical Sociology
- 3 Public Health Nurses Association of Midden-Limburg
- 4 Public Health Nurses Association of Limburg

---

* This chapter is an elaborated version of the article published in *Nursing Research* 1991; 40: 185-8.

Summary

Preventive home visits to elderly people by public health nurses or health visitors aim to assess the functional abilities of aged persons in order to prevent or postpone health problems and institutionalization. There is as yet no consensus about the merits of such home visits in the Netherlands, partly because the empirical evidence is still weak.

This chapter presents the rationale and the design of a study on this subject in the Netherlands. It is argued that only a study with an experimental design, more specifically a parallel group randomized trial, can be informative. Next, the selection of the study population, methods of increasing the comparability at baseline, the choice of the contrasted interventions, and the outcome measurements are explained. These issues are discussed with reference to the designs of experiments conducted previously in Wales and Denmark.

Samenvatting

Preventieve ouderenbezoeken door wijkverpleegkundigen beogen gezondheidsproblemen en institutionalisering te voorkómen, dan wel uit te stellen. In Nederland bestaat discussie over het nut van dergelijke bezoeken, onder andere omdat de beschikbare bewijskracht uit (buitenlands) onderzoek nog gering is.

Dit hoofdstuk beschrijft de opzet van een onderzoek in Nederland naar de effecten van preventieve ouderenbezoeken. Eerst wordt betoogd dat een dergelijk onderzoek alleen zin heeft indien het wordt uitgevoerd in de vorm van een gecontroleerd experiment. Daarna wordt ingegaan op de onderzoekspopulatie, de vergelijkbaarheid van de groepen bij de start van de studie, de interventies die met elkaar vergeleken worden en de effectmetingen. Deze keuzes bij de onderzoeksopzet worden toegelicht aan de hand van reeds eerder uitgevoerde experimenten in Wales en Denemarken.

Introduction

There is a growing interest in the effectiveness of geriatric assessment programmes (Rubenstein 1988, Kane 1988). In primary health care, medical screening for specific diseases seems to be disadvantageous (Frederiks 1986, Buckley and Williamson 1988). There are hardly any diseases to be found in aged persons which meet the criteria for screening. It is likely that the amount of needless disturbance and anxiety outweighs the positive effects in terms of case finding followed by successful treatment.

Instead of screening for diseases, assessment of the functional abilities of elderly people has been advocated. In this respect (repeated) assessment of the physical, mental and social functions is considered to be relevant. Public health nurses* and health visitors are well trained to assess these functions in elderly people living at home, and they can also give professional advice and guidance.

As in other countries, however, there is no consensus in the Netherlands as to the usefulness of such preventive home visits (van Rossum and Frederiks 1988). Those in favour claim it can add to the independence of elderly people, and prevent or postpone institutional care. Those opposed point at the privacy of elderly people, and emphasize that the home visits might lead to medicalization and thus to dependence.

Empirical research may be of help in settling the discussion. Its performance seems simple, but, if it is not well designed, the results are difficult to interpret. Generally, non-experimental studies in intervention research have little value. If health visitors can decide who will be visited and who will not, they will probably focus their attention on those elderly people who need the home visits most. As a result, there will be a clear prognostic incomparability between the contrasted groups ('confounding by indication'; Miettinen 1985), leading to biased results. It is an illusion to think that this can be smoothly corrected for with the help of data analysis techniques. Uncontrolled experiments also give rise to results that are uninterpretable. If all subjects receive the home visits, there is no contrast. Any improvement might be caused by the intervention, but also by other factors such as changing extraneous circumstances.

The performance of randomized trials is the only solution if one wishes to avoid these pitfalls. Among such trial designs, a cross-over experiment, such as was performed by Luker in Scotland (Luker 1981a and 1981b), again offers no satisfactory solution. Among other things, a carry-over effect is likely to occur in the second period of the cross-over.

For studies on the effectiveness of preventive home visits, only parallel group randomized trials make sense. By this we mean that the study subjects are randomly allocated to the experimental intervention or the control intervention (no, placebo or standard intervention), and that all participants are followed up simultaneously, measuring relevant outcomes. Fortunately, two such experiments have already been reported. One was performed in both a rural and an urban area in Wales (Vetter et al. 1984a and 1984b). The other was conducted in a suburb of Copenhagen, Denmark (Hendriksen et al. 1984). Both studies were of high quality and showed beneficial effects of preventive home visits.

---

* Public health nurses in the Netherlands execute the task of health visiting as well as that of home nursing care. A preventive home visit is the Dutch equivalent for a health visit.

In the Danish experiment the intervention was found to have reduced the mortality, the number of admissions to hospitals and nursing homes, and the medical care costs per subject. The use of home help and home nursing care had increased in the visited group. Data on several subjective measures, such as the quality of life, have as yet not been published. The results of the Welsh study were only partly consistent: reduced mortality in the urban area only, and a better functional status in the rural area only, while the subjective view of life seemed to have improved in both areas. No differences in the use of institutional care were reported.

It was felt that a replication was needed before definitive implementation of the preventive home visits in the Netherlands could be considered. In designing the experiment, we found it very helpful to discuss our study with the Welsh and Danish researchers. They gave us frank accounts of their experiences and, with hindsight, the drawbacks of their studies, and they encouraged us to perform a third experiment.

This chapter presents the design of the Dutch experiment, which aims to study the effects of preventive home visits on the health status and use of services by elderly people. A division is made into four sections: (1) study population, (2) comparability at baseline, (3) contrasted interventions, and (4) outcome measurements. The methodological choices will be explained with reference to the experiments in Wales and Denmark.

Study population

As in any other experiment, it is desirable to select as homogeneous a study population as possible. Compared to the previous studies, we decided to use stricter admission criteria (table 1). Partly based on the experience in these trials, it was thought that age could be an effect modifier, having its largest impact among elderly people between 75 and 84 years of age. Therefore, we restricted the study population to this age group. To avoid contamination by other nursing care beforehand, we excluded elderly people and their partners who were already receiving home nursing care at least once a week. Besides, home visits are not meant for these subjects, and it was also thought unlikely that the home visits could have any additional positive effects on these elderly persons.

The study was performed in Weert, a town in the south of the Netherlands, and some surrounding villages (60,000 inhabitants). This area was chosen, among other things, because of its clear system of services for the elderly. No major changes in the environment were expected and no other experiments among elderly people were in progress (or planned). Moreover, the municipalities and health care services showed a special interest in the study.

It is clearly advantageous to have baseline information about all participants in order to control comparability of the groups to be contrasted and for the measurement of changes of important outcomes. In the Welsh study interviews were used for this purpose. The Danish researchers, on the other hand, declined to perform a baseline measurement arguing (correctly in our opinion) that an interview resembles the intervention and that this may influence the control group (Hendriksen 1986). Advice and even referrals by the interviewer cannot always be precluded, and these are elements of the actual intervention. We solved this problem by using a postal questionnaire for our baseline measurement.

The questionnaire was sent out to every person between 75 and 84 years of age who was living at home ($n=1,545$). Among other things, the questionnaire dealt

with the admission criteria as well as relevant prognostic criteria (self-rated health, functional status, informal support and use of services). A covering letter explained what the goal of the experiment was and what was asked of potential participants. Those interested were invited to return the questionnaire and to sign their informed consent.

Table 1. Comparison of the study designs in Wales, Denmark, and the Netherlands: study population.

population	Wales	Denmark	the Netherlands
– type	healthy subjects	idem	idem
– recruitment subjects	<u>rural</u> : all 'patients' from a general practice <u>urban</u> : random sample of 'patients' from a general practice	random sample of the community	all subjects in area public health nurses association
– inclusion criteria	age 70 years or over, living at home	age 75 years or over, living at home	age 75-84 years, living at home
– exclusion criteria	no	no	home nursing care at least once a week
– baseline measurement	semi-structured interviews	no	postal questionnaire
– number of participants	n≈600 in each area	n≈600	n≈600
– assignment of treatments	unstratified randomization†	unstratified randomization†	stratified randomization†
– comparability groups at the start:			
– demographic	no differences	no differences	no differences
– prognostic criteria	no differences in functional status	unknown	no differences in i.a. self-rated health, informal support, use of home help; small difference in functional status

† Subjects living together were allocated together to one of the two groups.

The response was quite satisfactory: 85% (n=1,285) of the approached population returned the questionnaire.* Of these, 92% reported that they were willing to participate in the study. After exclusion of those elderly persons and their partners who were already receiving home nursing care, a random sample of 600 (out of 1,056) subjects could be drawn to form the study population.

This sample contained 20 persons who were found to live in a monastery. Because these subjects cannot be considered living independently at home (the monastery provides some domestic services for all inhabitants), we decided to exclude these subjects after all. Therefore, in the rest of this chapter, we will restrict the discussion to 580 participants in the experiment.

* Of the 1,545 persons who received a questionnaire, 26 appeared to have died or to have been institutionalized shortly before the questionnaire was sent out.

Comparability at baseline

It is a common approach in experiments to choose a study population and randomly allocate the subjects to the experimental or the control intervention. In this way, it is hoped to establish perfect prognostic comparability among the contrasted groups (no difference in outcome if the intervention does not work). However, due to random errors bias may easily occur (especially if the study population is not very large), unless extra precautions are taken. Therefore, it always makes sense to prestratify on important prognostic variables, in order to enhance prognostic comparability. Random allocation within each stratum now has to do with balancing the unknown or imprecisely measured prognostic variables. Properly measured but insufficiently balanced prognostic variables can be controlled for afterwards in a multivariate analysis.

Table 2. Distribution of some baseline measurements among the intervention and control groups.

characteristic		intervention group (n=292)	control group (n=288)
gender	male	42%	43%
	female	58%	57%
age	75-79	72%	73%
	80-84	28%	27%
composition of household	alone	39%	39%
	together	61%	62%
social class	low	27%	29%
	'medium'	61%	62%
	high	12%	10%
self-rated health*	0-5	20%	18%
	6-7	36%	37%
	8-10	45%	45%
functional status:**			
- ADL disabilities	0	91%	86%
	1-5	10%	14%
- household disabilities	0	38%	35%
	1-2	39%	39%
	3-5	23%	27%
use of home help	yes	19%	20%
	no	81%	80%
informal care available (if necessary)	yes	86%	88%
	no	14%	12%
contacts with GP in last 3 months	0-1	54%	56%
	> 1	46%	44%

* For self-rated health, or perceived state of health, the participants were asked to rate their health status on a scale between 0 (poor health) and 10 points (excellent health).

** Functional status refers to ADL and household disabilities. With regard to ADL, 5 questions were asked, related to: walking stairs, bathing, dressing, rising from the bed, and using a normal toilet. As to the household activities, again 5 questions were asked, related to: shopping, cooking, laundering, making beds, and mopping/washing windows. For both ADL and household activities a score was computed for each participant between 0 (no disabilities) and 5 points (completely dependent).

With our postal questionnaire we measured many important prognostic variables. Among these, we chose to prestratify the participants on gender, composition of household, self-rated health, and social class (neighbourhood).^{*} Randomization was performed by computer within each of the strata. After that, those elderly persons who turned out to have been allocated to the experimental intervention were once again randomly assigned to one of the three public health nurses who performed the home visits. In this way, our randomization procedure was far more precise than the procedures used in the Welsh and Danish studies, where prestratification was omitted (see table 1). The stratified randomization turned out to be quite successful; the distribution of almost all measured prognostic variables was equal among the contrasted groups (table 2).

Apart from the variables used for prestratification, there were no differences between the groups with regard to informal support, use of home help, frequency of social contacts and frequency of recent contacts with the general practitioner. Although we expected that the prestratification on self-rated health would also provide an equal distribution of the functional status of the elderly, it was found that, as an exception, the experimental intervention group scored slightly better on activities of daily living and household activities. However, this discrepancy can easily be corrected for in the data analysis.

Contrasted interventions

In accordance with the experiments in Wales and Denmark, it was decided to contrast the experimental intervention with no intervention, as our trial was primarily started as a replication of these studies. Hence, at this stage we did not choose to contrast the professional home visits with, for instance, home visits by volunteers. However, if home visits by public health nurses turn out to be effective, this possibility can be considered in a new experiment, which is to investigate the specific effect of professional versus nonprofessional preventive home visits.

For now, we can only guess at the possible effective element(s) of the home visit (e.g. quality of advice, referrals, a confidential relationship), since the visit is offered and investigated as a single package. Nevertheless, by carefully monitoring the visits we will try to shed some light on the mechanisms through which they might be effective.

Our intervention was largely a replication of the intervention in the Danish study (table 3). Participants were visited every third month for a period of three years. In this way the contrast between the interventions was much larger than in the Welsh study (two visits in two years). As in the Danish study the elderly persons could contact the nurse by phone every day to discuss problems or to ask for an extra visit.

The intervention was comparable to both previous studies as regards the following aspects. Each participant was visited by the same nurse during the entire study and the nurses were employed specifically to work on the study. In addition to the regular visits, extra visits could be paid if necessary. No physical examinations were performed during the visits. Instead, relevant topics were discussed with the subjects, information and advice were given and, if necessary, referrals to other services were made.

---

^{*} Social class was not directly measured with the postal questionnaire. Instead, employees at the departments of social security of the municipalities rated each street as foremost low, 'medium', or high social class.

Table 3. Comparison of the study designs in Wales, Denmark and the Netherlands: interventions compared.

interventions compared	Wales	Denmark	the Netherlands
control Intervention			
– active or inactive	no intervention (usual community care)	idem	idem
– concurrent or historical	concurrent	idem	idem
experimental Intervention			
– duration	2 years	3 years	3 years
– schedule of visits	once a year	four times a year	four times a year
– fixed/flexible	extra visits if necessary	idem	idem
– ancillary "therapy"	no; if necessary, referrals are made	idem	idem
– intervention			
– performed by	one health visitor in each area	two health visitors and a physician	three public health nurses
– employment visitors	in care setting, specifically for study	idem	idem

Contrary to the previous studies (and partly based on the experiences gained in these studies), a checklist was used during the visit, instead of a problem sheet (Wales) or an incidentally used questionnaire (Denmark). The checklist contained relevant topics such as functional and mental status, social functioning, medication, status of sense organs, informal support and use of health services. In addition, guidelines for different topics were designed to enable the nurses to discuss topics systematically and to probe for underlying problems. However, these guidelines are not meant to standardize the home visits in detail.

An important difference with the Danish experiment was our decision to continue the visits if participants become institutionalized, and to include all subjects (living at home and institutionalized) in the outcome measurements. The latter in particular is of importance. If home visits prevent institutionalization, it is likely that in the visited group more people with functional incapacities will still be living at home after three years of intervention. If in the control group persons with an equal functional status have been institutionalized in the meantime, then outcome measurements restricted to people still living at home might lead to biased outcomes.

The control group was left 'untouched' during the intervention period (except for a postal questionnaire after one and a half years). However, the subjects in this group could use or apply for all the regular services in the area as before. The home nursing care organization in the research area agreed with our request that their nurses could pay no unsolicited visits during the experiment to participants of the study. By this, it was prevented that subjects in the control group would receive similar interventions as those in the intervention group.

Outcome measurements

The choice of relevant outcome parameters should be based on what the main goal of the intervention is supposed to be. This implies that the choice should not

necessarily be based on the precision with which certain measurements can be made (Feinstein 1977). Furthermore, if several outcomes are intended, it is desirable to distinguish a hierarchy in the importance of the chosen outcome measures.

We determined three categories of outcome measures, combining the measures chosen in the Danish and Welsh experiments. The primary interest in the experiment was the effects of the home visits on the health status of the elderly subjects, expressed in terms of (i.a.) self-rated health, well-being and functional and mental status (table 4). In addition, mortality was registered in both groups. However, we considered improving the quality, rather than the duration of life, to be the most important goal of the intervention.

As a secondary interest, data were collected on the use of health care and welfare services. This information was gathered to see whether the visits can indeed prevent or postpone institutionalization. These services included institutional care (hospital, nursing home, and home for the elderly), as well as the general practitioner, home help, and home nursing care. Thirdly, the cost effectiveness of the home visits was calculated for policy purposes.

Another important aspect of the outcome measurements involves the time interval(s) of the measurements. We copied the intervention period from the Danish study, expecting that three years would be a sufficient period of time to obtain convincing evidence as to the merits of the home visits. This expectation is strengthened by the results of the Welsh study, which had an even smaller contrast between the interventions. If preventive home visits turn out to be effective in our study as well, it would be interesting to see whether these effects last after the intervention period has ended. In the Danish trial the study population could be followed up for 2.5 years after the last intervention with respect to mortality and the use of services. The initial reduction of mortality was found to disappear during this period. The demonstrated trend of a reduction in institutional care (and hence a reduction in medical care costs), however, continued to be in favour of the group which had been visited.* We will perform a comparable follow-up of the study population after the intervention period has ended, although restricted to a period of one year.

We repeated the baseline measurement (postal questionnaire) halfway through and at the end of the intervention period. The response on both measurements was 97%. Because of the additional measurement halfway through the study, it was not only possible to analyze differences between the contrasted groups with respect to some of the primary outcome measures (self-rated health and functional status) at the end of the study, but also to analyze the changes over time.

Primary outcome measures that could not easily be measured with the postal questionnaires, i.e. well-being and indicators of mental status, were assessed during interviews at the end of the intervention period (response 92%). In addition, these interviews were used to obtain information on other health related measures, such as the use of aids, prescribed medication, and functioning of the sense organs.

The interviews were conducted by independent interviewers and not by the public health nurses (as was done in the Danish trial), to prevent information bias. Data on the use of services were, in contrast with the Welsh study, gathered concurrently (with the informed consent of the subjects). Although the data were collected concurrently, no separate analyses were performed for the two groups during the study. In this way, it was avoided that members of the research team

---

* This information has been obtained by personal communication with the Danish researchers.

Table 4. Comparison of the study designs in Wales, Denmark and the Netherlands: outcome measures and data collection.

outcome measures/ data collection	Wales	Denmark	the Netherlands
outcome measures			
- hierarchy in measures	no	yes	yes
- outcome measures	arbitrary sequence: - mortality - use of services - perceived status of life overall - functional status (ADL/household activities) - mental status (anxiety, loneliness, memory, depressive complaints)	1 use of services 2 mortality/cost effectiveness 3 'subjective' measures: (i.a.) - quality of life - loneliness - functional status	1 health status: - self-rated health - well-being - functional status (ADL/ household activities) - mental status (loneliness, memory, depressive complaints) - mortality 2 use of services 3 cost effectiveness
- drop outs:			
- percentage	1% (rural) and 2% (urban) refused outcome measurements	6% refused intervention or outcome measurements	2% refused intervention and 3-8% refused outcome measurements
- effects on results	probably small	probably small	probably small
data collection			
- subjects	all subjects	re 1/2: all subjects re 3: restricted to subjects still living at home	all subjects
- methods	- interview	- interview - concurrent data collection on use of services	- interview - concurrent data collection on use of services - postal questionnaire
- observers	- independent interviewers	- visitors (visitors did not interview subjects of their own case-load) - co-operating services	- independent interviewers - co-operating services and researchers

influenced the intervention process by knowing interim results.

A brief outline of the Dutch experiment is presented in figure 1. By taking into account the experiences gained in the Welsh and Danish studies, we tried not merely to replicate but also to improve these studies. As discussed above, the main differences concern the stricter admission criteria, the baseline measurement, the random assignment of the interventions to the contrasted groups, an additional outcome measurement halfway through the study, the choice of the hierarchy of outcome parameters, and precautions to prevent biased measurements of primary outcome parameters.

An elaboration of the protocol, according to which the preventive home visits were carried out, will be discussed in chapter 3. The results of the experiment will be presented in the chapters 4 and 5.

Figure 1. Design of the Dutch study.

References

- Buckley EG, Williamson J. What sort of 'health checks' for older people? *British Medical Journal* 1988; 296: 1144-5.
- Feinstein AR. Hard science, soft data, and the challenge of choosing clinical variables in research. *Clinical Pharmacology and Therapeutics* 1977; 22: 485-98.
- Frederiks CMA. Preventief geneeskundig onderzoek bij ouderen: pro's en contra's. *Tijdschrift voor Gerontologie en Geriatrie* 1986; 17: 205-8.
- Hendriksen C, Lund E, Stromgård E. Consequences of assessment and intervention among elderly: a three year randomised controlled trial. *British Medical Journal* 1984; 289: 1522-4.
- Hendriksen C. An intervention study among elderly people. *Scandinavian Journal of Primary Health Care* 1986; 4: 39-42.
- Kane RL. Beyond caring: the challenge to geriatrics. *Journal of the American Geriatrics Society* 1988; 36: 467-72.
- Luker KG. Health visiting and the elderly. *Nursing Times* 1981(a); 77: 137-40.
- Luker K. Elderly women's opinions about the benefits of health visitor visits. *Nursing Times* 1981(b); 77: 33-5.
- Miettinen OS. *Theoretical epidemiology*. New York: John Wiley & Sons, 1985.
- Rossum HJL van, Frederiks CMA. Heeft preventief ouderenbezoek door wijkverpleegkundigen zin? *Tijdschrift voor Gerontologie en Geriatrie* 1988; 19: 3-6.
- Rubenstein LZ. Comprehensive geriatric assessment. In: Solomon DH, moderator. New issues in geriatric care. *Annals of Internal Medicine* 1988; 108: 724-7.
- Vetter NJ, Jones DA, Victor CR. Effect of health visitors working with elderly patients in general practice: a randomised controlled trial. *British Medical Journal* 1984(a); 288: 369-72.
- Vetter NJ, Jones DA, Victor CR. The effectiveness of health visitors working with the elderly. Final report, volume 1. Cardiff: Welsh National School of Medicine, 1984(b).

Chapter 3

The home visits*

Erik van Rossum,¹ Carla MA Frederiks,¹ Hans Philipsen,² Ko Portengen,³
Jannie Wiskerke,⁴ Paul Knipschild¹

- 1 University of Limburg, Department of Epidemiology
- 2 University of Limburg, Department of Medical Sociology
- 3 Public Health Nurses Association of Limburg
- 4 Public Health Nurses Association of Midden-Limburg

---

* This chapter is an elaborated version of the article "Preventief ouderenbezoek door wijkverpleegkundigen" ("Preventive home visits by public health nurses") published in: Crebolder HFJM, Visser APh (eds). Ouderenzorg in Limburg ("Elderly care in Limburg"). Amsterdam: Thesis, 1990: 48-55.

Summary

This chapter deals with the way in which the home visits were carried out during the experiment. The protocol for the visits is described, which included some general principles and two instruments which were developed for the visits: a checklist and corresponding flow charts for discussing health topics in a systematic way.

Data that were gathered in 3,000 home visits to 292 elderly subjects made it clear that a broad range of topics was discussed with the subjects during the visits, which lasted about 45 to 60 minutes. Themes often discussed were the functional abilities and the availability of and need for services. Half of the subjects ($n=154$) were referred to other services. A substantial proportion of these referrals (38%) was to the general practitioner. Nearly all subjects visited were positive about the visits, and 82% of them thought the visits were beneficial.

The protocol for the visits seems to be useful for public health nurses in performing preventive home visits. However, the protocol was used in a research setting by only three nurses. Further research is needed to assess its merits for nursing practice.

Samenvatting

Dit hoofdstuk beschrijft de wijze waarop tijdens het experiment de preventieve huisbezoeken uitgevoerd werden. Eerst wordt het protocol voor de bezoeken besproken. Hierbij worden enkele uitgangspunten genoemd, waarna nader ingegaan wordt op twee 'instrumenten' die voor de bezoeken werden ontwikkeld: een checklist en aanvullende stroomdiagrammen. Deze instrumenten waren bedoeld om de verschillende onderwerpen op een systematische manier met de ouderen te kunnen bespreken.

Vervolgens worden enkele gegevens gepresenteerd over zo'n 3.000 bezoeken die bij 292 ouderen werden uitgevoerd. Tijdens de bezoeken, die gemiddeld 45 à 60 minuten duurden, kwam een breed scala van onderwerpen aan bod. Veelbesproken thema's waren de functionele status en de beschikbaarheid en behoefte aan professionele zorgvormen. De helft van de bezochte ouderen ($n=154$) werd verwezen naar andere voorzieningen, waarin de huisarts met 38% van alle verwijzingen een belangrijk aandeel had. Bijna alle ouderen stelden de bezoeken op prijs en 82% van hen vond dat zij er profijt van hadden gehad.

Het protocol voor de bezoeken lijkt bruikbaar voor wijkverpleegkundigen bij de uitvoering van preventieve ouderenbezoeken. In deze studie werd het echter in een specifieke onderzoekssetting gebruikt door slechts drie wijkverpleegkundigen. Het is daarom zinvol om het protocol in de praktijk nader te toetsen.

Introduction

The previous chapter discussed the design of the experiment, but the intervention of interest was only briefly pointed at. For several reasons it seems useful to describe in detail what the intervention in our experiment was about. For instance, the interventions in the experiments previously conducted in Denmark (Hendriksen et al. 1984) and Wales (Vetter et al. 1984) emphasized different aspects of the home visits. Furthermore, while we were preparing the study it appeared that disagreement among Dutch home nurses did not only extend to the effectiveness of the home visits. Consensus was also lacking as regards the desirable elements of the home visits (van Rossum and Frederiks 1988).

This chapter describes the way in which the home visits were carried out during the experiment. We focus on the content of the visits, as the choices regarding the intervention period and frequency of visits have already been discussed in chapter 2. First, the protocol for the home visits is discussed. We then present data that were gathered during the visits, such as topics discussed with the participants, and referrals by the nurses to other services. Thereafter, the participants' opinions on the visits are presented, and some concluding remarks end the chapter.

Protocol for the home visits

We used several sources in developing the protocol. We contacted the researchers involved in the studies on this topic in Denmark and Wales, to discuss the characteristics of their interventions. On the other hand, we thought it important that Dutch nursing practice should be reflected in the intervention. For this purpose, we inventoried the available Dutch protocols for preventive home visits. Finally, we discussed drafts of our own protocol with experts in the home nursing field.

Although advice and referral to other services with regard to health problems and risks were key elements of the intervention in both the Danish and the Welsh study, the emphasis within the visits differed.

No detailed protocol was used in the Danish study, in which the intervention group was visited every third month over a period of three years. Among other things, the Danish research team thought it important to create a confidential relationship with the participants. The visitor should be an empathic listener, and the initiative for the first topic to be discussed at each visit was left to the elderly person. Furthermore, they relied on the 'clinical eye' of the health visitor. A short questionnaire was used for the visits, containing questions on, among other things, living conditions, functional status, use of medication, and use of services. However, it seems that this questionnaire was not used in a systematic way, as answers to the questions (as far as they had been discussed) were coded afterwards. In addition to the questionnaire, a short problem sheet was used for each participant.

The visits in the Welsh study, on the other hand, were far more structured. The annual visit was predominantly seen as an assessment, or screening tool, for which elaborate problem sheets were used to inventory physical, mental, and social problems. With respect to physical problems, for instance, about 50 different items were listed. The problem sheets were also used to record and evaluate the interventions by the health visitor. Unlike the situation in the Danish study, the visitor was a member of a primary care team; information gathered by the visitor could be used by the other health workers of the team.

We thought that the unstructured approach in the Danish study remained somewhat vague, whereas the Welsh intervention seemed to be too prescriptive. However, both approaches offered useful elements, and we decided to combine these elements in our protocol.

The second source for the protocol were the available standards for home visits in the Dutch home nursing field. It turned out that consensus was lacking among the home nursing care organizations. Elaborated protocols were hardly present. It seemed that public health nurses felt somewhat unsure about the visits, partly because of a lack of guidelines for performing the visits. The extent to which home visits were carried out by nurses differed considerably between areas, and even within organizations (Castelein et al. 1990). Sometimes, the target population consisted of specific risk groups, whereas other organizations merely used age criteria. Furthermore, the frequency of visits differed between organizations, although they often recommended one visit a year.

Most organizations, however, used a checklist for the home visits. These checklists contain questions on various health-related topics relevant to the visits, such as functional status, nutrition, medication, social contacts and housing conditions. Although the available checklists showed considerable variations in size (ranging from one page to an extensive booklet), we thought the basic idea useful for our protocol.

Based on the interventions in the foreign studies and the examples available from Dutch practice, we formulated some general principles for the protocol:

- The concept of prevention should be viewed in a broad sense. According to the traditional definition, the visits should aim at primary, as well as secondary and tertiary prevention. It did not seem useful to restrict the visits to one of these areas beforehand. Furthermore, the distinctions between the three levels of prevention are in practice not very clear.
- Because nursing care is mainly focussed on the functional abilities of subjects, home visits by public health nurses should not primarily focus on (screening for) specific diseases. Therefore, physical examination was not included in the home visit. Instead, the nursing intervention should consist of advice with respect to the health status of subjects, if necessary followed by referral to other health and social services.
- It should be feasible to implement the protocol in standard nursing practice in future.
- We thought it important to achieve a balance between a systematic approach during the visits and freedom for the nurses to act on their own initiative. Thus, the visit should be more than a non-committal interview, without however fixing the course of the visits in detail.
- The home visits aim to add to the independent functioning of elderly subjects. Therefore, decisions have to be made by the elderly subjects themselves. In other words, the risk of a medicalising effect should be avoided.

With these principles in mind, we designed the details of the protocol. A distinction was made between the first home visit and subsequent visits. The first visit was not highly structured, as it was mainly for the nurse to get to know the subjects, to introduce the study, and to get a first impression of the health status and living conditions of the subjects. After this introductory visit, subsequent visits

- focussed on specific health topics. For these follow-up visits the following hierarchy in topics to be discussed was drawn up:
- (1) The nurse always started with the topic that the participant wanted to discuss first.
  - (2) After that, advice (including referrals to other services) given during the previous visit was evaluated.
  - (3) Then, one or a few new topics were discussed in detail.
  - (4) Next, changes with respect to previously discussed topics (such as prescribed medication) were inventoried.
  - (5) Finally, the visit was summarized and plans for the next visit were discussed.

Two instruments were developed for the home visits: a checklist and corresponding flow charts. As is common in Dutch nursing practice, the checklist (of 5 pages) contained questions on various health topics relevant to the visits, such as activities of daily living, nutrition, medication, social contacts and housing conditions. The checklist was constructed on the basis of various lists in use in the Netherlands. Table 1 shows as an example the questions in the checklist related to medication.

Table 1. Questions in the checklist with respect to medication use.

Do you use medication (type and dosage)?	.....
(can you please show them)	.....
Who prescribed these medications?	.....
How do you store them?	.....
How old are they?	.....
In your opinion, are they effective?	.....
Have you read the package insert?	.....
Do you ever forget to take your medication?	.....
Do you use medication which has not been prescribed by a physician?	.....

A drawback of the mere use of checklists is that it still remains rather unclear for the nurse when and what to advise in specific situations. We therefore developed flow charts for each topic in the list in order to provide additional support for the nurse. These charts provided guidelines helping the nurse to probe systematically for underlying problems, and they gave practical information on, among other things, possible solutions to problems found to be present. By way of example, figure 1 shows the flow chart for medication use. The structure of all charts was similar to the one in this example.

The flow charts were developed in cooperation with the three nurses who were to perform the home visits, as well as several experts within the specific areas of interest. It should be stressed that the charts merely served as a tool for the nurses in preparing and evaluating the home visits; they were not meant to be used during the visits.

In addition to serving as a tool for the nurses, the checklist and flow charts helped to standardize the intervention to some extent. For this purpose, the visits were also discussed in weekly meetings between the three nurses and the principal investigator, at which each of the nurses in turn presented a case report.

Figure 1. Flow chart with respect to medication use.

As in the Danish experiment, the nurses were available for consultation by telephone each morning between 8.30 and 9.30. Participants could contact 'their nurse' to ask for advice, to inform the nurse about changes in their health status, or to ask for an extra visit. In line with the experiences in the Danish experiment, it was found that the participants did not make frequent use of this additional service. Over the three year period the nurses were consulted by phone about once a fortnight, the majority of phone calls being initiated by relatives of the participants. Still, the participants stated during the final interviews after three years, that they had appreciated this service. It probably comforted them that they could contact a confidential person 'just in case'.

The nurses had their own office and were considered a separate community service for elderly people. Arrangements were made with the public health nursing organization in the research area to define the nursing tasks. The research nurses did not provide curative care. If this care was indicated, participants were referred to the nursing care organization. With respect to the use of aids, it was agreed upon that if one extra visit would suffice to instruct the subject, the research nurse would do this without referring the client.

Although they are not directly related to the protocol, it is important for a study evaluating the effects of a health programme to consider whether arrangements should be created for the intervention group after the programme has ended. Continuation of care should be offered in particular for those subjects for whom an abrupt cessation of care would seem unethical. The participating municipalities were willing to finance an additional year of preventive care for those subjects in the intervention group who needed this. One of the nurses already employed for the study carried out these additional home visits. Other subjects in the intervention group not in need of a direct continuation of preventive care after three years were 'turned over' to the home nursing care organization.

Data on the visits

The nurses summarized each visit on a precoded sheet (one page). Registration included the time spent on the visit, topics discussed, and referrals to other services. A summary of these data is presented below.

Visits performed and time spent on the visits

As in the Danish study, the 292 subjects in the intervention group were visited four times a year over a period of three years. During this period, 3,059 (regular) visits were performed (table 1). Some visits (2%) could not be carried out, for instance because the participant was absent for several weeks, or, as happened during the third year, on account of ill-health of one of the nurses. Seven subjects (2%) refused the visits after they had given their informed consent, and one participant moved to another area. Although the visits were continued when participants were admitted to long term care facilities (nursing homes and homes for the elderly), visits to five institutionalized psycho-geriatric patients were no longer feasible.

In addition to the regular visits, extra visits could be paid if necessary. One third of the participants ($n=96$) received a total of 174 additional visits. In most cases (66%) it was the nurse who initiated these extra visits, often because they considered the regular period of three months too long in view of a (sudden) change in the subject's situation (for instance in cases of hospital admission or

discharge, or when the spouse of the participant had died). Thirty per cent of the extra visits were requested by the elderly subjects or their relatives, whereas the rest of the extra visits (4%) were initiated by other persons.

Table 1. Numbers of visits performed and dropout rates during the intervention period.

	visits performed	visits not performed (incidental)	cumulative dropout			
			deceased*	institutionalized	moved away	refused visits
first year (n=292)	1,105	15	10	1		7
second year (n=274)	1,029	9	30	3	1	
third year (n=251)	925	53	38	5		
total	3,059	77	38	5	1	7

* The numbers of deceased subjects (n=38) deviate from those reported in chapter 4 (n=42), because 4 subjects died shortly after the last visit, but within the intervention period.

In general, the visits lasted about 45 to 60 minutes. Table 2 shows that the median time spent on the visit gradually decreased during the intervention period, from 70 minutes at the start to 50 minutes in the last one and a half years. The time spent on other activities related to the visits (travelling, preparation of the visit and administration), was about 26 minutes per visit and constant over time.

Table 2. Median time spent on activities related to the consecutive home visits.

activity	median time (minutes)					
	first year		second year		third year	
	1-2	3-4	5-6	7-8	9-10	11-12
home visit	70	60	55	50	50	50
travelling	11	10	10	10	10	10
preparation	5	5	5	5	5	5
administration	13	11	11	11	11	11

Topics discussed and referrals to other services

The nurses registered the three topics on which they had spent most of their time during each visit. Table 3 gives an overview of all topics registered. In interpreting these data one has to take into account that the topics registered were not necessarily the most important ones.

Not surprisingly, functional status was a frequently discussed issue during the visits. This broad category includes activities of daily living, mobility, incontinence, use of aids, and household activities. A relatively large amount of attention was also paid to the availability and need for professional (15%) and informal (2%) care; these accounted for a total of 17% of all registered topics. Other frequently discussed themes were social contacts (including worries about the health status of the spouse and children), the physical condition of the participants (such as the functioning of sense organs, and foot and dental problems), as well as the more general health status.

Table 3. Topics discussed during the home visits.

topic	first year	second year	third year	total
functional status	19%	18%	19%	18%
health services/informal care	11%	17%	21%	17%
social contacts/relations	13%	12%	14%	13%
physical condition	12%	11%	9%	11%
general health status	13%	9%	6%	9%
housing/neighbourhood	6%	9%	7%	7%
mental status	4%	4%	5%	4%
nutrition	9%	5%	4%	6%
activities during the day	6%	4%	5%	5%
medication	6%	5%	4%	5%
other	3%	6%	7%	6%
total	102%	100%	101%	101%

During the three year period half of the participants ($n=154$) were advised 290 times, or on average twice per subject, to contact another health or social service (table 4). The proportion of subjects referred decreased over time from 35% in the first year to about 25% in the second and third years of intervention. Almost 40% of these referrals were to the general practitioner (GP). Participants were also frequently referred to voluntary services, such as day care facilities, whereas home nursing care and home help played a less prominent role than expected (8% and 7% of all referrals respectively).

Advice for referral was evaluated by the nurses during the next visit, to see whether the elderly subject had actually contacted the service. Half of the referrals (53%) had indeed led to the care that had been applied for (table 5). In 13% of the referrals, the participants contacted the service, but the care had either been refused by the service, or had not yet been realized within the three month period. In one out of four referrals (24%), the participant did not comply with the advice. This often concerned the voluntary services (33% of the referrals made to these services were not followed up), exercise programs (64%), home help (28%), and, to a lesser extent, the GP (18%).

Table 4. Referrals to health care and social services.

service	number of referrals			
	first year	second year	third year	total
general practitioner	56	30	25	111 (38%)
volunteer organizations	13	11	14	38 (13%)
home nursing care	9	5	9	23 (8%)
home help	11	4	5	20 (7%)
optician/audiologist	6	8	4	18 (6%)
exercise programs for the elderly	9	2		11 (4%)
medical specialist	5	4	2	11 (4%)
local authorities/building society	3	5	3	11 (4%)
home for the elderly	3	3	5	11 (4%)
dentist	5	3	1	9 (3%)
chiropractist	4	2	3	9 (3%)
centre for medical aids	4	2	1	7 (2%)
mental home care	1		1	2 (1%)
other	2	6	1	9 (3%)
total	131 (n=101)	85 (n=68)	74 (n=59)	290 (100%) (n=154)

Table 5. Evaluation of the referrals.

subject's decision on advice for referral	proportion of referrals			
	first year	second year	third year	total
positive, and care realized	44%	59%	66%	53%
positive, but care not (yet) realized	14%	15%	6%	13%
negative, but other solution	10%	9%	8%	10%
negative, service not contacted	31%	17%	21%	24%
total	99%	100%	101%	100%

- Notes:
- 26 Of the 290 referrals could not be evaluated, because the subject had died or had been institutionalized shortly after the visit in which the participant was advised to contact another service, or because the referral was proposed during the last home visit.
  - The category 'negative, but other solution' refers to the situation in which the participant decided not to follow up the advice, but in which he or she found another solution for the problem (for instance a privately paid cleaning person instead of applying for home help).

Differences in home visits between the visiting nurses

The subjects in the intervention group were allocated to the three nurses in accordance with the nurses' terms of employment. One nurse worked on a full-time basis and visited 146 subjects, while the other two nurses worked part-time (0.5

FTE) and visited 74 and 72 subjects respectively. The protocol for the home visits and the case reports which were discussed among the nurses aimed to standardize the intervention to some extent.

As far as the data on the visits provide evidence in this respect, we found no large differences between the visits by the three nurses. On average they spent the same amount of time on the visits, as well as on the activities related to the visits. Hardly any differences were found between the nurses with respect to the topics discussed with the participants. With respect to referrals to other services, some differences appeared (table 6). One of the nurses (nurse 1 in the table) referred more subjects. It turned out that she had referred 88 of the 146 subjects, or 60% of her group, while nurses 2 and 3 had referred 47% ($n=35$) and 43% ($n=31$) of the subjects in their groups. Nurse 1 made an average of 1.2 referrals per subject visited (175 referrals with respect to 146 subjects) compared to 0.9 and 0.7 referrals per person for nurses 2 and 3 respectively. Furthermore, nurse 1 referred subjects more often to other services than the GP or medical specialist (especially volunteer organizations or services aimed at hearing and sight problems).

Table 6. Referrals to other services for the three nurses separately.

	nurse 1 ($n=146$)	nurse 2 ($n=74$)	nurse 3 ($n=72$)	total ($n=292$)
proportion referred subjects	60%	47%	43%	53%
number of referrals per person of the total group	1.2	0.9	0.7	1.0
of which to GP/specialist	0.4	0.5	0.4	0.4
other services	0.8	0.4	0.3	0.6

Participants' opinions about the home visits

During the interviews at the end of the study (in which 232 of the original 292 subjects participated) the subjects in the intervention group were asked about their experiences with the home visits. Not surprisingly, nearly all subjects (96%) had appreciated the home visits. They were also satisfied with the average length of the visits (93%), and 96% considered the three month period between the visits a convenient time interval.

The majority of subjects in the intervention group thought they had benefited from the visits: 47% stated they had profited greatly, and 35% said they had profited to some extent from the visits. When they were asked to specify these benefits, almost half of the benefits mentioned (47%) referred to 'nice conversations' with the nurses (table 7). Useful advice on the health status (including the use of services and aids) made up 26% of all reported benefits. Eighteen per cent of the benefits referred to the opportunity to discuss and ask questions about their health status.

A substantial proportion of the intervention group (71%) stated they would once again participate in a preventive home visits programme if such a programme was offered to them. Nearly one out of five subjects (17%) thought the three year programme sufficient for them, whereas 13% were not sure about participating again.

Table 7. Perceived benefits from the home visits.

benefit mentioned	proportion of benefits mentioned
nice conversations	47%
useful advice on health status, services, and use of aids	26%
opportunity to discuss health status	9%
opportunity to ask questions	9%
general feeling of support	5%
other	5%

These questions on the degree of satisfaction with regard to the home visits were only posed to the subjects in the intervention group. We were also interested in the opinions of the subjects in the control group about these visits (221 of the original 288 subjects in this group were interviewed). Twenty-nine per cent of the non-visited subjects stated they would appreciate regular home visits, while 13% were uncertain about this. Thus, a substantial proportion of the interviewed subjects in the control group thought they were not in need of regular home visits by public health nurses.

Discussion

In designing the experiment, we tried to create optimal conditions for the intervention to be effective. If the visits turned out to be ineffective, it would be hard to imagine that they might still be effective in (less favourable) practice conditions. To achieve these conditions, we employed experienced and motivated nurses specifically for the research project, so they would not be burdened with other nursing tasks. In addition, the intervention group was visited (at least) four times a year, which is more frequent than common Dutch nursing practice.

Useful and tested protocols for the home visits were hardly available in the Netherlands. Nor did the two foreign studies provide an unambiguous solution, as emphasis within the visits in these studies differed. By combining elements from the 'open approach' in the Danish study and the rather prescriptive protocol in the Welsh study, we aimed to develop a protocol which was a cross between the two examples.

Apart from different assumptions about the effective elements of the visits, the difference in emphasis between the home visits in the Danish and Welsh study might partly be due to differences in the length of the intervention period and the frequency of visits (four times a year versus once a year). An unstructured approach may make more sense if the visits can be carried out rather frequently over a longer period of time, and, as happened in the Danish experiment, if they are carried out by well-trained and experienced visitors.

We strove for a more detailed protocol, because of, among other things, the perceived need for supporting guidelines. In addition to a checklist, flow charts were developed for discussing health topics in a systematic way. If clear positive effects of the visits could be demonstrated, we thought it important that (elements of) the protocol might be of use to nursing practice.

On the other hand, one has to be careful in formulating detailed guidelines. These are only appropriate if evidence is available with regard to the effectiveness of specific interventions. Much of that information is lacking, however, especially with regard to the merits of preventive interventions within this age group (see for instance Hickey and Stilwell 1991). Furthermore, we thought that a too clinical approach would not be in agreement with the characteristics of community care. As far as guidelines for the nurses were formulated, we tried to stick to those already available in nursing practice.

The data that were gathered on the visits provide an additional picture of what happened during the visits. Almost all planned visits could be carried out and the numbers of dropouts, for reasons other than mortality were low. In view of the average time spent on the visits (about 75 minutes), it is clear that the intervention was time consuming, and thus rather expensive.

A broad range of topics was discussed with the participants. Since the functional status of the participants was an important element of the visits, much attention was paid to this. Fifteen per cent of the topics discussed concerned professional care services. It was found that many subjects had questions about the availability of services, and about criteria for applicants (including financial consequences). In view of this finding, and since half of the intervention group were referred to other services, knowledge of the availability of services seems an important prerequisite for performing the home visits.

Almost half of all referrals were to the GP. This may be partly due to the position of the GP within the Dutch health care system: in addition to being the family doctor who provides medical care, the GP has a key function in guiding patients through the (medical) system. For instance, consultation of a clinician at the hospital outpatient clinic is only possible after authorization by the GP.

In 25% of all referrals the participants decided not to comply with the advice of the visiting nurse. It should be taken into account that evaluation of referrals could only be made after a three month period (i.e. at the next visit). The nurses often discussed the need for a certain service several times before the participant decided to apply for it. Nevertheless, it still does not seem a 'bad score', as there is nothing bad about participants disagreeing with the nurse's advice.

Nearly all subjects visited were satisfied with the preventive programme. Part of this finding will have been biased by a 'socially desirable answer' tendency. It may have been difficult for those not too enthusiastic about the visits to express their negative feelings in this respect, even though the interviews were not conducted by the visiting nurses. In any case, these positive reactions are an indication that the nurses' approach during the visits corresponded with the expectations of the participants.

Somewhat in contrast to this, a substantial proportion of the subjects in the control group did not seem very eager to receive regular home visits. Although they may have assessed the usefulness of the visits correctly, all participants in the control group stated at baseline that they were willing to participate in the programme. In addition, it may have been difficult for them to judge the merits of a programme they had not received.

The protocol described here was used by only three nurses in a specific research setting. It would seem useful to test the protocol further in nursing practice. But first it must be examined how beneficial the home visits are. Results regarding the effects of these visits are presented in the next two chapters.

References

- Castelein E, Kerkstra A, Philipsen H. Preventieve huisbezoeken bij ouderen door de wijkverpleging. *Verpleegkunde* 1990/1991; 4: 201-11.
- Hendriksen C, Lund E, Stromgård E. Consequences of assessment and intervention among elderly: a three year randomised controlled trial. *British Medical Journal* 1984; 289: 1522-4.
- Hickey T, Stilwell DL. Health promotion for older people: all is not well. *The Gerontologist* 1991; 31: 822-9.
- Rossum HJL van, Frederiks CMA. Heeft preventief ouderenbezoek door wijkverpleegkundigen zin? De Nederlandse discussie en buitenlands onderzoek. *Tijdschrift voor Gerontologie en Geriatrie* 1988; 19: 3-6.
- Vetter NJ, Jones DA, Victor CR. Effect of health visitors working with elderly patients in general practice: a randomised controlled trial. *British Medical Journal* 1984; 288: 369-72.

Chapter 4

Effects of preventive home visits on the health status of elderly people*

Erik van Rossum,¹ Carla MA Frederiks,¹ Hans Philipsen,² Ko Portengen,³
Jannie Wiskerke,⁴ Paul Knipschild¹

- 1 University of Limburg, Department of Epidemiology
- 2 University of Limburg, Department of Medical Sociology
- 3 Public Health Nurses Association of Limburg
- 4 Public Health Nurses Association of Midden-Limburg

---

* An abbreviated version of the results presented in the chapters 4 and 5 has been submitted for publication.

Summary

A controlled experiment was conducted to study the effects of preventive home visits by public health nurses on the health status of elderly people (aged 75-84). An intervention group (n=292) was visited four times a year during a period of three years by experienced public health nurses. A control group (n=288) received no home visits. Effects of the visits were traced halfway through and at the end of the intervention period by means of postal questionnaires and interviews.

- No differences between the two groups were found with respect to the health status of the elderly subjects. The visited group did not show better scores on self-rated health and functional status (ADL and household disabilities). Nor did they appear to have benefited from the visits with respect to well-being, feelings of loneliness, depressive complaints and memory disturbances. Only slightly fewer subjects in the intervention group had died (14% versus 17% in the control group).
- Additional analyses indicated that the visits seemed to have improved the health status of those participants who rated their health status as poor at the start of the experiment. However, the numbers of subjects within this subgroup were small (about 55 in both groups).

We conclude that preventive home visits do not seem to be useful for improving the health status of the general population of elderly people living at home. They might be effective when restricted to subjects with a relatively poor health status; further research focussed on this population is recommended.

Samenvatting

In een gecontroleerd experiment werd onderzocht of preventieve ouderenbezoeken door wijkverpleegkundigen de gezondheid van thuiswonende ouderen (75-84 jaar) positief beïnvloeden. Een interventiegroep (n=292) werd gedurende drie jaar om de drie maanden preventief bezocht door ervaren wijkverpleegkundigen. Een controlegroep (n=288) ontving geen huisbezoeken. Effecten van de bezoeken werden halverwege en aan het eind van de interventieperiode vastgesteld middels schriftelijke en mondelinge enquêtes.

- Er konden geen verschillen in de gezondheidstoestand tussen de beide groepen aangetoond worden. De preventief bezochte groep scoorde niet beter op gezondheidsbeleving en ook beperkingen in de functionele status (ADL en huishoudelijke beperkingen) kwamen in deze groep niet minder vaak voor. Er werden ook geen verschillen tussen de groepen gevonden in welbevinden, eenzaamheid, depressieve klachten en geheugenstoornissen, terwijl de verschillen in sterfte gering waren (14% van de bezochte ouderen versus 17% van de ouderen in de controle groep).
- Uit nadere analyses kwamen aanwijzingen naar voren dat de preventieve bezoeken mogelijk wél de gezondheid bevorderd hebben van de ouderen, die bij de start van het onderzoek niet tevreden over hun gezondheid waren. Het ging hierbij echter om een relatief kleine subgroup (circa 55 ouderen in beide groepen).

Geconcludeerd wordt dat preventieve ouderenbezoeken niet zinvol lijken voor de gehele populatie thuiswonende ouderen. Mogelijk hebben ouderen met een minder goede gezondheid wel baat bij deze bezoeken; verder onderzoek bij deze categorie ouderen wordt aanbevolen.

Introduction

In view of the ageing population, preventive programmes are being developed, which aim to enhance the independent functioning of elderly people and to reduce their use of (expensive) institutional care. Some of these programmes are undertaken in institutional care. An example is the establishment of geriatric evaluation and treatment units in hospitals, which aim to minimize the length of stay in the hospital and to discharge elderly people to their homes, rather than a prolonged stay in another institution (Rubenstein et al. 1984, Applegate et al. 1990). Programmes in the home care setting include medical screening of elderly people by general practitioners and follow-up surveillance by a multidisciplinary family practice (Tulloch and Moore 1979). Sometimes the screening is performed by a nurse, while the subsequent care is again provided by a primary care team (McEwan et al. 1990).

One of the preventive programmes in the field of home nursing care consists of regular visits by health visitors or public health nurses to elderly people living at home. Through repeated assessment of the functional abilities, followed by professional advice, it is hoped that elderly people are better off with respect to their health status and risk of institutionalization.

In the early 1980s, two controlled experiments were performed to study the effectiveness of these home visits by health visitors. One was performed in Denmark among 600 elderly people aged 75 years or over (Hendriksen et al. 1984). An intervention group was visited four times a year for a period of three years, while the control group received no home visits. The study showed promising results: the home visits appeared to have reduced the number of admissions to hospitals and nursing homes, the medical care costs per subject, and mortality. The other experiment was performed in both a rural and an urban area in Wales (Vetter et al. 1984a and 1984b). In both areas 600 elderly people (aged 70 or over) were selected and the intervention group received at least two visits in two years. Again, the control group in both areas received no home visits. The results of the Welsh study were only partly consistent: mortality was reduced in the urban area only and functional status in the rural area only. The subjective view of life seemed to have improved in both areas. The study reported no differences in the use of (longterm) institutional care in favour of the visited group.

In view of the promising, though not entirely convincing evidence of the usefulness of home visits, we decided to perform a new experiment in the Netherlands (Van Rossum et al. 1991). The study was conducted in Weert, a town in the south of the Netherlands, and some surrounding villages (60,000 inhabitants). The aim of the study was to investigate the effects of the visits on the health status and use of services by elderly people living at home.

This chapter reports on the effects of the visits on the health status. First, the design of the study is discussed. Next, the results are presented, including a summary of the effects within specific subgroups of the study population. Finally, the implications of our findings are discussed.

Methods

Details of the study design have been discussed in chapter 2 and 3. Therefore, we restrict the method section here to a short overview of the design, in which specific attention is paid to the measurements of relevant outcome measures.

Study population

The study population was restricted to elderly people between 75 and 84 years of age, as we thought that the home visits would have their largest impact on this age group. To avoid contamination by other nursing care beforehand, we excluded those subjects and their partners from the study who were already receiving home nursing care on a regular basis. In addition, the home visits are not meant for these subjects.

In order to select participants and to gather baseline information about them, a postal questionnaire was sent out to every person between 75 and 84 years of age in the research area who was living at home ($n=1,545$). The questionnaire dealt with the admission criteria as well as relevant prognostic criteria, such as self-rated health, functional status, informal support and use of services. A letter, enclosed with the questionnaire, explained the goal of the experiment. Those interested were invited to complete the questionnaire and to sign their informed consent.

Eighty-five per cent ($n=1,285$) of the population approached returned the questionnaire.* Of these respondents, 92 per cent were willing to participate in the study. After exclusion of those subjects and their partners who were already receiving home nursing care, as well as 20 subjects who were found to live in a monastery, a sample of 580 (out of 1,036) subjects was drawn to form the study population.

To enhance the prognostic comparability among the contrasted groups, the participants were stratified before random allocation on the following prognostic characteristics: gender (2 strata), composition of household (2 strata), self-rated health (3 strata), and social class (neighbourhood, 3 strata). Randomization was performed within each of the 36 strata by means of random numbers generated by computer. Participants who were living together were always allocated together to one of the contrasted groups. The subjects who had been allocated to the intervention group were then once again randomly assigned to one of the public health nurses, who would pay the visits. Seven persons (2%) in the intervention group refused the home visits after they had given their informed consent.

After the stratified randomization, the distribution of the prognostic variables measured was almost equal for the two groups. Apart from the characteristics on which the participants had been stratified, there were no differences between the two groups as to their age, use of home help, recent contacts with the general practitioner, availability of social support or social contacts. There were only some small differences (in favour of the intervention group) with regard to functional status (activities of daily living and household activities).

Contrasted interventions

The interventions were largely the same as in the Danish study. The intervention group ($n=292$) was visited every third month for a period of three years. In addition to the regular visits, extra visits could be paid if necessary. Moreover, these subjects could contact the nurse by phone every day to discuss problems or to ask for an extra visit. Each participant was visited by the same nurse during the entire intervention period, and if subjects became institutionalized, the visits continued as before. The nurses had already been working in home nursing care for many years and were employed specifically for the study.

---

* Of the 1,545 persons who received a questionnaire, 26 appeared to have died or to have been institutionalized shortly before the questionnaire was sent out.

In general, the visits lasted 45 to 60 minutes. During the visits no physical examinations, such as measurement of blood pressure or urinalysis, were performed. Instead, the nurses discussed health topics in a broad sense with the participants, and gave information and advice. If necessary, referrals to other services were made, for instance to the general practitioner or the home help organization. To standardize the intervention, without however fixing the course of the visits in detail, the nurses used a checklist for the visits. Additional guidelines were developed to enable them to discuss the various health topics more systematically and to probe for underlying problems.

The subjects in the control group ($n=288$) received no home visits. However, they could use or apply for all the regular services in the area as before. To ensure that the control group would not receive similar interventions as the intervention group, the nurses of the home nursing care organization in the research area paid no unsolicited visits to the participants during the study.

Follow-up and outcome measures

To trace the effects of the home visits on the health status of the participants, the initial postal questionnaire was sent out again halfway through (after one and a half years), as well as at the end of the intervention period. The response on both measurements was 97% (table 1). Shortly after the last postal measurement all participants were contacted for a personal interview. The interviews were conducted by trained interviewers, who were unaware of whether a participant had been regularly visited by a nurse or not (response 92%). Analyses of the small non-response on the three measurements showed no differences between the two groups, neither in the number of non-respondents in each group, nor in their last available scores on various health measures. Therefore, we do not think that the outcomes have been biased by non-response.

Table 1. Follow-up measurements and response.

follow-up measurement	intervention group ($n=292$)	control group ($n=288$)	total population ($n=580$)
postal questionnaire (after 1.5 years)			
deceased	27	25	52
approached	265	263	528
response	255 (96%)	255 (97%)	510 (97%)
postal questionnaire (after 3 years)			
deceased	40	47	87
approached	252	241	493
response	245 (97%)	231 (96%)	476 (97%)
interviews (after 3 years)			
deceased	41	48	89
approached	251	240	491
response	232 (92%)	221 (92%)	453 (92%)

Primary outcome measures with regard to the health status were self-rated health, well-being and the functional and mental status of the elderly (table 2). In addition to these measures, the final interviews included questions on, among other things, existing health complaints, and hearing and sight problems. Furthermore,

mortality was registered in both groups, although we considered improving the quality, rather than the duration of life, to be the most important goal of the intervention.

To measure self-rated health, or perceived state of health, the participants were asked to rate their health between 0 points (poor health) and 10 points (excellent health). This was a familiar scale for the participants, because the same rating scale is used in the Dutch educational system to mark papers. The functional status refers to disabilities in performing activities of daily living (ADL) and household tasks. Both ADL and household tasks were represented by 5 activities (see table 2). By assigning 1 point to every activity that could not be performed independently, a score was computed between 0 points (no disabilities) and 5 points (completely dependent). Self-rated health and functional status were recorded at baseline, as well as during all follow-up measurements.

Table 2. Primary outcome measures and their operationalization.

primary outcome measures	operationalization*	measurements**
self-rated health	mark between 0 and <u>10</u> points.	1,2,3,4
functional status		
ADL-activities	score between 0 and 5 points with regard to the independent performance of 5 activities: rising from the bed, bathing, dressing, using a normal toilet, and walking stairs.	1,2,3,4
household activities	score between 0 and 5 points with regard to the independent performance of 5 activities: laundering, cooking, shopping, making beds, and mopping and washing windows.	1,2,3,4
well-being	subscales morale and optimism (6 and 7 items, score 0- <u>20</u> points each) of a more extended Dutch scale for well-being (Tempelman 1987).	4
mental status		
loneliness	loneliness scale (11 items, score 0-11 points) (de Jong-Gierveld and Kamphuis 1985).	4
depressive complaints	abbreviated version (4 items, score 4-16 points) of Zung's self-rating depression scale (Zung 1965).	4
memory disturbances	short version (5 items, score 0- <u>5</u> points) of the Abbreviated Mental Test (Qureshi and Hodkinson 1974).	4

* The underlined scores indicate the most favourable score on the specific scale.

** 1 = postal questionnaire at the start of the study;

2 = postal questionnaire after 1.5 years;

3 = postal questionnaire after 3 years;

4 = interview after 3 years.

Primary outcome measures that we thought too difficult to measure in a postal questionnaire (well-being and indicators of mental status) were measured during the final interviews. Often, these characteristics are measured using extensive scales; more than 20 items to measure one characteristic is not an exception. We thought it to be too time-consuming and strenuous for the subjects to measure all

characteristics with elaborated scales, as we strove for an average interview of 90 minutes. Moreover, there appeared to be some overlap between the items of the various scales, for instance between the scales for depressive complaints and well-being. Therefore, we decided to use or construct abbreviated versions of some scales.

On the basis of data gathered in a comparable population of elderly people living at home (Frederiks 1990), we selected those 4 items of the original 20 items of Zung's self-rating depression scale (Zung 1965) which had the highest correlations with the total score. In the same way 5 items of the Abbreviated Mental Test were selected to measure memory disturbances; the original scale contains 10 questions (Qureshi and Hodkinson 1974). Loneliness and well-being were measured using two Dutch scales (De Jong-Gierveld and Kamphuis 1985, Tempelman 1987). With respect to well-being we selected two subscales ('morale' and 'optimism') from the original five subscales. We thought that the other three subscales were already covered in the interview ('health' and 'social contacts') or were too difficult for the participants to answer ('self-respect').

All subjects, i.e. those still living at home as well as those who were institutionalized during the intervention period, were included in the measurements. If the home visits prevented institutionalization, more subjects with functional incapacities in the visited group would still be living at home after three years, whereas persons in the control group with a comparable functional status would have been institutionalized in the meantime. As a consequence, outcome measurements restricted to subjects still living at home would lead to biased effect estimates.

Data analysis

During the intervention period no separate analyses were performed for the two groups, to prevent the researchers and nurses from influencing the intervention process by knowing interim results. Therefore, all data were analyzed after the final interview. Analyses were performed on the basis of a protocol and according to the 'intention-to-treat' principle.

For the outcome measures recorded at baseline as well as during follow-up (self-rated health and functional status), we computed the difference between the follow-up score and the baseline score. In this way the groups could not only be compared for differences in their mean scores at the follow-up measurements, but also for their mean improvement or deterioration scores. With regard to the outcome measures for which baseline information was lacking (well-being and the measures of mental status) only differences between the two groups in the scores after three years could be calculated.

One-way analysis of covariance (ANCOVA) was performed for each outcome measure, adjusting the estimated differences in the mean scores for small prognostic differences between the two groups at the start of the experiment. However, this adjustment did not change the estimates (or their precision intervals) of the group differences. Hence, we only present the unadjusted estimates with their 90% precision intervals (PI). Finally, a survival analysis was performed on the mortality data, using Cox' proportional hazards model.

Results

In presenting the results, mortality will be considered first, because large differences in mortality between the groups might influence the results on the other outcome measures. After that, the results on self-rated health will be reported. The next section deals with functional status, as well as some other indicators for physical health. Thereafter, we will look at the effects of the home visits on well-being, loneliness and the mental status of the subjects (depressive complaints and memory disturbances). Finally, the effects within particular subgroups of the study population will be briefly presented.

Mortality

Table 3 shows the mortality rates for the two groups during the intervention period. No substantial differences in mortality between the groups were found. After the first year 5% of the visited subjects and 6% of the participants in the control group had died. After two years this was 11% for both groups. Although twice as many subjects in the control group died in the final year (18 versus 9 subjects in the intervention group), the differences at the end of the study still were not very large. After three years, 42 subjects in the intervention group (14%) had died, compared to 50 in the control group (17%).

Table 3. Cumulative mortality in the intervention and control groups over 3 years.

year	intervention group (n=292)	control group (n=288)
0.5	6 (2%)	8 (3%)
1	15 (5%)	16 (6%)
1.5	26 (9%)	24 (8%)
2	33 (11%)	32 (11%)
2.5	39 (13%)	41 (14%)
3	42 (14%)	50 (17%)

Not surprisingly, further analysis of the data using Cox' proportional hazard model showed no substantial differences in mortality. The hazard ratio, which can be interpreted as a relative risk, was 1.2 (90% PI from 0.9 to 1.7). Considering the small overall differences in mortality between the two groups, it is not likely that mortality influenced the results on the other outcome measures.

As we found a positive trend in mortality in the last year of intervention, there might have been more pronounced differences if the intervention period had been longer. However, mortality data that we gathered during the six months period after the end of the intervention period refute this argument. During this period 14 subjects died in the intervention group, compared to 7 in the control group. Thus, after three and a half years, 56 visited subjects (19%) and 57 subjects in the control group (20%) had died.

Self-rated health

As stated before, self-rated health refers to a mark between 0 (poor health) and 10 points (excellent health), which the elderly gave in rating their own health status. Table 4 presents the average scores on self-rated health for the two groups as measured by means of the three postal questionnaires and during the interviews.

The left half of the table shows the mean scores on self-rated health at the start of the study, after 1.5 years, and after 3 years. The right half shows the mean change in score over time for each group. The change in score was calculated for each participant by subtracting the baseline score from the score on the postal questionnaire halfway through and at the end of the study. A similar calculation for the 'interview-score' and baseline score was not performed, because the two scores were obtained using different methods of data collection.

Table 4. Mean scores and mean changes in scores on self-rated health in the intervention and control groups (90% precision intervals).

	mean scores			mean changes in scores		
	intervention group	control group	difference (90% PI)	intervention group	control group	difference (90% PI)
start	7.2	7.2	0.0 (−0.2, 0.2)			
1.5 years	7.2	7.1	0.1 (−0.2, 0.4)	−0.2	−0.3	0.1 (−0.1, 0.3)
3 years	6.9	6.8	0.1 (−0.2, 0.4)	−0.4	−0.6	0.2 (−0.1, 0.5)
3 years (interviews)	7.0	7.1	−0.1 (−0.2, 0.4)			

We could find hardly any differences in self-rated health between the two groups. On the scale from 0 to 10 points, the visited group scored only 0.1 point better than the control group, both after 1.5 years and at the end of the study. Similar results appeared when the changes in scores over time were considered. During the interviews the subjects in both groups rated their health status slightly better than in the postal questionnaire. This is probably due to interviewer effects.

At first sight the mean scores and the mean changes in scores over time do not seem to relate logically. For instance: the intervention group scored an average of 7.2 points at the start, as well as after one and a half years. During this period, however, their score deteriorated by an average of 0.2 points. This discrepancy is caused by the fact that the change in score could only be calculated for those subjects who participated in both measurements. The subjects who died during this period probably decreased the baseline score within the group, whereas these subjects did not contribute to the average score halfway the intervention period. Hence, to obtain a better insight into the changes in scores over time, we restricted a second analysis to subjects with valid scores on all three postal questionnaires. This additional analysis did not show any substantial differences in favour of the intervention group either.

Halfway through and at the end of the study we asked the participants whether their health status, in their own opinion, had improved or deteriorated compared to the situation at the start of the study. No differences between the two groups were found in this respect. Neither were there any differences between the groups in the subjects' opinions about the extent to which they could influence their health status. In both groups, 65% of the subjects thought that they had a great or very great influence on their health status. Only a minority of the subjects in the two groups, 14% of the visited 12% of the non-visited subjects, thought that they had little or no influence on their health status.

Functional status

The data on functional status (ADL and household activities) were analyzed in the same way as those on self-rated health. Table 5 shows the mean scores in the two groups at the start, after 1.5 years and after 3 years, as well as the mean changes in scores over time. The differences in scores refer to the intervention group. A negative difference means that the visited group had a lower, and thus a more favourable score compared to the control group. A positive difference, on the other hand, indicates a better score for the control group.

Like the results on self-rated health, there appeared to be hardly any differences in functional status between the two groups. The small differences that we found were not even in favour of the intervention group.

Table 5. Mean scores and mean changes in scores on functional status (ADL and household disabilities) in the intervention and control groups (90% precision intervals).

	mean scores			mean changes in scores		
	intervention group	control group	difference (90% PI)	intervention group	control group	difference (90% PI)
ADL disabilities						
start	0.1	0.2	-0.1 (0.0, 0.2)			
1.5 years	0.3	0.3	0.0 (-0.1, 0.1)	0.2	0.2	0.0 (-0.1, 0.1)
3 years	0.6	0.5	0.1 (0.0, 0.2)	0.4	0.3	0.1 (0.0, 0.2)
3 years (interviews)	0.5	0.5	0.0 (-0.2, 0.2)			
household disabilities						
start	1.5	1.6	-0.1 (-0.1, 0.3)			
1.5 years	2.0	2.0	0.0 (-0.3, 0.3)	0.6	0.4	0.2 (0.0, 0.4)
3 years	2.2	2.3	-0.1 (-0.2, 0.4)	0.8	0.7	0.1 (-0.1, 0.3)
3 years (interviews)	2.0	2.0	0.0 (-0.3, 0.3)			

Note: Scores for both the ADL and household activities range from 0 (no disabilities) to 5 points (completely dependent).

Although the ADL score is a well-known measure of functional status, it is not a very sensitive one for intervention studies among elderly people living at home. A large proportion of this population can perform these activities independently, which is reflected by the low average scores on the 5 activities presented in table 5. Therefore, the final interview also inquired about some other, physically more difficult activities, such as walking outside for 15 minutes, cycling, and tending the garden. It turned out that the two groups did not differ with regard to performing these more complex activities either.

The scale for household activities is more suitable for differentiating between persons with various levels of functional incapacities. One could argue, however, that questions on household tasks in this age group are more valid for women than for men. Traditionally, household tasks are performed more often by women. Consequently, limitations in performing these tasks among older men are more difficult to interpret: do they indicate that the men are no longer physically able to perform these tasks or have they simply never learned to do so? Even if the latter is

true, however, these are still limitations for which support is needed (and therefore they are of importance for the intervention). In any case, we performed additional analyses on household disabilities for men and women separately. It turned out that the visited elderly women scored slightly better on household limitations after three years, whereas no differences were found in favour of the visited elderly men.

In addition to questions on functional status, the interviews also included questions on existing health complaints over the last six months, such as headaches and shortness of breath. Additional questions dealt with falls during the last six months, problems of equilibrium, sleeping problems, and hearing and sight problems. We were unable to find any differences between the two groups with respect to these health aspects. By way of illustration the results with regard to four health complaints are presented in table 6.

Table 6. Health complaints over the last six months of the study in the intervention (n=232) and control (n=221) groups.

health complaint	group	frequency of complaint			
		(almost) never	sometimes	often	deceased*
headache	intervention	177 (65%)	35 (13%)	20 (7%)	41 (15%)
	control	176 (65%)	34 (13%)	11 (3%)	48 (18%)
fatigue	intervention	126 (46%)	60 (22%)	46 (17%)	41 (15%)
	control	127 (47%)	60 (22%)	33 (12%)	48 (8%)
irritability	intervention	184 (67%)	41 (15%)	7 (3%)	41 (5%)
	control	173 (65%)	43 (16%)	4 (2%)	48 (8%)
shortness of breath	intervention	167 (61%)	41 (15%)	24 (9%)	41 (15%)
	control	159 (59%)	41 (15%)	21 (8%)	48 (8%)

* The numbers of deceased subjects deviate from those presented in table 3 because one subject in the intervention group and two subjects in the control group died shortly after the interview, but before the intervention period had ended.

Well-being, loneliness and mental status

Finally, we discuss the results with respect to well-being, loneliness and mental status of the subjects. These data were only gathered during the interviews after three years. Two aspects of well-being were measured: morale and optimism. For both aspects the scores range from 0 (very negative) to 20 (very positive). The average scores in the two groups are presented in table 7.

Contrary to our expectations, the intervention group scored slightly lower on morale than the control group. Although the visited group seemed to be slightly more optimistic, the results on the two aspects of well-being do not indicate favourable effects of the intervention.

The average scores on feelings of loneliness, depressive complaints, and memory disturbances are also listed in table 7. Again, we hardly found any differences between the two groups with regard to these measures: the visited elderly people did not seem to be less prone to loneliness or depressive complaints. Neither did they have fewer memory problems.

Table 7. Mean scores on aspects of well-being, loneliness, depressive complaints and memory disturbances in the intervention and control groups (90% precision intervals).

		intervention group (n=232)	control group (n=221)	difference (90% PI)
well-being				
morale	(<u>0-20</u>)	15.1	15.7	-0.6 (-1.4, 0.2)
optimism	(<u>0-20</u>)	11.7	11.5	0.2 (-0.6, 1.0)
loneliness	(<u>0-11</u>)	2.1	1.9	0.2 (-0.2, 0.6)
mental status				
depressive complaints	(4-16)	6.9	6.8	0.1 (-0.2, 0.4)
memory disturbances	(0- <u>5</u>)	4.3	4.4	-0.1 (-0.3, 0.1)

Note: The underlined scores indicate the most favourable score for each scale.

Effects in subgroups

The results on the health-related outcome measures do not indicate positive effects of the home visits, at least not for the study population in general. As a next step, we explored whether particular subgroups of the population did benefit from the visits. We initially restricted these analyses to the effects on the main outcome measures: self-rated health, well-being, functional and mental status, and mortality. Subgroups were formed on the basis of the following five baseline characteristics: age (75-79 and 80-84), gender, composition of household (living alone or with others), disabilities in performing household tasks (0, 1-2, or 3-5 disabilities), and self-rated health (scores between 0-5, or 6-7, or 8-10). Within these subgroups, separate analyses were performed for the visited and non-visited subjects. The ADL score at the start of the study was not included in the analyses, because limitations for these activities were hardly reported.

Table 8 summarizes the results within the subgroups. As our intention was only to explore the effects within subgroups, we simply marked whether there were small differences ('+' or '-') or substantial differences ('++' or '--') between the two groups. We did not test the differences for their statistical significance. The signs in the table refer to the intervention group; when signs are omitted, no differences between the groups were found.

Hardly any differences were found within the two age groups; there is no evidence that (within the limited age range of 75 to 84) 'younger' or 'older' subjects benefit more from the home visits. With respect to gender, it seems that women were more responsive to the visits than men. The visited women scored slightly better on self-rated health and household activities than the women in the control group, and their mortality rates were lower (11% versus 16% after three years). On the other hand, elderly men in the intervention group scored somewhat poorer on household activities and feelings of loneliness than elderly men in the control group.

We expected that differences would especially emerge in the subgroup of elderly people living alone. However, (slightly) positive effects were only found with respect to self-rated health and mortality. No differences in outcomes were found for those participants who did not live alone at the start of the study.

No differences were found either between the visited and non-visited subjects with no or only a few (1-2) household disabilities at the start of the experiment. Although those subjects in the intervention group with more (3-5) disabilities at the

start scored better on self-rated health than comparable subjects in the control group, they scored slightly worse on well-being, loneliness, and depressive complaints.

Table 8. Summary of effects within subgroups of the study population.

subgroup (baseline)	SRH*	HHA*	ADL	well-being	loneliness	depression	memory	mortality
age								
75-79 yrs	+							
80-84 yrs					-			
gender								
men		-			-			
women	+	+						+
composition of household								
alone	+							+
together			+					
household limitations								
0								
1-2	+							
3-5	+			-	-	-		
self-rated health								
0- 5	++	++				+	+	++
6- 7			+					
8-10								

* SRH = self-rated health, HHA = household activities.

Convincing differences in favour of the intervention group were only found in the subgroup of elderly people who rated their health as poor at baseline (scores 0-5, the mean score being 4.7). This subgroup consisted of 57 subjects in the intervention group and 53 subjects in the control group. Within this subgroup, the visited participants scored considerably better on self-rated health and the performance of household activities after 1.5 and 3 years (table 9). Furthermore, fewer subjects in the intervention group had died (24% versus 41% of the control group). Although to a lesser extent, these visited subjects also scored more favourably on depressive complaints and memory disturbances. At the risk of labelling the obvious, these findings were not influenced by a 'regression to the mean' effect.

In view of these findings we also looked at the effects within this subgroup on the other outcome measures. However, no differences were found with respect to, for instance, health complaints, performing more complex physical activities, sight and hearing problems or falls.

As was mentioned above, self-rated health was measured on a scale between 0 and 10 points, analogous to the scale used in the Dutch educational system. In the subgroup analyses (as well as in the stratified randomization procedure), we divided the score into three categories, in accordance with the meaning given to them in our school system. Scores between 0-5, 6-7, and 8-10 points correspond to poor, fair, and good/excellent results respectively. We wondered, however, whether similar

effects could be shown if the category of poor self-rated health was extended to include a score of 6 points. This was not the case: hardly any differences in favour of the intervention group were found within this extended category, neither with respect to the main outcome measures, nor for the other health-related outcome measures. Thus, positive effects were only found for the visited subjects who rated their health status below 6 points. This indicates that the subjects indeed interpreted the scale in accordance with the meaning given to it in our country.

Table 9. Changes in scores after 1.5 and 3 years on self-rated health and household disabilities, separately for subjects who rated their health as poor at baseline (scores 0-5), and for those who were more optimistic about their health status (scores 6-10).

outcome measure		self-rated health 0-5†				self-rated health 6-10†			
		better	same	worse	deceased*	better	same	worse	deceased*
self-rated health									
1.5 years	intervention	48%	25%	8%	19%	25%	28%	39%	8%
	control	37%	27%	12%	25%	21%	30%	43%	6%
3 years	intervention	44%	22%	11%	24%	17%	27%	44%	12%
	control	29%	18%	12%	41%	15%	23%	49%	12%
household disabilities									
1.5 years	intervention	21%	33%	27%	19%	9%	46%	37%	8%
	control	14%	28%	34%	24%	13%	47%	34%	6%
3 years	intervention	20%	32%	24%	24%	8%	40%	40%	12%
	control	12%	16%	32%	40%	12%	37%	39%	13%

† 57 Subjects in the intervention group and 53 subjects in the control group rated their health as poor (scores 0-5) at the start. In both groups, 235 subjects rated their health as fair to good (scores 6-10) at the start.

* Deviations in percentages of deceased subjects are due to missing data on self-rated health and household limitations.

Discussion

One of the aims of preventive home visits is to influence the health status of elderly subjects. Our results do not confirm the presumed benefits, at least not for the study population in general.

The question, of course, is why we could not show any substantial effects, as the experiment was performed under nearly ideal conditions. The intervention group was visited by experienced and highly motivated public health nurses. Besides, the nurses were specifically employed for the research project, so they were not burdened with other nursing tasks. The cooperation of the elderly subjects was quite satisfactory and the number of dropouts was small.

Several explanations for the results can be given. The most obvious explanation is that preventive home visits have no effect on the health status of elderly people living at home. Perhaps this population is in general still 'too healthy' to gain positive effects.

On the other hand, there might be positive effects which we could not demonstrate in our study. One could argue, for instance, that our measurements

were not sensitive enough to reveal relevant effects. However, we do not think that this problem has had an important influence in the study. The results on all outcomes showed no substantial differences between the two groups, whether the outcomes were measured by means of postal questionnaires or during personal interviews, and whether we used a more elaborate index or a direct question to measure the characteristic of interest.

Another explanation could be that the effects differed between the three nurses, for instance because one of the nurses 'did not do her work well', which masked overall differences. This was not the case: we could not find any differences in outcomes between the three groups of visited subjects. Next, 'intervention effects' might have influenced the results. Elderly people in the visited group had regular discussions about their health, and as a result, they may have expressed their health problems more easily than the non-visited subjects. This might have led to relatively poorer scores in the visited group, making existing differences in the health status disappear. Finally, the number of visits per year (at least four) or the duration of the intervention period (three years) may have been insufficient to demonstrate beneficial effects.

In our opinion, however, the most convincing explanation is that preventive home visits do not improve the health status of elderly people in general.

Although the overall results on the health status are somewhat disappointing, they are in partial agreement with the results of the previous experiments. The experiment in Wales showed slightly positive effects on some subjective health measures, but the differences were not very convincing. Recently, the Welsh research team has reported on a new controlled study on this topic among 675 elderly subjects (Vetter et al. 1992). The intervention group was visited by a health visitor at least once a year during a period of four years, while the control group received no visits. Although they merely reported on the incidence of fractures in the two groups, no differences were found in this respect.

The Danish researchers did not publish their results on the effects on the health status, but they told us that they had found no differences in this respect. The striking differences in mortality which were found in the Danish study and, even with a modest intervention, in the urban area of the first study in Wales, were not found in our study. We do not know exactly what caused this discrepancy in results. It might be that our study population had a better health status at the start of the study compared to those in Denmark and Wales. This may have been partly caused by our decision to exclude subjects from the study who were already receiving home nursing care on a regular basis. Besides, in comparison with other Western countries a relatively large proportion of aged persons in the Netherlands is institutionalized (about 7% of persons aged 65 or over live in homes for the elderly, while 2.5% are in nursing homes, CBS 1992, SIG 1991).

The subgroup analyses showed that the visits seemed to have improved the health status of those subjects who rated their health as poor at baseline (scores 0-5 points). No or less convincing evidence was found within other subgroups, such as elderly people living alone, or participants with a less favourable functional status at the start of the study. Self-rated health is known to be related to the various aspects of the health status, such as the number of identified health problems or medical diagnoses, functional status, use of medication, and loneliness (Ferraro 1980, Fillenbaum 1979). Our findings indicate that self-rated health might be considered an

overall expression of the health status, instead of merely being associated with various aspects of health, which has been suggested previously (Tissue 1972).

Obviously, one has to be cautious in drawing conclusions, in view of the limited number of subjects that rated their health as poor at baseline ($n \approx 55$ in both groups). Nevertheless, this finding is promising, and, if true, it has implications for nursing practice: preventive home visits might focuss on a specific category of elderly people, instead of the entire elderly population. In addition, it might lead to a different orientation for preventive programmes for the elderly. In general, the assumption of programmes like the one we studied is that health promotion and advice focussing on healthy subjects can prevent future health problems. Our findings with respect to the effects on the health status suggest a very different idea: preventive home visits are only useful for subjects with a relatively poor health status, and not for healthy subjects. This might lead to a more prominent role of secondary and tertiary prevention, rather than primary prevention. However, a definitive assessment of the merits of preventive home visits also depends on the effects of the visits on the use of health care services. These effects will be presented in chapter 5.

References

- Applegate WB, Miller ST, Graney MJ, Elam JT, Burns R, Akins, DE. A randomized controlled trial of a geriatric assessment unit in a community rehabilitation hospital. *The New England Journal of Medicine* 1990; 322: 1572-8.
- CBS. Statistisch jaarboek 1992. Den Haag: SDU/uitgeverij, CBS-publikaties, 1992.
- Ferraro KF. Self-ratings of health among the old and the old-old. *Journal of Health and Social Behavior* 1980; 21: 377-83.
- Fillenbaum GG. Social context and self-assessments of health among the elderly. *Journal of Health and Social Behavior* 1979; 20: 45-51.
- Frederiks CMA. Zorgbehoefte van en zorgverlening aan ouderen. PhD thesis. University of Limburg, the Netherlands. Maastricht: Datawyse, 1990.
- Hendriksen C, Lund E, Stromgård E. Consequences of assessment and intervention among elderly: a three year randomised controlled trial. *British Medical Journal* 1984; 289: 1522-4.
- Jong-Gierveld J de, Kamphuis FH. The development of a Rasch-type loneliness scale. *Applied Psychological Measurement* 1985; 9: 289-99.
- McEwan RT, Davison N, Forster DP, Pearson P, Stirling E. Screening elderly people in primary care: a randomized controlled trial. *British Journal of General Practice* 1990; 40: 94-7.
- Qureshi KN, Hodgkinson HM. Evaluation of a ten-question mental test in the institutionalized elderly. *Age and Ageing* 1974; 3: 152-7.
- Rossum E van, Frederiks C, Philipsen H, Kil-van Lierop J, Mantel A, Portengen J, Knipschild P. Design of a Dutch study to test preventive home visits to the elderly. *Nursing Research* 1991; 40: 185-8.
- Rubenstein LZ, Josephson KR, Wieland GD, English PA, Sayre JA, Kane RL. Effectiveness of a geriatric evaluation unit. *The New England Journal of Medicine* 1984; 311: 1664-70.
- SIG. Jaarboek verpleeghuizen 1990. Utrecht: SIG, 1991.
- Tempelman CJJ. Welbevinden bij ouderen. Konstruktie van een meetinstrument. PhD thesis. University of Groningen, the Netherlands. Groningen, 1987.
- Tissue T. Another look at self-rated health among the elderly. *Journal of Gerontology* 1972; 27: 91-4.
- Tulloch AJ, Moore V. A randomized controlled trial of geriatric screening and surveillance in general practice. *Journal of the Royal College of General Practitioners* 1979; 29: 733-42.
- Vetter NJ, Jones DA, Victor CR. Effect of health visitors working with elderly patients in general practice: a randomised controlled trial. *British Medical Journal* 1984(a); 288: 369-72.
- Vetter NJ, Jones DA, Victor CR. The effectiveness of health visitors working with the elderly. Final report, volume 1. Cardiff, Welsh National School of Medicine, 1984(b).
- Vetter NJ, Lewis PA, Ford D. Can health visitors prevent fractures in elderly people? *British Medical Journal* 1992; 304: 888-90.
- Zung WWK. A self rating depression scale. *Archives of General Psychiatry* 1965; 12: 63-70.

Chapter 5

Effects of preventive home visits on the use of services by elderly people*

Erik van Rossum,¹ Carla MA Frederiks,¹ Hans Philipsen,² Ko Portengen,³
Jannie Wiskerke,⁴ Paul Knipschild¹

- 1 University of Limburg, Department of Epidemiology
- 2 University of Limburg, Department of Medical Sociology
- 3 Public Health Nurses Association of Limburg
- 4 Public Health Nurses Association of Midden-Limburg

---

* An abbreviated version of the results presented in the chapters 4 and 5 has been submitted for publication.

Summary

The effects of preventive home visits by public health nurses on the use of health care services among elderly people were studied in a controlled experiment. An intervention group ($n=292$) was visited four times a year during a period of three years by experienced public health nurses. A control group ($n=288$) received no home visits. Data on the use of services were gathered concurrently during the intervention period by relevant community and institutional care services.

The use of community care, such as home help and home nursing care, increased slightly in the intervention group. No differences in the contact rate with the GP were found, while more subjects in the control group were referred to hospital outpatient clinics (66% versus 55% in the intervention group). The control group was also more often admitted to the hospital (incidence rate ratio 1.4, 90% precision interval from 1.2 to 1.6), and on average they spent 3.5 more days in the hospital during the three year period (90% precision interval from -0.7 to 7.9). This difference was mainly caused by a reduction in readmissions in the intervention group. No differences were found with respect to longterm institutional care (nursing homes and homes for the elderly). The overall health care expenditures per person in the intervention group exceeded those in the control group with 4%.

More convincing effects of the visits, especially with respect to hospital admissions, were found within a small subgroup of subjects who rated their health status as poor at the start of the experiment ($n\approx 55$ in both groups).

We conclude that the effects on the use of services are not convincing enough to encourage the home visits among the general population of elderly people. They might be useful for subjects with a poor health status, but further research in this respect is needed.

Samenvatting

In een gecontroleerd experiment werd onderzocht of preventieve ouderenbezoeken door wijkverpleegkundigen het beroep op gezondheidszorgvoorzieningen kunnen beïnvloeden. Een interventiegroep ($n=292$) werd gedurende drie jaar om de drie maanden preventief bezocht door ervaren wijkverpleegkundigen. Een controlegroep ($n=288$) ontving geen huisbezoeken. De relevante extra- en intramurale voorzieningen registreerden gedurende de interventieperiode het zorggebruik in beide groepen.

In de interventiegroep werd in het algemeen wat vaker gebruik gemaakt van professionele thuiszorg (o.a. gezinszorg en wijkverpleging). De huisarts werd in beide groepen even vaak geconsulteerd, maar in de controlegroep werden meer ouderen naar de specialist verwezen (66% versus 55% in de interventiegroep). Ouderen in de controlegroep werden ook vaker in het ziekenhuis opgenomen (incidentie rate ratio 1.4, 90% precisie interval van 1.2 tot 1.6), en zij verbleven per persoon gemiddeld 3,5 dagen langer in het ziekenhuis gedurende de interventieperiode (90% precisie interval van -0.7 tot 7.9). Dit verschil kwam vooral tot stand door een reductie van heropnamen in de interventiegroep. Er werden geen verschillen gevonden in opnamen in het verzorgingshuis en verpleeghuis. De totale kosten van het zorggebruik lagen in de interventiegroep per persoon 4% hoger dan in de controlegroep. Effecten van de bezoeken, met name op de ziekenhuisopnamen, kwamen duidelijker naar voren bij ouderen die bij de start van het onderzoek niet tevreden waren over hun gezondheid ($n\approx 55$ in beide groepen).

Geconcludeerd wordt dat de effecten van de preventieve huisbezoeken op het zorggebruik niet voldoende overtuigend zijn voor de gehele populatie thuiswonende ouderen. Mogelijk zijn ze wel zinvol voor ouderen met een minder goede gezondheid; aanvullend onderzoek bij deze categorie ouderen is gewenst.

Introduction

Preventive home visits by public health nurses to elderly people living at home serve various purposes. One is to reduce the risk of institutionalization. The underlying idea is that deterioration of health, and related problems of daily activities, can be prevented by professional advice and (additional) community care.

Two controlled experiments on this topic showed results that were only partly in agreement with this assumption. Hendriksen et al. (1984) performed a controlled experiment in a suburb of Copenhagen among 600 elderly people aged 75 or over. Half were visited four times a year over a period of three years by health visitors, whereas the other half received no home visits. There was a substantial reduction in the number of hospital admissions in the intervention group, and a smaller reduction in admissions to nursing homes. Although home care (home help and home nursing care) had increased at the same time, the medical care costs per subject were considerably reduced.

The other experiment was conducted in both a rural and an urban area in Wales. Vetter and colleagues (1984a and 1984b) selected 600 elderly people (aged 70 or over) in both areas. In this study the intervention group received only two visits in two years. Again, the control groups in both areas received no home visits. The results of the Welsh study were disappointing: the use of home care was higher in the intervention group in the urban area only, whereas no differences in (long term) institutional care were reported for either area.

There are several explanations for the differences in results between the two experiments. An obvious explanation is the discrepancy in interventions: compared to the Danish study, the number of visits in the Welsh study was much smaller. Besides, the studies were conducted in different health care settings.

We performed a new experiment in the Netherlands, with an intervention and follow-up similar to the Danish study, to restudy whether home visits can indeed prevent or postpone institutionalization, and reduce health care expenditures (Van Rossum et al. 1991). Our experiment was conducted in Weert, a town in the south of the Netherlands, and some surrounding villages (60,000 inhabitants); it is an area with both urban and rural characteristics.

This chapter presents the results with regard to the use of health care and welfare services, as well as the costs of the service use.

Methods

Details of the study design have already been discussed in chapter 2 and 3. Therefore, we confine ourselves here to a general outline of the design, and focus on the follow-up and outcome measurements with respect to the use of services.

Study population and contrasted interventions

To select participants for the experiment and to obtain background information on their health status and use of services, a postal questionnaire was sent out to all elderly people in the research area who were living at home and between 75 and 84 years of age ($n=1,545$). Of those respondents who were not receiving home nursing care on a regular basis, and who gave their informed consent to participate ($n=1,036$), 580 subjects were selected for the experiment. These participants were stratified on gender, self-rated health, composition of household, and social class, and then per stratum (based on random numbers generated by computer) randomly allocated to an intervention or a control group. After the randomization, it appeared

that the two groups were comparable as to various aspects of their health status and initial use of services (as far as measured with the postal questionnaire), although the intervention group scored slightly better on functional status.

The subjects in the intervention group ($n=292$) were visited four times a year over a period of three years. The visits were carried out by three experienced nurses who were employed specifically for the study. Each nurse visited the same participants 12 times. If necessary, extra visits could be paid, and the subjects in the intervention group could also contact the nurse by phone every day to discuss problems, or to ask for an extra visit. Seven persons (2%) who had been allocated to the intervention group refused the home visits after randomization.

In general, the visits lasted 45 to 60 minutes. The nurses did not perform physical examinations. Instead, they discussed health topics with the participants, and gave information and advice. If necessary, referrals to other health care and welfare services were made. However, the elderly subjects (or their relatives) had to apply for these services themselves; the nurses only assisted them if the participants were no longer able to do so.

The nurses had their own office and were considered a separate nursing care facility. Referrals during the visits to the home nursing care organization were 'treated' in the same way as referrals to other services. If participants were institutionalized during the intervention period, the visits continued as before.

The subjects in the control group ($n=288$) received no home visits during the intervention period. However, they could use or apply for all the regular services in the area as before.

Follow-up and outcome measurements

In order to gather information on the use of services, we obtained the cooperation of all relevant services for the elderly in the research area. These included the following community care services: home help, meals on wheels, home nursing care, general practice, ambulatory mental health care service, physiotherapy, and (referral to) hospital outpatient clinics.

Data on institutional care were collected with respect to hospital and nursing home admissions, as well as admissions to homes for the elderly. One of the advantages of the research area was its clearly structured system of institutional care. There was one hospital and one nursing home in the area, and three homes for the elderly. Admissions to other hospitals and institutions outside the area were exceptional, but we were able to obtain data on these admissions during interviews with the participants at the end of the intervention period. Besides, the municipalities provided us with information on long term admissions outside the area, as such subjects were removed from their registers.

With the informed consent of the participants, the organizations concurrently registered data on the use of their services by all participants. Data were collected primarily with respect to the frequency and duration of care provided (table 1). If available, we gathered additional information on, for instance, the type of care received and admission diagnoses. To prevent biased outcomes, the organizations were not informed whether participants were receiving preventive home visits or not.

For practical reasons, data on some of the services were gathered in a different way. Information on home nursing care was obtained by the researchers, while data on the use of physiotherapy were gathered with the help of the sick-funds health insurance scheme. This insurance scheme, which is compulsory for (past) employees with incomes below a fixed level, covered 72% of the participants ($n=419$). Key data on hospital admissions were registered by the hospital, while

additional information on these admissions (such as admission diagnoses) was collected afterwards by the researchers. Five of the 31 general practitioners in the area did not participate in the study. In addition, we failed to obtain complete data sets for 32 subjects. As a consequence, information about the contact rate with the general practitioner and referrals to outpatient clinics was restricted to 85% of the participants (n=493).

Apart from the registration by the services, we inventoried contacts with some other community services, such as a chiropodist, during the final interviews with the participants. Furthermore, these interviews were used to record information on medication prescribed, use of aids, and the presence of modifications to the homes. Of the 491 subjects who could be approached, 453 (92%) participated in the interviews (with similar response rates for the two groups).

Table 1. Participating health care services and methods of data collection.

service	intervention group	control group	data collected by	main outcomes
home help	n=292	n=288	service	number of hours home help
meals on wheels	n=292	n=288	service	number of meals delivered
home nursing care	n=292	n=288	researchers	number of contacts with a public health nurse
general practice	n=240	n=253	general practitioners	number of contacts with the general practitioner
ambulatory mental service	n=292	n=288	service	number of contacts
physiotherapy	n=207	n=212	health insurance organization	number of contacts with a physiotherapist
outpatient clinic of the hospital	n=240	n=253	general practitioners	number of referrals to a clinician
hospital	n=292	n=288	service and researchers	number of admissions and hospital days
home for the elderly	n=292	n=288	service	number of admissions and length of stay
nursing home	n=292	n=288	service	number of admissions and length of stay

To see whether the visits reduced health services expenditures, we calculated for each group the costs of service use during the intervention period. The calculation was restricted to the health related costs; others costs, such as additional pensions as a result of (possibly) decreased mortality were not taken into account. In the calculation we used the average total costs per service, which include both the variable costs and the fixed (or overhead) costs. In addition, we used the costs for the specific services in the research area, instead of the average national costs per service. These area-specific costs may differ to some extent from the average national costs, and if so, probably with respect to institutional care in particular.

Although most participating services could provide us with quite detailed information on their costs, we had to estimate the costs for some of the services. With respect to home nursing care, for instance, merely rough estimates presented

in other studies were available as to the total costs per hour and the average time spent on client contacts. As a consequence, we had to use these estimates to calculate the costs of both the use of home nursing care and the home visits.

Due to the Dutch health insurance system, it is hard to specify the costs per contact with the GP. The majority of the study population had a compulsory insurance against medical costs. Under this insurance the GP receives a fixed fee per client, which is independent of the number of contacts with the client. Therefore, we had to approximate the costs per contact.

We registered only referrals by the GP to hospital outpatient clinics. For practical reasons we could not follow the participants at the clinics. Hence, we do not know the subsequent frequency of contacts with the clinicians (and, for instance, additional costs caused by diagnostic procedures). Because of this incomplete information, we omitted these expenditures from the calculation.

Finally, the hospital in the research area could inform us only about their 'all-out' fee per hospital day. Again, we (conservatively) estimated the average additional expenditures per day.

Data analysis

During the intervention period no separate analyses were performed for the two groups. It was only after all the data had been collected that we divided the study population into the intervention and control group. The seven persons in the intervention group who had refused to receive home visits remained in their group.

The proportions of users in the contrasted groups were compared for each service separately. In addition, we calculated the differences between the groups regarding the average frequency and duration of service use per person (e.g., number of contacts with the GP, hospital days). We adjusted these differences for small differences between the groups with regard to their health status at the start of the study and initial use of services (analysis of covariance). However, the adjusted estimates only differed from the unadjusted estimates with regard to the use of home help and meals on wheels. For all other services we therefore present the unadjusted estimates of the differences, with their 90% precision intervals (PI).

Results

Before presenting the results, an outcome presented in chapter 4 (and of importance for the results presented here) is discussed. With respect to mortality, we found only minor differences between the two groups: 14% of the intervention group and 17% of the control group had died during the intervention period. Hence, it is not likely that these small differences substantially influenced the results on the use of services.

First, we present data on community care and, after that, on institutional care. Then, the health services expenditures in the two groups are compared. The next section deals with the results within specific subgroups of the population. We conclude with a discussion of the findings.

Community care

Home help

At the start of the experiment an equal number of subjects (18%) in both groups received home help (table 2). During the intervention period a slightly larger proportion of the visited participants used home help: 35% versus 31% of the control group (90% PI for difference from -2% to 10%). The mean number of hours of home

help over the three year period was similar for the users in the two groups (about 515 hours per user). For the two groups as a whole (or the 'total groups'), the number of hours of home help was 180 per person in the intervention group, compared to 159 hours in the control group, a difference of 13%.

Further analysis revealed the usefulness of making a distinction between participants who were already receiving home help at the start of the experiment ('prevalent users') and others. Among the former, the average number of hours of home help was much higher in the intervention group (726 hours versus 629 in the control group). Adjusted for baseline differences, the difference was 68 hours per person over the three year period (90% PI from 17 to 119). Among the others (both new or 'incident users' and non-users), there were no large differences found (about 58 hours per person on average in both groups).

Table 2. Cumulative use of home help in the intervention and control groups.

	intervention group (n=292)		control group (n=288)	
	number of users	number of hours	number of users	number of hours
start	53 (18%)		52 (18%)	
1 year	76 (26%)	17,031	72 (25%)	15,479
2 years	90 (31%)	34,402	82 (29%)	30,693
3 years	101 (35%)	52,529	90 (31%)	45,820
over the three years				
per user		520		509
per person		180		159
'prevalent' users	53	38,453	52	32,727
per user		726		629
difference (90% PI)*		+ 68 (17, 119)		
others	48 (20%)	14,076	38 (16%)	13,093
per user		293		345
per person**		59		56
difference (90% PI)*		+ 8 (-18, 34)		

* The differences in use per person were adjusted for the following baseline characteristics: age, gender, composition of household, functional status (household disabilities), availability of informal care, and initial frequency of received hours of home help. The last characteristic was only included in the analysis with respect to the 'prevalent' users.

** The calculation of received hours of home help among 'the others' includes both the 'incident' users and the non-users. For example: these 'other subjects' in the intervention group received a total of 14,076 hours of home help. Divided by 239 subjects (292 subjects minus 53 'prevalent' users), this means 59 hours on average per person.

Meals on wheels

Two organizations of volunteers in the research area delivered meals at the homes of elderly people, the so-called meals on wheels service. In one of the smaller communities meals were not delivered at home, but elderly people could have a meal at the home for the elderly. Other forms of (more profit oriented) dinner

services, such as special menus for the elderly in restaurants, were not registered during the study.

No differences between the proportions of users in the two groups appeared, neither at the start of the study, nor after three years. In both groups 12% of the participants had used meals on wheels during the intervention period (table 3).

However, an unexpectedly large difference between the two groups was found in the frequency of use. An equal number of subjects in the intervention group received almost 70% more meals than the subjects in the control group (the mean number of received meals per person being 54 and 32 respectively). Again, the overall differences could largely be explained by an increased use of this service among the few 'prevalent' users in the intervention group. Adjusted for baseline differences these users received an average of 335 more meals per person compared to the control group (90% PI from 159 to 511). Among the others ('incident users' and non-users), we found no differences (21 meals per person on average).

Table 3. Cumulative use of meals on wheels in the intervention and control groups.

	intervention group (n=292)		control group (n=288)	
	number of users	number of meals	number of users	number of meals
start	12 (4%)		8 (3%)	
1 year	17 (6%)	4,274	16 (6%)	2,685
2 years	24 (8%)	9,448	25 (9%)	6,070
3 years	36 (12%)	15,650	33 (12%)	9,224
over the three years				
per user		435		280
per person		54		32
'prevalent' users	12	9,652	8	3,411
per person		804		426
difference (90% PI)*		+ 335 (159, 511)		
others	24 (9%)	5,998	25 (9%)	5,813
per person**		21		21
difference (90% PI)*		0 (-14, 15)		

* The differences in received meals per person were adjusted for the following baseline characteristics: age, gender, composition of household, functional status (household disabilities), availability of informal care, and initial frequency of received meals. The last characteristic was only included in the analysis with respect to the 'prevalent' users.

** See corresponding note in table 2 (use of home help).

Home nursing care

Subjects who were already receiving home nursing care at least once a week were excluded from the study beforehand. Hence, none of the participants used this care on a regular basis at the start of the experiment. Table 4 shows that, as expected, more visited subjects received home nursing care: 45% versus 38% of the control group (90% PI for difference from 0% to 14%). Because the users in the intervention group turned out to have fewer contacts with public health nurses (on

average 29 versus 37 in the control group), the average number of contacts was similar for the total groups.

Physical exercise groups for the elderly were provided by the home nursing care organization. During the final interviews we asked about participation in these programmes, as well as about contacts during the last six months with some other community services. More subjects in the intervention group had participated in physical exercise groups during the last half year of the study (11% versus 5% in the control group, 90% PI for difference from 2% to 10%). No differences were found as to the use of day care services provided by homes for the elderly or volunteers, and contacts with chiropodists.

Table 4. Cumulative use of home nursing care in the intervention and control groups.

	intervention group (n=292)		control group (n=288)	
	number of users	number of contacts	number of users	number of contacts
start	–	–	–	–
1 year	62 (21%)	768	53 (18%)	804
2 years	95 (33%)	2,052	80 (28%)	2,078
3 years	131 (45%)	3,779	108 (38%)	3,947
over the three years				
per user		29		37
per person		13		14
difference (90% PI)				+ 1 (–4, 5)

Use of aids and modifications to the homes

Data collected during interviews at the end of the intervention period showed that more subjects in the intervention group used aids, such as a walking-stick or hearing-aid. The differences were not very large between the two groups in general, but they became more striking if functional status was taken into account (table 5). Among the total groups, for instance, only small differences in the use of a walking-stick appeared (30% of the intervention group versus 27% of the control group), whereas the proportions were 46% and 35% respectively among subjects with functional disabilities (in this case at least two disabilities in performing household activities*).

Modifications to the homes, especially in the bathroom and the toilet, were also more often present in the homes of the subjects in the intervention group. Again, the differences were larger between those participants in the two groups who had functional disabilities.

* The performance of household activities as an indicator of functional status was measured at baseline with the postal questionnaire. On the basis of 5 tasks we computed a score for each participant between 0 (no disabilities) and 5 points (completely dependent).

Table 5. Use of aids and presence of modifications to the home for the total groups, and for those with functional disabilities (percentages).

	total population			population with 2-5 household disabilities		
	intervention group (n=232)	control group (n=221)	difference (90% PI)	intervention group (n=140)	control group (n=132)	difference (90% PI)
use of aids						
walking-stick	30	27	3 (-4, 10)	46	35	11 (1, 21)
hearing-aid	22	17	5 (-1, 11)	25	16	9 (1, 17)
toilet heightened	21	16	5 (-1, 11)	29	18	11 (2, 20)
chair for bathing	20	16	4 (-2, 10)	32	20	12 (3, 21)
portable alarm system	19	13	6 (0, 12)	27	17	10 (2, 18)
medication box	11	6	5 (1, 9)	17	10	7 (0, 14)
modifications to the home						
anti-slip mat in bathroom	68	61	7 (0, 14)	71	62	9 (-1, 19)
special grips in bathroom	60	52	8 (0, 16)	68	54	14 (-7, 21)
no or low threshold	50	49	1 (-7, 9)	49	44	5 (-5, 15)
special grips in toilet	48	40	8 (0, 16)	59	43	16 (6, 26)

Note: Because this information was obtained after three years, the numbers of subjects in the two groups deviate from those at the start of the study.

General practitioner

In the registration of contacts with the general practitioner (GP), no distinction could be made between contacts at the GP's office or at the home of the participant. Neither could we differentiate between emergency calls or 'regular contacts'.

Table 6 shows that nearly all subjects in both groups contacted their GP at least once during the intervention period, the majority of them already in the first year. The contact rates were similar for the two groups (17.4 contacts in the intervention group versus 17.5 contacts in the control group).

Table 6. Cumulative numbers of contacts with general practitioners in the intervention and control groups.

	intervention group (n=240)		control group (n=253)	
	number of users	number of contacts	number of users	number of contacts
1 year	221 (92%)	1,487	220 (87%)	1,676
2 years	229 (95%)	2,890	242 (96%)	3,151
3 years	230 (96%)	4,185	246 (97%)	4,431
over the three years				
per person		17.4		17.5
difference (90% PI)				0.1 (-2, 2)

Information on prescribed medication was not recorded by the GPs, but gathered during the final interviews. At that moment 80% of the intervention group and 76% of the control group used one or more drugs prescribed. The mean number of different drugs (non-users included) was slightly higher in the intervention than in the control group: 2.6 versus 2.4 drugs. No clear differences between the two groups were found in the types of prescribed drugs.

Ambulatory mental service

Only a small minority of the study population received help at home from the ambulatory mental health care service. This service provides treatment for psychiatric disorders. At the start of the study, only two subjects in the intervention group and three subjects in the control group had been in contact with this service. During the intervention period 6% of the visited elderly people ($n=17$) and 4% of the control group ($n=10$) contacted this service. The mean number of contacts appeared to be slightly lower in the intervention group (10 versus 13 per user in the control group).

Physiotherapy

Data on physiotherapy were gathered with respect to 207 subjects in the intervention group (71%) and 212 subjects in the control group (74%). The registration included contacts at the physiotherapist's practice, at the homes of the participants, as well as treatment at the hospital outpatient practice for physiotherapy.

An equal number of subjects in both groups received physiotherapy (31%), but the number of contacts with physiotherapists was considerably higher in the intervention group (table 7). Further inspection of the data revealed, however, that only two subjects in the intervention group (one with 356 and one with 355 contacts during the intervention period) caused the overall difference. If these two participants were excluded from the analysis, the average number of contacts was similar in both groups (26 per person for the users of physiotherapy, and 8 for the total groups).

Table 7. Cumulative use of physiotherapy in the intervention and control groups.

	intervention group ($n=207$)		control group ($n=212$)	
	number of users	number of contacts	number of users	number of contacts
1 year	26 (13%)	684	30 (14%)	536
2 years	45 (22%)	1,482	49 (23%)	1,213
3 years	65 (31%)	2,371	66 (31%)	1,661
over the three years				
per user		37		25
per person		12		8
difference (90% PI)		+ 4 (-2, 9)		

Outpatient clinics

The GPs registered referrals to hospital outpatient clinics. We tried to obtain separate information on incident and recurrent referrals, but we did not succeed in collecting these data from all GPs during the entire intervention period.

In the three months before the start of the experiment, an equal number of subjects in both groups was being treated at an outpatient clinic (table 8). As regards to the various specialisms (table 9), however, more subjects in the control group were at that moment being treated by an internist (20% versus 14% of the intervention group, 90% PI for difference from 0% to 12%).

During the intervention period fewer subjects in the intervention group were referred: 55% versus 66% in the control group (90% PI for difference from 4% to 18%). Note that this difference already emerged in the first year, and thereafter remained constant for the rest of the intervention period.

Table 8. Cumulative number of referrals by the general practitioner to outpatient clinics.

	intervention group (n=240)		control group (n=253)	
	number of subjects	number of referrals	number of subjects	number of referrals
start*	90 (38%)	130	98 (39%)	137
1 year	63 (26%)	91	91 (36%)	135
2 years	105 (44%)	212	137 (54%)	267
3 years	132 (55%)	333	166 (66%)	381
over the three years				
per referred person		2.5		2.3
per person		1.4		1.5
difference (90% PI)				+ 0.1 (-0.2, 0.4)

* The registration of baseline use refers to whether participants were being treated at a clinic during the period of three months before the start of the study.

Because of the baseline difference with respect to internist care, a stratified analysis was performed to see whether this difference influenced the overall proportions of referred persons during the intervention period. It turned out that this was not the case. Among the subjects treated initially by the internist 79% of those in the intervention group (n=27) and 80% of those in the control group (n=41) were referred to one of the outpatient clinics during the three year period. The difference in numbers of subjects referred mainly occurred among those persons who were initially not being treated at the internal medicine clinic: 105 subjects in the intervention group (51%) and 125 in the control group (62%) were referred to one of the clinics (90% PI for difference from 3% to 19%).

As for the frequency of referrals, no differences between the groups were found; the average number of referrals during three years was about 1.4 per person. As regards the various clinics subjects were referred to, the control group was referred more often to the internist (28% versus 23% of the intervention group, 90% PI for difference from -1% to 11%), while no differences were found for the other specialisms.

Table 9. Proportions of subjects in the two groups that were being treated at an outpatient clinic during the three month period before the start of the study ('start'), and that were referred by the GP during the intervention period.

	start		intervention period	
	intervention group (n=240)	control group (n=253)	intervention group (n=240)	control group (n=253)
outpatient clinic				
internal medicine	14%	20%	23%	28%
cardiology	9%	9%	15%	17%
surgery	7%	4%	15%	14%
neurology	3%	2%	8%	11%
ophthalmology	5%	4%	9%	9%
orthopaedy	3%	4%	8%	10%
urology	2%	3%	7%	5%
oto(rhino)laryngology	4%	3%	6%	8%
pulmonology	4%	4%	5%	5%
dermatology	1%	1%	2%	4%
psychiatry	1%	—	2%	—
others	1%	—	2%	2%
total	38%	39%	55%	66%

Note: Some participants visited several outpatient clinics. The percentages for the various clinics may not be added.

Institutional care

Hospital

A small difference appeared between the proportion of subjects in the two groups that were admitted to hospitals: 41% of the intervention group versus 46% of the control group (90% PI for difference from -2% to 12%). It is remarkable that the difference occurred in the first year, while the second and third intervention years did not add to this difference (table 10).

Table 10. Cumulative numbers of hospital admissions and hospital days in the intervention and control groups.

year	intervention group (n=292)			control group (n=288)		
	number of subjects	admis- sions	hospital days	number of subjects	admis- sions	hospital days
1 year	45 (15%)	59	1,318	64 (22%)	88	2,189
2 years	88 (30%)	131	2,971	108 (38%)	188	3,603
3 years	121 (41%)	189	3,838	133 (46%)	253	4,789
over the three years						
per user		1.6	31.7		1.9	36.0
per admission			20.3			18.9
per person		0.6	13.1		0.9	16.6
difference (90% PI)						+ 3.5 (-0.7, 7.9)

The difference in the numbers of admissions increased more gradually. After three years, there were 0.6 admissions per person in the intervention group and 0.9 in the control group. A difference was also found for the number of hospital days. It was already present in the first year and rose to 3.5 days per person after three years (90% PI from -0.7 to 7.9).

The average number of hospital days per admission was the same for both groups (about 20 days on average). Nor did the admission diagnoses provide a clear explanation for the differences in numbers of hospital days, although the control group were admitted more often for a heart disease (22% of all admissions in the control group, versus 16% of the admissions in the intervention group). No differences appeared with respect to the other diagnoses.

Further analysis showed that the overall difference seemed to be mainly due to fewer readmissions in the intervention group. This finding is illustrated in table 11. Among the participants who were admitted only once during the intervention period, no differences were found between the groups, neither with respect to the proportion of subjects admitted, nor in the number of hospital days. The overall difference in hospital days could mainly be attributed to the large difference in the small stratum of subjects who were admitted more than two times during the intervention period. Compared to the intervention group, twice as many subjects in the control group were admitted at least three times during the intervention period (with an average of about 17 days per admission).

Table 11. Hospital days in the intervention and control groups per number of admissions.

	intervention group (n=292)			control group (n=288)		
	number of admissions	number of subjects	admissions	number of subjects	admissions	hospital days
0		171 (59%)	—	155 (54%)	—	—
1		77 (26%)	77	70 (24%)	70	1,701
2		30 (10%)	60	36 (13%)	72	1,227
> 2		14 (5%)	52	27 (9%)	111	1,861

As a next step, we studied differences in the risk of being (re)admitted, adjusting for differences in baseline characteristics and mortality. Due to missing admission and discharge dates for several admissions (all of which took place outside the research area), calculation of the risks using Cox' proportional hazards model resulted in imprecise estimates. As an alternative, the incidence density rate was calculated for each group by dividing the number of admissions by the total number of days the subjects were at risk of being admitted to the hospital (the number of days one was alive minus the days spent in the hospital). The ratio of the two rates, or the incidence rate ratio, which can be interpreted as a relative risk, was 1.4 (90% PI from 1.2 to 1.6).*

* The incidence density rate was 0.000887 for the control group and 0.000651 for the intervention group. The precision interval for the incidence rate ratio was estimated according to the method recommended by Rothman (1986).

This approach accounts for mortality and days spent in the hospital (during which one is not at risk of being admitted), but does not adjust for baseline differences between the two groups. As the ratio was most likely to be biased by the unequal distribution at the start of the study with respect to contacts with the internist, the ratios were calculated separately for those initially treated by the internist and those who were not. It turned out that the ratio among the former was 1.6 (90% PI from 1.2 to 2.4), and among those who were not treated by the internist 1.2 (90% PI from 1.0 to 1.4). This implies that among those subjects who were already being treated at the internal medicine clinic at baseline, persons in the control group had a higher risk of being admitted to the hospital than comparable subjects in the intervention group. For the other subjects only a slightly increased risk for the control group was found.

Homes for the elderly and nursing homes

In the Netherlands two main forms of longterm institutional care for elderly people are available: homes for the elderly and nursing homes. Homes for the elderly provide sheltered residential accommodation. The homes are not primarily aimed at treatment of diseases or intensive nursing care. Nursing homes, on the other hand, are focussed on nursing and medical care for physically or mentally disabled persons.

Contrary to our expectations, an equal number of subjects in both groups were admitted during the intervention period to homes for the elderly ($\approx 6\%$), and to nursing homes (2%). Furthermore, no large differences appeared in the length of stay in either institution (table 12).

Table 12. Cumulative number of admissions to homes for the elderly and nursing homes in the intervention and control groups.

	intervention group (n=292)		control group (n=288)	
	number of subjects	number of months	number of subjects	number of months
home for the elderly				
1 year	6 (2%)	21	4 (1%)	27
2 years	13 (5%)	117	11 (4%)	111
3 years	20 (7%)	284	18 (6%)	241
over the three years				
per user		14		13
per person		1.0		0.8
nursing home				
1 year	3 (1%)	3	—	—
2 years	4 (1%)	25	3 (1%)	9
3 years	7 (2%)	48	5 (2%)	54
over the three years				
per user		7		11
per person		0.2		0.2

Health services expenditures

If home visits influence the use of services, it is important to see whether this leads to a reduction of health services expenditures. Table 13 shows that, from a financial point of view, the visits were not beneficial: the expenditures on service use per person in the intervention group exceeded those in the control group by 4%. Apart from the reduced hospital costs, the 'gains' in favour of the intervention group were only marginal (home nursing care and nursing home). The increased costs in the intervention group with respect to most community services and homes for the elderly balanced the reduction of hospital costs. Thus, taken the additional expenses for the home visits into account, the total expenditures in the intervention group appeared to be slightly higher than those in the control group.

Table 13. Health expenditures in the intervention and control groups (Dutch guilders).

service*	intervention group	control group	difference per person
home help	1,967,603	1,730,439	+ 12%
meals on wheels	132,289	83,117	+ 57%
home nursing care	188,950	197,350	- 5%
GP	104,625	110,775	0%
ambulatory mental health care	42,770	31,039	+ 36%
physiotherapy	94,487	56,427	+ 72%
hospital	1,919,000	2,394,500	- 21%
home for the elderly	673,932	571,893	+ 16%
nursing home	345,600	388,800	- 12%
home visits**			
planned visit	382,375		
extra visits	11,606		
total	5,863,237	5,564,340	
per person	20,080	19,321	+ 4%

* The costs were calculated on the basis of the frequency of service use as presented in this chapter. Therefore, only the expenditures with respect to home help and meals on wheels were calculated on the basis of the frequency of use, adjusted for baseline differences between the two groups.

** The expenses of the home visits include the average time spent by the three nurses in travelling, preparing the visits, and administration.

Note: During the intervention period, the exchange rate for 1 Dutch guilder was approximately 0.29 pound sterling and 0.51 US dollar.

Effects within subgroups

In chapter 4 we could not show any beneficial effect of the home visits with respect to the health status of the subjects. However, the visits seemed to have improved the health status of those subjects who rated their health status as poor at the start of the experiment. Therefore, we were specifically interested in the effects on the use of services within this subgroup, consisting of 57 subjects in the intervention group and 53 subjects in the control group. Table 14 summarizes the proportion and frequency of use in these groups, as well as the average use per person (non-users included).

Table 14. Use of services among the participants in the two groups who rated their health status as poor at the start of the study (scores 0-5).

		intervention group (n=57)		control group (n=53)	
service		proportion of users	frequency of use (mean)	proportion of users	frequency of use (mean)
home help (hours)	start	24 (42%)		18 (34%)	
	3 years	34 (60%)	18,820 (330)	28 (53%)	12,864 (242)
meals on wheels (meals)	start	2 (4%)		3 (6%)	
	3 years	5 (9%)	2,774 (49)	9 (17%)	1,253 (24)
home nursing (contacts)	3 years	34 (60%)	1,233 (22)	27 (51%)	1,122 (21)
GP*:					
– contacts	3 years	42 (96%)	1,015 (23)	46 (96%)	1,039 (22)
– referrals to an outpatient clinic	start	25 (57%)		27 (56%)	
	3 years	27 (61%)	74 (1.7)	38 (79%)	105 (2.2)
ambulatory mental care (contacts)	start	2 (4%)		1 (2%)	
	3 years	9 (16%)	108 (1.9)	1 (2%)	28 (0.5)
physiotherapy* (contacts)	3 years	24 (50%)	1,716 (36)	18 (44%)	595 (15)
hospital (days)	3 years	27 (47%)	1,134 (20)	39 (74%)	2,043 (39)
home for the elderly (months)	3 years	12 (21%)	191 (3.4)	7 (13%)	103 (1.9)
nursing home (months)	3 years	2 (4%)	14 (0.3)	2 (4%)	15 (0.3)

* With respect to the GP, complete records were available for 44 subjects in the intervention group and 48 subjects in the control group. The registration of contacts with physiotherapists related to 48 subjects in the intervention group and 41 subjects in the control group.

As in the total groups, the use of most community services was higher among the visited subjects. However, the differences in the frequency of use with respect to home help, meals on wheels, and physiotherapy were more striking than among the total groups. The intervention group includes the two subjects who together had over 700 contacts with physiotherapists; even when these subjects were excluded from the analysis, still the frequency of contacts was higher in the intervention group (on average 22 versus 15 contacts).

Again, the contact rate with the GP was about the same for both groups, but larger differences were found in the proportion of subjects referred to outpatient clinics (79% of the control group versus 61% of the intervention group, 90% PI for difference from 3% to 33%). Furthermore, the control group was referred more often (2.2 versus 1.7 referrals on average).

Within this subgroup the home visits had large effects on hospital admissions. Far more subjects in the control group had been admitted at least once to the hospital: 74% versus 47% of the intervention group, a difference of 27% (90% PI from 12% to 42%). Furthermore, they were admitted twice as many times during the three year period (1.7 versus 0.8 admissions per person); the incidence rate ratio was 2.2 (90% PI from 1.7 to 3.0). In addition, the control group spent an average of 19 days more in the hospital per person. Thus, almost the entire difference in hospital days for the total groups emerged within this small subgroup. As in the total groups, no differences appeared in the average length of stay per admission.

Table 15. Cumulative numbers of referrals to outpatient clinics and hospital admissions for subjects who rated their health (SRH) as poor at the start of the study (scores 0-5), and for those who perceived their health status as fair to good (scores 6-10).

	first year			second year			third year		
	subjects (%)	referrals (mean)		subjects (%)	referrals (mean)		subjects (%)	referrals (mean)	
referrals to an outpatient clinic*									
SRH poor									
intervention (n=44)	15 (34%)	24 (0.6)		23 (52%)	54 (1.2)		27 (61%)	74 (1.7)	
control (n=48)	23 (48%)	41 (0.9)		35 (73%)	82 (1.7)		38 (79%)	105 (2.2)	
SRH fair/good									
intervention (n=196)	48 (25%)	67 (0.3)		82 (42%)	158 (0.8)		105 (54%)	259 (1.3)	
control (n=205)	68 (33%)	94 (0.5)		102 (50%)	185 (0.9)		128 (62%)	276 (1.3)	
hospital admissions									
	subjects (%)	admissions (mean)	hospital days (mean)	subjects (%)	admissions (mean)	hospital days (mean)	subjects (%)	admissions (mean)	hospital days (mean)
SRH poor									
intervention (n=57)	13 (23%)	17 (0.3)	456 (8)	21 (37%)	37 (0.7)	928 (16)	27 (47%)	47 (1.7)	1,134 (20)
control (n=53)	24 (45%)	39 (0.7)	1,032 (20)	35 (66%)	71 (1.3)	1,599 (30)	39 (74%)	89 (2.3)	2,043 (39)
SRH fair/good									
intervention (n=235)	32 (14%)	42 (0.2)	862 (4)	67 (29%)	94 (0.4)	2,043 (9)	94 (40%)	142 (0.6)	2,704 (12)
control (n=235)	40 (17%)	49 (0.2)	1,157 (5)	73 (31%)	117 (0.5)	2,004 (9)	94 (40%)	164 (0.7)	2,746 (12)

* Complete records with respect to referrals were available for 240 subjects in the intervention group and 253 subjects in the control group.
 Note: The mean number of referrals, admissions, and hospital days were calculated for the total subgroups (both users and non-users).

On the other hand, an unexpected difference was found with respect to long term institutional care. More visited subjects were admitted to homes for the elderly, and the intervention group spent twice as many months in these homes (3.4 versus 1.9 months per person). No differences were found between the groups as regards nursing home admissions.

Notwithstanding the lower number of hospital days in the intervention group, the total health expenditures were about similar per person (36.949 Dutch guilders per person in the intervention group, compared to 37.278 in the control group). This result was generated by the relatively large differences in the use of the other services. For example: the additional costs in the intervention group due to increased use of home help and more admissions to homes for the elderly alone were just as high as the reduced hospital expenditures.

The results for the total groups showed that large differences in referrals to outpatient clinics and hospital admissions already emerged during the first year. On the other hand, table 14 shows that for both services a large part of the overall differences occurred among the small subgroup of subjects who perceived their health to be poor at the start of the study. We therefore studied the data on referrals and admissions over time separately for those who rated their health status as poor (scores 0-5) and for those who were more optimistic about their health status (scores 6-10) at baseline, to see whether differences in favour of subjects with a poor health status were indeed gained right from the start of the experiment (table 15).

This appeared to be the case particularly with respect to hospital admissions: large differences in hospital admissions and days already appeared in the first year among the subjects who rated their health status as poor. Among the 'healthier subjects', hospital admissions were only marginally reduced in the first year, whereas the results were exactly the same for the two groups after three years (40% of the subjects in both groups spent about 2700 days in the hospital). The results with respect to referrals to outpatient clinics also support this explanation, although they were less convincing.

We also calculated the proportion and frequency of service use among other subgroups, based on various strata of baseline characteristics, such as age (75-79), gender, composition of household (living alone or with others), and functional status (0, 1-2, or 3-5 disabilities in performing household tasks). No large differences in service use appeared within most of these subgroups. Only among those subjects with at least three household disabilities (65 subjects in the intervention group and 73 in the control group), the intervention group used community services more often and these subjects spent considerably less days in the hospital (1.171 days or an average of 18 days, compared to 1.923 or an average of 26 days for subjects in the control group).

Discussion

Our study was conducted to see whether we could demonstrate similar effects to those of the Danish experiment, viz. that home visits would increase the use of community care, with a large reduction in institutional care and health care expenditures. Our data are only in partial agreement with the results of the Danish study.

The home visits increased the use of community care only to some extent. More subjects in the intervention group used services focussing on assistance in

daily living conditions (home help and home nursing care). Except for meals on wheels, we could not demonstrate a clear effect of the visits on the frequency of other community care use.

Differences in the frequency of use of home help and meals on wheels mainly appeared among those persons in the intervention group who already used these services at the start of the study. The visiting nurses may have increased the frequency, or prolonged the use among these 'prevalent' users. Thus, if the intervention can be regarded as responsible for the differences in use of these services, the increase is most obvious among subjects who already profited from these services at the start of the study.

No differences were found in the contact rate with the home nursing organization. It is likely that the visiting ('research') nurses contacted their colleagues in the home nursing organization regularly to discuss whether nursing care in the intervention group was still necessary, or should be started. Both factors together might be responsible for our finding that more visited subjects had received home nursing care, while no difference was found in the frequency of contacts.

More subjects in the intervention group used aids, and modifications to the homes were more often present, especially when limitations in the functional status were taken into account. Although no baseline information on this was available, it seems reasonable to assume that at least part of the difference was caused by the visiting nurses.

No large effects could be detected for the use of the ambulatory mental health care service, and similar numbers of persons in the two groups had contacted a physiotherapist. Although the visited subjects were on average treated more frequently by a physiotherapist, these differences appeared to have mainly been caused by only two subjects in the intervention group.

The home visits did not increase the number of contacts with the GP. However, contacts with the GP more often led to referral to an outpatient clinic in the control group. It might be that visited subjects contacted their GP more often for problems that did not yet require referral, because, for instance, related 'psychosocial' problems had already been taken care of with help of the visiting nurses. Without this 'filter function', health problems in the control group may have been offered to the GP in a more complex form, thereby increasing the chance of being referred to a specialist.

Although medication was a fairly frequently discussed topic during the visits (6% of all registered topics, see chapter 3), no differences in medication prescribed were found. This finding does not imply that the nurses had no influence on the use of medication. The results are not only difficult to interpret because of lacking baseline information, but it is also generally difficult to judge whether, for instance, less prescribed medication should be regarded as favourable, if, as in our case, information on the indications for medication and on compliance is lacking.

More substantial differences between the groups were found in hospital admissions and days spent in the hospital. As in the Danish study, it seems that hospital days were 'gained' among the total groups by a reduction of readmissions in the intervention group. To our surprise, however, the large differences already emerged in the first year of intervention. In the Danish study, the reduction in hospital admissions appeared in the second half of the three year intervention period. The Danish researchers explained this as follows: by creating a confidential relationship with the participants in the first part of the intervention period,

interventions on health problems and living conditions became more effective over the years. Plausible or not, this explanation does not fit our data.

Further analyses of both referrals to outpatient clinics and hospital admissions rendered evidence in favour of the opposite explanation. Not only did it turn out that almost the entire difference between the total groups was to be found within the small subgroup of subjects who perceived their health status to be poor at the start of the study, but the differences within this subgroup also emerged during the first year of intervention. Among those subjects in the two groups who perceived their health to be fair to good at the start, no differences in referrals or hospital admissions were found. This could mean that the most striking health problems were accurately assessed and 'handled' by the nurses right from the start, whereas little or no effect could be gained among persons whose general health status was fairly good.

We did not find evidence for the assumption that regular home visits might lead to a reduction in long term institutional care. No differences between the groups were found with respect to the proportions of subjects admitted to a home for the elderly or nursing home, and no clear differences appeared in the length of stay in these institutions.

In general, health problems of applicants to homes for the elderly are less complex than those of applicants to nursing homes, and social factors (e.g. housing conditions and loneliness) play a more important role in the decision to admit them (te Wierik 1991). Therefore, there would seem to be more opportunities for preventing admissions to homes for the elderly. The visiting nurses may indeed have prevented some admissions to these homes. On the other hand, certain admissions may have been stimulated in urgent cases, as indicated by the results among the subjects with poor health at the start of the study. If this is true, it is not surprising that we found no overall differences in admissions to homes for the elderly.

Health problems of elderly people admitted to a nursing home are often so overwhelming that (additional) community care is not sufficient to prevent these admissions. Furthermore, only a small minority of the control group in our study (2%) were admitted to a nursing home. Both factors make it difficult to demonstrate the supposed effects of the intervention on nursing home admission.

In summary, our findings for the total groups are less convincing than those in the Danish study. The visits did not lead to a substantial reduction in institutional care: admissions to long term care facilities were not prevented. Although the visits reduced the numbers of days spent in hospital, this reduction amounted to as little as one day per person per year. Besides, the visits did not lead to reduced health services expenditures.

The Welsh study, using a far more moderate intervention (at least two visits in two years) did not reveal positive effects on the use of services. Other controlled experiments investigating the effects of (medical) screening and follow-up of elderly persons also reported disappointing effects (Tulloch and Moore 1979, McEwan et al. 1990). Despite the findings in the Danish study, we consider our results and the available evidence from other studies not convincing enough to encourage the use of preventive home visits among the general population of elderly people.

Promising, though not entirely consistent, results were found within the subgroup of participants who rated their health status as poor at the start of the study. Among the visited subjects in this subgroup, the use of community care services was considerably increased, while fewer participants were referred to

outpatient clinics. A clear effect could be demonstrated with respect to hospital admissions. The control group spent twice as many days in the hospital, causing a difference which nearly equalled the difference in hospital days for the total groups.

On the other hand, no reduction in long term institutional care was found within this subgroup. On the contrary: more subjects in the intervention group moved to a home for the elderly, and an equal (small) number of participants in the two groups were admitted to a nursing home. Besides, even the large reduction in hospital days did not lead to reduced costs.

The results of a recently published Canadian controlled study among "frail elderly" seem to support the assumption that home visits might be useful for subjects with a poor health status (Hall et al. 1992). The population consisted of elderly subjects (aged 65 or over) admitted to a long term community care programme. In addition to the community care, an intervention group (n=81) received regular home visits by a public health nurse over a period of three years. The control group (n=86) only received the community care they had been admitted to. After three years, 75% of the intervention group were still living at home, compared to 59% of the control group.

Although these results, like our own findings for subjects with a poor (perceived) health status, are promising, the numbers of subjects in both studies were small. Therefore, further research is needed to draw more definite conclusions as to the usefulness of home visits among elderly people with a poor health status.

References

- Hall N, De Beck P, Johnson D, Mackinnon K, Gutman G, Glick N. Randomized trial of a health promotion program for frail elders. *Canadian Journal on Aging* 1992; 11: 72-91.
- Hendriksen C, Lund E, Stromgård E. Consequences of assessment and intervention among elderly: a three year randomised controlled trial. *British Medical Journal*, 1984; 289: 1522-4.
- McEwan RT, Davison N, Forster DP, Pearson P, Stirling E. Screening elderly people in primary care: a randomized controlled trial. *British Journal of General Practice* 1990; 40: 94-7.
- Rossum E van, Frederiks C, Philipsen H, Kil-van Lierop J, Mantel A, Portengen J, Knipschild P. Design of a Dutch study to test preventive home visits to the elderly. *Nursing Research* 1991; 40: 185-8.
- Rothman KJ. *Modern Epidemiology*. Boston/Toronto: Little, Brown and Company, 1986.
- Tulloch AJ, Moore V. A randomized controlled trial of geriatric screening and surveillance in general practice. *Journal of the Royal College of General Practitioners* 1979; 29: 733-42.
- Vetter NJ, Jones DA, Victor CR. Effect of health visitors working with elderly patients in general practice: a randomised controlled trial. *British Medical Journal* 1984(a); 288: 369-72.
- Vetter NJ, Jones DA, Victor CR. *The effectiveness of health visitors working with the elderly*. Final report, volume 1. Cardiff: Welsh National School of Medicine, 1984(b).
- Wierik MJM te. *Verpleeghuisopname. Een onderzoek naar factoren die van invloed zijn op verpleeghuisopname en het verloop daarvan*. PhD thesis. University of Limburg, the Netherlands. Maastricht: Datawyse, 1991.

Chapter 6

Postal questionnaires sent to elderly people living at home: a comparison with results obtained from personal interviews*

Erik van Rossum,¹ Carla MA Frederiks,¹ Hans Philipsen,² Jannie Wiskerke,³
Paul Knipschild¹

1 University of Limburg, Department of Epidemiology

2 University of Limburg, Department of Medical Sociology

3 Public Health Nurses Association of Midden-Limburg

Summary

This chapter reports on the feasibility of using postal questionnaires to obtain information on the health status of elderly people. As a part of this, it compares data gathered by this method with those obtained from personal interviews.

A short postal questionnaire included questions on functional status, self-rated health, informal support, and the use of some community services. It was sent out three times over a three year period. Response rates ranged from 85% at baseline ($n=1,545$) to about 98% at follow-up for a subset of the persons who participated in the baseline measurement ($n=580$).

Information obtained from both postal questionnaires and interviews was available on 426 subjects (average age 81). In general, the agreement between answers obtained by the two methods was fairly good as regards questions on self-rated health and functional status (kappa values ranging from 0.51 to 0.82 for various activities of daily living and household activities). It was found that subjects tended to be slightly more optimistic about their health status during interviews than when they filled out the postal questionnaires. Poorer agreement was found with respect to social contacts and informal support, partly because the questions in the two methods differed.

Although some aspects remain which need further attention, it seems worthwhile to consider the use of postal questionnaires more often for health care research among aged populations.

Samenvatting

In dit hoofdstuk gaan we in op de mogelijkheid om met behulp van een schriftelijke vragenlijst bij ouderen gegevens te verzamelen over hun gezondheid. Voor de beoordeling hiervan worden onder meer de gegevens die met deze methode verzameld werden vergeleken met antwoorden tijdens mondelinge interviews.

Een korte schriftelijke vragenlijst werd in een periode van drie jaar driemaal verstuurd. De lijst bevatte vragen over de functionele status, gezondheidsbeleving, informele zorg en het gebruik van enkele voorzieningen. De response op de enquêtes varieerde van 85% bij de beginmeting ($n=1.545$) tot zo'n 98% bij de vervolgmetingen. Deze laatste metingen betroffen een groep ouderen ($n=580$) die op basis van de beginmeting verder gevolgd werd.

Over 426 ouderen (met een gemiddelde leeftijd van 81 jaar) waren gegevens voorhanden die zowel met de schriftelijke lijst als middels interviews verzameld werden. De antwoorden met de twee methoden verkregen kwamen redelijk goed overeen voor gezondheidsbeleving en functionele status (met kappa waarden tussen 0.51 en 0.82 voor ADL- en huishoudelijke activiteiten). De ondervraagde ouderen bleken tijdens het interview wat optimistischer over hun gezondheid te zijn dan bij het invullen van de schriftelijke vragenlijst. De antwoorden kwamen minder goed overeen bij vragen over sociale contacten en informele hulp. Dit was echter deels te wijten aan verschillen tussen de twee methoden in de formulering van vragen.

Hoewel er nog onderdelen zijn die nadere aandacht verdienen, lijkt het nuttig om het gebruik van schriftelijke enquêtes voor onderzoek naar de gezondheid van ouderen vaker te overwegen.

Introduction

When we decided to use postal questionnaires to gather data on the health status and use of professional and informal care by elderly people living at home, many colleagues were sceptical about the feasibility of this idea. Not many examples were available and despite obvious advantages (data can be gathered within a short time at relatively low costs), data are usually collected by means of personal interviews in this population. Presumed drawbacks of self-administered questionnaires include restrictions as to the information that can be gathered and difficulties that aged persons may experience in completing the questionnaire by themselves. Furthermore, response rates are usually (much) lower compared to those obtained by means of interviews.

We had the opportunity to test whether we had been too optimistic when, as part of the same study, we interviewed persons in their homes shortly after they had completed the postal questionnaire. The questions asked in both methods were partly the same, especially with respect to the functional status of the subjects and their perceived health status. This allowed us to gain more insight into the question whether the two methods yielded similar results.

This chapter discusses the feasibility of a postal survey among an aged population and the consistency of the obtained information compared to that from personal interviews.

Methods

Population and practical procedures

In a controlled experiment, a questionnaire consisting of five pages was sent out three times over a period of three years to an elderly population (aged 75-84) in one of the southern regions of the Netherlands (60,000 inhabitants). The first survey approached all subjects in the area within this age group who were living at home ($n=1545$). Based on this survey, 580 subjects were selected and followed up: they received the questionnaire once again after one and a half years, as well as after three years. In addition to the last postal measurement, the subjects were interviewed in their homes by trained interviewers (van Rossum et al. 1991).

All postal surveys were performed according to the following procedure. The local authorities provided the names and addresses of the subjects, as well as their date of birth and marital status.* In addition, they informed us during the three year period about mortality and removals among the study population. The questionnaires were sent out together with a letter from the mayor, recommending participation to the study, and one by the research team, providing information on the study. A postage free envelope was included for return of the questionnaire. All questionnaires were despatched shortly before the weekend. Elderly persons often receive visits from relatives during the weekend, so these might assist them in completing the questionnaire if necessary.

Information on the study and the telephone number of the research team were disseminated by the local newspapers and cable television. Health care and social services for the elderly in the research area were also informed, because subjects might ask questions on the study during contacts with these services. Furthermore,

---

* Local authorities in the Netherlands keep complete registers of their citizens.

the local associations of aged persons participated in the study. In each neighbourhood, a member of the association acted as a contact person to assist subjects in completing the questionnaire, if necessary. The name and address of this person were included in a separate note in the questionnaire. If possible, his or her name was also published in the local church magazine.

With regard to the measurements at the start of the study and after one and a half years, a reminder letter with a further copy of the questionnaire was mailed to those subjects who had not yet responded after two weeks. After receiving the questionnaire, we checked the age and gender of the respondent. If the questionnaire had not been completed by the correct person, or if (large) parts of the questionnaire had not been filled out by mistake, we contacted the subject by phone. If possible, the questionnaire or the missing parts of it were completed by phone, otherwise a new one was sent out. Although we did not register these phone calls, we estimate that about 5 to 10% of the population was contacted this way.

Within one to two weeks after the final postal questionnaire had been sent out, the subjects were visited by interviewers to make an appointment for the interview. Although time consuming, this approach was preferred to phone calls, in order to increase participation in the interviews. During this contact, it was checked whether the postal questionnaire had been returned, and, if not, the subjects were asked to fill it out before the interview took place. If necessary or requested, an informal caregiver was present during the interview to provide part of the information. This was the case in 36% of all the interviews conducted.

The two methods of data collection after three years were strictly separated: information obtained during interviews was never used to complete data lacking in the postal questionnaire (or vice versa).

Questionnaire and interview scheme

The postal questionnaire contained about 30 questions. In addition to demographic characteristics (age, gender and composition of household), the questionnaire dealt with functional status (activities of daily living and household activities), self-rated health, feelings of loneliness, social contacts, use of some community services (home help, home nursing care and the general practitioner (GP)), and the availability and use of informal support (table 1). Nearly all questions had fixed and precoded answer categories, mostly restricted to 'yes-no'. With respect to social contacts, recent contacts with the GP, and self-rated health, the subjects were asked to fill in a score.

The interview contained additional questions on those aspects of the health status which we thought difficult to measure with the postal questionnaire. Among other things, these aspects referred to well-being, depressive complaints and memory disturbances.

Of the characteristics listed in table 1, questions on functional status, self-rated health, and feelings of loneliness were the same in both methods. With regard to the other variables the formulation of questions differed slightly. These discrepancies will be mentioned in the relevant results sections. Because a comparison of reported contacts with the GP is restricted by differences in the time reference of questions in the two methods, these data were omitted from the analyses.

Table 1. Characteristics and their operationalizations included in the postal questionnaire.

characteristic	operationalization
functional status	
ADL activities	Can you perform the following 5 activities independently: rising from the bed, bathing, dressing, using a normal toilet, climbing stairs. (yes-no)
household activities	Ditto with respect to the following 5 activities: laundering, cooking, shopping, making beds, mopping/washing windows. (yes-no)
self-rated health	- How do you assess your health status at this moment? Could you give a report mark between 0 and 10 for your health status? (0 = very poor health, 10 = excellent health) - Do you consider your health status at present to be better or worse than three years ago? (better, the same, worse, much worse)
loneliness	Do you suffer from feelings of loneliness? (never, sometimes, often)
social contacts	- How often do you receive visits from other people? (average number per week) - How often do you visit other people? (average number per week)
use of community services	- Do you receive home help at least once a week? (yes-no) - Do you receive home nursing care at least once a week? (yes-no) - How many times did you consult your GP over the last three months? (number of contacts)
Informal support	- Do you receive help from your spouse, children, neighbours/friends at least once a week? (yes-no) - Suppose you have the flu and are therefore bed-ridden for a few days. Is there anyone who can take care of you? (no-yes: namely .....)

Data analysis

Differences in observed outcomes between the two methods of data collection were assessed in two ways. First, we simply calculated the proportion of agreement in answers. Because part of this agreement occurs by chance, the kappa statistic was calculated to adjust for chance agreement (Cohen 1960). The value of this coefficient ranges from -1.0 to 1.0, with 0 indicating mere chance agreement. The more kappa approximates 1, the better the agreement. In general (though this is arbitrary) kappa values below 0.40 are considered to represent poor agreement, values between 0.40 and 0.75 fair to good agreement, and values above 0.75 excellent agreement (Fleiss 1986).

For those characteristics measured with ordinal or interval scales, weighted kappa's were calculated using quadratic disagreement weights (Cohen 1968). If, for instance, the scores on self-rated health (measured on a scale between 0 and 10 points) differed by more than one point, disagreement was given more weight than if the scores differed by only one point.

Results

Response and characteristics of the study population

Of the original 580 subjects selected at baseline, 461 persons were still living at home at the end of the study. The response on the postal questionnaires and interviews after three years was quite satisfactory: 97% of the population ($n=446$) returned the questionnaire, whereas only slightly fewer subjects, 93% ($n=426$), participated in the interviews.*

Comparably high response rates were obtained with respect to the postal questionnaires at baseline (to 1,545 subjects) and after one and a half years (to 510 subjects still living at home): 85% and 98% respectively. The high degree of cooperation of the subjects is also indicated by our finding that about 80 per cent of the subjects returned their questionnaire within one week. Only 15% (at baseline) and 5% (after one and a half years) of the returned questionnaires were received after a reminder letter had been sent out.

All subjects interviewed had first completed the postal questionnaire. Thus, information obtained from both methods was available for 426 subjects. The average age of these subjects was 81 (75% aged 78-82 and 25% aged 83-88). As expected, the population consisted of more women than men (59% versus 41%) and almost half of the subjects (46%), a large majority of them women, were living alone.

Table 2. Characteristics of the study population (row percentages).

	age		composition of household		
	78-82	83-88	alone	together	total
gender					
male	136 (78%)	39 (22%)	44 (25%)	131 (75%)	175 (41%)
female	183 (73%)	68 (27%)	153 (61%)	98 (39%)	251 (59%)
total	319 (75%)	107 (25%)	197 (46%)	229 (54%)	426 (100%)

Functional status

With respect to the functional status we asked about the independent performance of 5 activities of daily living (ADL) and 5 household activities (see table 1). We aimed to inventory the ability to perform these activities, rather than whether the subjects actually performed these activities themselves. In this way a clearer understanding of the functional capacities is obtained, because not performing an activity does not necessarily imply a limitation (especially as regards household activities). The introduction to the questions said: "Please answer the following questions as if you were all by yourself; even if you might get some help in performing these activities". For each activity only two answers were precoded in the questionnaire: yes and no. The interview scheme had four answer categories: independent performance, with or without difficulty, and partly or completely

* Shortly after the postal questionnaire had been mailed, 3 subjects died or were institutionalized. Therefore, 458 subjects living at home could be approached for a personal interview.

dependent for the activity. In comparing the answers from the two methods we transformed the interview answers into two categories (independent/dependent).

Table 3 presents the agreement between answers for each activity separately. The figures in the table show the proportion of subjects who gave the same answer in the interview as they had done in the postal questionnaire. For example: of the subjects who in the postal questionnaire reported that they could rise from their bed independently, 100% (416 out of 417 subjects) confirmed this in the interview. On the other hand, of the 9 persons who had indicated disabilities in rising from their bed in the postal questionnaire, only 6 (67%) gave the same answer during the interview. The right-hand column of the table lists the kappa values for the various activities.

Table 3. Agreement between answers on questions with respect to the functional status.

functional status	missing (n)	independent performance		kappa
		yes-yes	no-no	
ADL activities				
rising from bed	—	416 (100%)	6 (67%)	0.75
bathing	—	362 (97%)	47 (89%)	0.82
dressing	1	398 (99%)	14 (61%)	0.67
normal toilet-making	—	409 (99%)	6 (43%)	0.51
climbing stairs	8	342 (98%)	47 (69%)	0.72
household activities				
making beds	2	294 (95%)	73 (64%)	0.63
laundrying	2	210 (91%)	138 (72%)	0.63
mopping/washing windows	4	102 (79%)	230 (79%)	0.53
shopping	3	233 (89%)	133 (83%)	0.71
cooking	4	276 (94%)	99 (78%)	0.73

A fairly good agreement in answers was found with respect to the ADL activities, kappa values ranging from 0.51 to 0.82 for the individual activities. Disagreement was mainly restricted to the (few) subjects who reported disabilities in the postal questionnaire, but did not confirm this during the interview. Although larger differences in answers emerged with regard to the household activities, kappa values still ranged from 0.53 to 0.73.

We calculated a score for each subject for both ADL and household activities by adding one point for each activity that could not be performed independently. Hence, the score ranges from 0 (no disabilities) to 5 (completely dependent).

For 85% of the population similar ADL scores were obtained with both methods of data collection. The unweighted kappa was 0.54, while the weighted kappa was 0.84. This change in kappa value indicates that if differences in scores emerged, the deviation in scores was hardly ever larger than 1 point. Ten per cent of the subjects reported fewer disabilities during the interview than in the postal questionnaire. As a result, the average ADL-score obtained from the interviews was slightly lower (0.34 versus 0.39 reported disabilities in the postal questionnaires).

The majority of the population (about 80%) reported no disabilities in performing ADL activities. If a distinction is made between no disability and at least one disability, the agreement in scores is again satisfactory (table 4).

The scores on household activities showed somewhat greater differences between the two methods. The agreement in scores was 54%, and the unweighted and weighted kappa values were 0.43 and 0.78 respectively. Again, subjects tended to report more disabilities in the postal questionnaire than during the interview (the average number of limitations being 2.1 and 1.9 respectively). This is illustrated in table 4, in which the score is divided into not disabled, moderately and severely disabled (scores 0, 1-2, and 3-5 respectively).

Table 4. Distribution of scores on ADL and household activities (HHA) obtained with postal questionnaires and during personal interviews (row percentages).

	Interview				
	ADL score		HHA score		
postal questionnaire	0	1-5	0	1-2	3-5
ADL score					
0	314 (95%)	16 (5%)			
1-5	23 (26%)	64 (74%)			
HHA score					
0			80 (75%)	24 (22%)	3 (3%)
1-2			34 (24%)	90 (64%)	17 (12%)
3-5			9 (5%)	40 (24%)	119 (71%)

Note: Due to missing data, ADL and HHA scores could not be compared for 9 and 10 subjects respectively.

Self-rated health, feelings of loneliness, and social contacts

In both methods subjects were asked to express their health status on a scale between 0 (poor health) and 10 (excellent health). Because the same rating scale is used in the Dutch educational system to grade test papers, this scale was familiar to the participants.

Subjects turned out to be slightly more optimistic about their health status when asked by the interviewer compared to what they had reported in the postal questionnaire: on average they assessed their health status 0.2 point higher during interviews (7.1 versus 6.9 points). Seventy per cent of the population gave themselves the same score in both methods, whereas 19% reported a less favourable score in the postal questionnaire. The unweighted and weighted kappa values were 0.60 and 0.62 respectively. Table 5 summarizes the agreement in scores. By analogy to the meaning given to the scores in our school system, the score has been divided into poor (0-5), fair (6-7), and good to excellent health (8-10).

The same trend was found for the assessment of the subjects' present health status compared to the status three years ago, as well as for feelings of loneliness. In both cases, more favourable scores were obtained during the interview. For example: with respect to feelings of loneliness, 77% of the population gave the same answer in both methods, whereas 17% of the subjects changed their answer to a more favourable one during the interview.

Table 5. Comparison of scores on self-rated health, obtained with postal questionnaires and during personal interviews (n=407, row percentages).

postal questionnaire	Interview			
	0-5	6-7	8-10	total
0- 5	50 (64%)	21 (27%)	7 (9%)	78 (100%)
6- 7	1 (1%)	148 (83%)	30 (17%)	179 (101%)
8-10	2 (1%)	14 (9%)	134 (89%)	150 (99%)

Questions on social contacts were asked in greater detail during interviews than in the self-administered questionnaires. The interviewers inventoried the average numbers of contacts (visits to and visits from) with children, grandchildren, other family members, and neighbours/friends separately. The questionnaire, by contrast, did not differentiate between these various persons, but simply asked how often they visited other people and received visits on average during a week.

It turned out that the numbers of contacts with other people reported in the questionnaire were lower than those obtained during the interviews, both for visits to other people (average 1.8 versus 2.6 visits) and, more strikingly, as regards visits from other persons (average 2.7 versus 8.8 visits).

Use of community services

A comparison of data collected on the use of community services was restricted to home help and home nursing care. In the postal questionnaires we asked the subjects whether they received home help and/or home nursing care at least once a week. During the interviews it was recorded whether they had used these services during the last six months, one of the answer categories being 'yes, and I am still receiving this care at present'. If we assume that subjects using either or both services received the care at least once a week, a comparison of results becomes possible. Under this assumption the agreement between the answers was quite satisfactory, kappa values being 0.93 and 0.83 for the use of home help and home nursing care respectively (table 6).

Table 6. Distribution of answers to questions on the use of home help and home nursing care obtained with postal questionnaires and during personal interviews (row percentages).

Postal questionnaire	Interview			
	home help		home nursing care	
	yes	no	yes	no
home help				
yes	118 (94%)	8 (6%)		
no	4 (1%)	289 (99%)		
home nursing care				
yes			40 (78%)	11 (22%)
no			3 (1%)	366 (99%)

Note: Due to missing data, answers with respect to the use of home help and home nursing care could not be compared for 7 and 6 subjects respectively.

Informal support

Information on two aspects of informal support was obtained: is this support available if needed, and do subjects actually receive help from other persons in their environment? Again, questions in the interview scheme were more detailed in this respect. With regard to the availability of informal support the postal questionnaire simply asked whether anyone was available to support them if necessary, whereas the interview scheme made a distinction between various types of assistance (for instance ADL and household activities). Possible informal caregivers were also precoded in the interview scheme.

For both aspects of informal support the agreement between the answers turned out to be low (table 7). The availability of this support showed a kappa value of 0.30; the use of informal support one of 0.24. Poor agreement between the answers occurred mainly because a large proportion of subjects who had reported the absence of informal support in the questionnaire stated during interviews that they did have persons in their environment who helped or could help them.

Table 7. Agreement between answers on informal support, measured with postal questionnaires and during personal interviews (row percentages).

Postal questionnaire	Interview			
	availability of informal support		use of informal support	
	yes	no	yes	no
availability of informal support				
yes	347 (97%)	10 (3%)		
no	43 (74%)	15 (26%)		
use of informal support*				
yes			274 (87%)	41 (13%)
no			66 (65%)	36 (35%)

* If informal care was received from the spouse, other family members, or neighbours/friends, this was coded as receiving informal support.
Note: Due to missing data, answers with respect to the availability and use of informal support could not be compared for 11 and 9 subjects respectively.

Discussion

Postal questionnaires can be a useful method of data collection among aged persons. If they are carefully conducted, high response rates and fairly complete data sets can be obtained.

Nearly full participation was obtained in the follow-up surveys (97% and 98%). This cooperation can be partly explained by the fact that the population consisted of subjects who had already participated in the baseline measurement; in this respect, they had already 'proved' to be motivated to participate in the research project. Furthermore, half of the subjects were receiving a nursing intervention programme, which might have increased response rates. However, participation of these subjects was comparable to those in the control group, who did not receive the programme.

An indication of the participation obtainable under 'normal conditions' is given by the baseline measurement, in which 85% of the approached population returned the questionnaire. Roughly the same response rates (ranging from 75 to 85%) were obtained with similar postal surveys among aged subjects in other areas in the south of the Netherlands (Bisscheroux and Frederiks 1984, Rijksuniversiteit Limburg 1987, Frederiks and te Wierik 1988, Schrijnemaekers and Haveman 1992). An extensive survey among persons aged 55-79 in Amsterdam showed lower response rates (59%, van den Bos et al. 1985). In other countries, satisfactory participation of elderly subjects was reported in, for instance, the United Kingdom (Victor 1988, Graham and Firth 1992) and the United States (Gordon and Stokes 1989) with response rates over 80%. These reported response rates in various studies are comparable to those normally obtained with personal interviews.

We tried to increase participation in the study in various ways. Besides informing subjects in covering letters, in which both the importance of participation of the individual subject and the collaboration between municipalities, university and health services were stressed, we disseminated information on the study in the media and among services for the elderly. We considered it crucial to inform key persons of the elderly subjects (children and health workers for instance). Because elderly subjects in general are not very familiar with completing self-administered questionnaires, persons in their environment might encourage and perhaps help them to fill out the questionnaire.

Next to providing information in several ways, the cooperation of the local associations of aged persons has probably increased the response rate. Although the contact persons of these organizations were hardly ever consulted, subjects might have viewed this as an additional supportive (comforting) service. Finally, phone calls in cases where the intended recipient did not complete the questionnaire appear to have helped.

We also contacted subjects by phone if the questionnaire had not been filled out completely. In combination with other details (lay-out of the questionnaire and format of questions) this led to fairly complete data sets. Although data were more often missing from the postal questionnaire than from the interviews, the quantity of missing data was acceptable. The numbers of missing data reported above refer to our third postal measurement. Hence, subjects might have gained some experience in completing the questionnaire. On average, missing values appeared more often in the postal baseline measurement, especially with respect to questions on social contacts, contacts with the GP and informal support.

Obviously, high response rates and fairly complete data sets do not necessarily imply data of high quality. A comparison with results obtained from personal interviews indicate that, for the characteristics measured, agreement in scores between the two methods was in general fairly good. The extent to which agreement was caused by (inevitable) test-retest effects is hard to specify.

The kappa statistic was used as the measure of agreement. Although useful as a summary measure of agreement, one has to be cautious in interpreting kappa values. The unweighted value depends on the number of distinct answer categories and the weighted value is influenced by the disagreement weights applied (de Vet et al. 1990).

If the distribution of scores is extremely unequal, it might, as an alternative, be more useful to look at the agreement for the least reported score. With respect to the ability to perform ADL activities, for instance, it is known that a very large

proportion of subjects living at home are able to perform these activities independently. As such, it might be more instructive to focus on the agreement in answers among those who report disabilities on these activities. We preferred, however, to use one measure of agreement for all the characteristics studied.

It turned out that subjects in general tended to report a somewhat less optimistic picture of their health status in the postal questionnaires compared to that obtained from personal interviews. Among other things, they reported, on average, slightly fewer ADL and household disabilities and a more positive score on self-rated health during interviews.

Disagreement between the answers on those characteristics which were measured in exactly the same way with both methods raises the question which method yielded the most valid (or 'true') answers. To assess this, scores obtained from both methods should either be compared with a reference measurement ('gold standard'), or one of the two methods should be chosen as the reference measurement. For most of the characteristics measured, no objective standards are available. However, one could make assumptions on the reference method of data collection for various characteristics separately. It seems reasonable, for instance, to assume that scores on functional status were more accurately obtained during interviews compared to postal questionnaires, because additional information and instructions could be given by the interviewers (particularly in this study, in which we aimed to measure the functional abilities of subjects instead of the actual performance of daily activities). Any such differences in reported disabilities probably occurred mainly because subjects' answers in the postal questionnaire may have reflected the actual performance of the various activities, despite our introduction to the questions. If this is true, it is not surprising that disagreement emerged more often with respect to the household activities. Performing these activities depends not only on the actual functional abilities, but also on, for instance, the division of tasks between men and women.

With regard to the more subjective measures of health (self-rated health and feelings of loneliness), it is not entirely clear which answer is the most accurate one. Interviewer effects probably led to over-optimistic scores. On the other hand, we do not know to what extent proxies influenced the scores in the postal questionnaires or even filled out questions without discussing them with the elderly subjects. Although proxies were present during 36% of the interviews, their influence will probably have been smaller during the interview than in the postal questionnaire. Several studies showed that proxies (and health care workers) tend to assess the health status and functional abilities of elderly subjects less optimistically than the subjects themselves (Weinberger et al. 1992, Rubenstein et al. 1984, Magaziner et al. 1988, Epstein et al. 1989). Perhaps, 'true' answers on these subjective measures are in between those obtained from the two methods.

Part of the disagreement between answers on the other characteristics measured is probably related to the difference in the extensiveness of the formulation of questions between the two methods, especially with regard to those characteristics for which poor agreement emerged: availability and use of informal support and social contacts. In the interview scheme, more detailed information was gathered on these aspects and possible answer categories were precoded in the scheme. Furthermore, informal support from close persons is often taken for granted, and therefore not reported separately. The same holds for visits received

from other people. For example: daily visits by a child caring for an elderly person are often not seen as help or a social contact. The interviewers were aware of these aspects and did register such support and contacts. Because no instructions in this respect were given in the postal questionnaire, this may have led to an underestimation in the postal questionnaire.

Up to now, postal questionnaires among an aged population have mainly been used as a screening tool in primary health care (Wilcock 1979, Barber et al. 1980, Peach et al. 1980), or to select participants for further research (see for instance Frederiks 1990). Reports in which this was the main method of data collection among elderly subjects are scarce. It seems worthwhile, however, to investigate whether postal questionnaires could take up a more prominent role in health care research among the elderly.

Some aspects which need further attention relate to the quantity of missing data, and the development of 'simple measures' to replace commonly used elaborate indexes for measuring aspects of the (especially mental) health status. In addition, it is not yet clear whether participation in a study decreases with the extension of the number of questions included in the questionnaire. Some studies indicating that a more extensive questionnaire does not render lower response rates than shorter versions are promising in this respect (Victor 1988, van den Bos et al. 1985). Finally, it would be interesting to include a question asking whether subjects were assisted in completing the questionnaire, as this provides information about the extent to (and the domains in which) subjects were helped to fill out the questionnaire.

References

- Barber JH, Wallis JB, McKeating E. A postal screening questionnaire in preventive geriatric care. *Journal of the Royal College of General Practitioners* 1980; 30: 49-51.
- Bisscheroux P, Frederiks CMA. Onderzoek onder ouderen in Geleen. *Eerste verslag van de resultaten van de schriftelijke enquête naar lichamelijke en huishoudelijke invaliditeit en zorgverlening*. Maastricht: Rijksuniversiteit Limburg, vakgroep Epidemiologie/Gezondheidszorgonderzoek, 1984.
- Bos GAM van den, Maas PJ van der, Habbema JDF. Gezondheidsenquête 1983 Amsterdam. Het beproeven van de vragenlijst. Amsterdam/Rotterdam: Instituut voor Sociale Geneeskunde en Instituut Maatschappelijke Gezondheidszorg, 1985.
- Cohen J. A coefficient of agreement for nominal scales. *Educational and Psychological Measurement* 1960; 20: 37-46.
- Cohen J. Weighted kappa: nominal scale agreement with provision for scaled disagreement or partial credit. *Psychological Bulletin* 1968; 70: 213-30.
- Epstein AM, Hall JA, Tognetti J, Son LH, Conant L. Using proxies to evaluate quality of life. *Medical Care* 1989; 27: S91-8.
- Fleiss JL. The design and analysis of clinical experiments. New York: John Wiley & Sons, 1986.
- Frederiks CMA, Wierik MJM te. De validiteit van thuiswonende ouderen in Maastricht. Een inventarisatie met behulp van een postenquête. Maastricht: Rijksuniversiteit Limburg, vakgroep Epidemiologie/Gezondheidszorgonderzoek, 1988.
- Frederiks CMA. Zorgbehoefte van en zorgverlening aan ouderen. PhD thesis. University of Limburg, the Netherlands. Maastricht: Datawyse, 1990.
- Gordon SE, Stokes SA. Improving response rate to mailed questionnaires. *Nursing Research* 1989; 38: 375-6.
- Graham HJ, Firth J. Home accidents in older people: role of primary health care team. *British Medical Journal* 1992; 305: 30-2.
- Magaziner J, Simonsick EM, Kashner TM, Hebel JR. Patient-proxy response comparability on measures of patient health and functional status. *Journal of Clinical Epidemiology* 1988; 41: 1065-74.

- Peach H, Green S, Locker D, Darby S, Patrick DL. Evaluation of a postal screening questionnaire to identify the physically disabled. *International Rehabilitation Medicine* 1980; 2: 189-93.
- Rossum E van, Frederiks CMA, Philipsen H, Kil-van Lierop J, Mantel A, Portengen J, Knipschild P. Design of a Dutch study to test preventive home visits to the elderly. *Nursing Research* 1991; 40: 185-8.
- Rijksuniversiteit Limburg, vakgroep Economie van de Gezondheidszorg en Stedelijke Werkgroep Ouderenbeleid Kerkrade. Ouderenbeleid gewogen. Deel 2: Zorgvraag van ouderen in Kerkrade. Maastricht: Rijksuniversiteit Limburg, 1987.
- Rubenstein LZ, Schairer C, Wieland GD, Kane R. Systematic biases in functional status assessment of elderly adults: effects of different data sources. *Journal of Gerontology* 1984; 39: 686-91.
- Schrijnemaekers VJJ, Haveman MJ. Kwetsbaarheid van en zorggebruik door zelfstandig wonende ouderen in Sittard. *Tijdschrift voor Sociale Gezondheidszorg* 1992; 70: 418-24.
- Vet HCW de, Knipschild PG, Schouten HJA, Koudstaal J, Kwee W, Willebrands D, Sturmans F, Arends JW. Interobserver variation in histopathological grading of cervical dysplasia. *Journal of Clinical Epidemiology* 1990; 43: 1395-8.
- Victor CR. Some methodological aspects of using postal questionnaires with the elderly. *Archives of Gerontology and Geriatrics* 1988; 7: 163-72.
- Weinberger M, Samsa GP, Schnader K, Greenberg SM, Carr DB, Wildman DS. Comparing proxy and patients' perceptions of patients' functional status: results from an outpatient geriatric clinic. *Journal of the American Geriatrics Society* 1992; 40: 585-8.
- Wilcock GK. Use of a self-administered postal questionnaire when screening for health problems in the elderly. *Gerontology* 1979; 25: 345-9.

Chapter 7

Self-rated health as a predictor of mortality among elderly people*

Erik van Rossum,¹ Carla MA Frederiks,¹ Hans Philipsen,² Jannie Wiskerke,³
Alphons GH Kessels,¹ Paul Knipschild¹

1 University of Limburg, Department of Epidemiology

2 University of Limburg, Department of Medical Sociology

3 Public Health Nurses Association of Midden-Limburg

Summary

We studied whether aged subjects living at home, by assessing their own health status, could provide relevant information on their vital status in the future. Data on self-rated health (SRH), as well as some other measures of health, were gathered by means of postal questionnaires among 965 subjects (aged 75-84). Mortality data were registered over a three year period. It turned out that those who rated their health status as poor at baseline had a threefold risk of dying within three years, compared to those who perceived their health to be good. This risk increased to 3.5 (90% precision interval from 2.6 to 4.8) when survival time was taken into account.

We also studied whether, once scores on SRH were known, additional information on some other (more 'objective') measures of health improved the prediction of mortality. A procedure using logistic regression analysis is proposed to study such a prognostic problem for practical purposes. Comparing various models it was found that, once scores on SRH were known, additional information on gender and functional status improved the prediction of mortality. The inclusion of further information on contacts with the general practitioner and the use of some community services did not add to the prediction.

Samenvatting

In een studie bij 965 ouderen (75-84 jaar) onderzochten we in hoeverre een rapportcijfer dat de ouderen zichzelf voor hun gezondheid gaven, sterfte kan voorspellen. Informatie over deze gezondheidsbeleving en enkele andere gezondheidsmaten werd verzameld middels schriftelijke enquêtes. Gedurende drie jaar werd de sterfte in de onderzoekspopulatie geregistreerd. Het bleek dat ouderen die hun gezondheid als slecht ervaarden (rapportcijfer 0-5) een drie keer zo grote kans hadden om binnen drie jaar te overlijden dan degenen die veel positiever over hun gezondheid oordeelden (rapportcijfer 8-10). Dit risico steeg tot 3.5 als rekening werd gehouden met de overlevingstijd (90% precisie interval van 2.6 tot 4.8).

Vervolgens werd onderzocht of de sterfte beter voorspeld kon worden wanneer, naast gezondheidsbeleving, enkele andere (meer 'objectieve') gezondheidsmaten in de analyse betrokken werden. Met behulp van logistische regressie-analyse wordt geïllustreerd hoe een dergelijk prognostisch probleem voor praktische doeleinden onderzocht zou kunnen worden. Op basis van een vergelijking van verschillende modellen bleek dat aanvullende informatie over de functionele status en het geslacht de voorspelling verbeterde. Indien deze drie kenmerken bekend waren, leverde verdere informatie over huisartsconsulten en het gebruik van enkele andere extramurale voorzieningen geen wezenlijke bijdrage meer aan de voorspelling.

Introduction

Self-rated health (SRH) or perceived status of health is a measure that has increasingly been used over the past two decades in research among elderly people. Its popularity stems from several attractive features. SRH is a simple and easily obtainable measure. Many studies have reported strong associations between scores on SRH and indicators of the physical, or 'objective' health status, such as functional status, number of diseases, medical diagnoses, and medication use (see for instance Linn and Linn 1980, Ferraro 1980, Fillenbaum 1979). More importantly, SRH seems to represent a summary expression which incorporates various aspects of health, such as physical and mental status (Tissue 1972, Jylhä et al. 1986). Furthermore, there is evidence that SRH might be a relevant measure in predicting health outcomes in terms of, for instance, mortality (Mossey and Shapiro 1982, Kaplan and Camacho 1983, Kaplan et al. 1988, Idler et al. 1990, Thomas et al. 1992), functional status (Grand et al. 1988), and hospital and nursing home admissions (Weinberger et al. 1986). Other studies, however, have not clearly supported these findings with respect to mortality (Idler and Angel 1990, Lee and Markides 1990) or nursing home admissions (Greene and Ondrich 1990, Wolinsky et al. 1992).

In a three year prospective study among aged people living at home, we measured SRH, as well as some other characteristics, by means of postal questionnaires. Mortality was registered during this period. This allowed us to study the association between SRH and mortality, in order to see whether SRH was indeed an important predictor of mortality. We also wondered whether, once scores on SRH were known, additional information on some other measures of health, such as functional status and use of community services, would lead to a better prediction of mortality.

Methods

A short questionnaire was mailed to all elderly people aged between 75 and 84 ($n=1,545$) living at home in one of the southern regions of the Netherlands (60,000 inhabitants). Those subjects who had not returned the questionnaire within two weeks received a reminder letter and a new copy of the questionnaire. Of the population approached, 1,285 subjects completed the questionnaire. Accounting for subjects who were found to have died or had been institutionalized shortly before the questionnaire was mailed ($n=26$), the response rate was 85%.

The local authorities in the area informed us about the vital status of the participants.* By this, the natural course of mortality within this population could be observed. As part of the study, however, 292 subjects received a nursing intervention programme (van Rossum et al. 1991). In addition, 28 subjects were found to live in a monastery. In our opinion these persons cannot be considered as living at home, because some assistance in daily living (for instance meals) is provided by the monastery. Hence, in view of the research question we excluded 320 subjects for this study and restricted the analyses to the remaining 965 subjects.

The questionnaire contained 27 questions, most of which could simply be answered with 'yes' or 'no'. In addition to SRH, questions were asked on demographic characteristics, functional status, use of certain community services,

---

* Local authorities in the Netherlands keep complete registers of their citizens.

informal support, and social contacts. With respect to SRH we asked the subjects to rate their health status on a scale between 0 (poor health) and 10 (excellent health). This rating scale should be familiar to the subjects, since it is also used in the Dutch educational system to grade test papers. Scores on SRH were trichotomized into scores between 0-5, 6-7, and 8-10 points. By analogy with the meaning given to scores in our school system, these scores correspond to poor, fair and good to excellent health respectively.

Functional status refers to activities of daily living (ADL) and household activities (HHA). For both aspects questions were asked on the ability to perform 5 activities independently.* By adding one point for each activity that could not be performed independently, scores were computed for both ADL and HHA between 0 (no disabilities) and 5 (completely dependent). In addition, scores were calculated for the combined ADL and HHA scale, with scores ranging from 0 to 10 points. The use of community services was restricted to home help or home nursing care (at least once a week), and the number of contacts with the general practitioner (GP) over the last three months. With regard to informal support subjects were asked whether they received, again at least once a week, help from the spouse, other family members, or friends. We also asked whether informal support was available, if necessary. Two questions were included on social contacts (average number of visits per week to other people and number of received visits).

Data were analyzed in several ways. The association between SRH and mortality was calculated first on the basis of the vital status of the subjects after three years. Then survival time was taken into account using Cox' proportional hazards model. The measure of effect obtained from this analysis is the hazard ratio, which can be interpreted as a relative risk. In the next step, the associations between the other baseline characteristics and mortality were studied. Logistic regression analysis was used to investigate the improvement in the prediction of mortality when, in addition to SRH, information on some 'objective measures of health' was used. Details of this approach are described in the results section.

Results

The study population's average age at baseline was 79. Sixty per cent were women and 36% (a majority of them women) were living alone. About 80% reported no ADL disabilities and 33% stated they could perform their household tasks independently. The majority assessed their health status as fair (37%, scores 6-7) to good (40%, scores 8-10). Nearly one in four subjects (23%) reported the use of home help on a weekly basis, whereas 14% received home nursing care.

During the three year period, 187 subjects (19.5%) died, while we were unable to obtain mortality data on seven subjects (0.7%) who moved to another area. It turned out that the proportion of deceased subjects was highest among those who rated their health as poor at baseline: 38% of these subjects had died, compared to 17% and 13% for subjects who rated their health as fair or good respectively. Hence, comparing the worst score with the most favourable yielded a crude risk ratio of 2.9 (38% divided by 13%). Figure 1 shows the proportions of survivors over time for the three SRH scores separately.

---

* Questions on ADL related to: rising from the bed, bathing, dressing, toileting, and climbing stairs. The five questions on performing household tasks related to: laundering, cooking, shopping, making beds, and mopping/washing windows.

Figure 1. Proportions of survivors over time for scores on self-rated health at baseline.

When the crude risk ratio for SRH scores was calculated separately for men and women (again comparing poor health with good health), the ratio was found to be somewhat higher for men: 3.4 versus 2.8 for women. A comparable calculation with respect to the age of the participants showed a higher risk ratio for subjects aged 75-79 at baseline than for those between 80 and 84 (3.1 versus 2.7).

Table 1 shows the results of the Cox' regression analysis which takes survival time into account. Subjects who perceived their health status to be poor at baseline were found to have a 3.5 times increased risk of being deceased after three years compared to those who perceived their health status to be good (90% precision interval (PI) from 2.6 to 4.8). The hazard ratio was still 2.7 when subjects with the worst score were compared with those perceiving their health to be fair (90% PI from 2.0 to 3.6). Participants who assessed their health as fair turned out to have an only slightly increased risk of mortality compared to those with more favourable scores (hazard ratio 1.3, 90% PI from 0.9 to 1.8). Thus, taking the additional information of survival time into account led to a change in the risk ratio from 2.9 (crude risk ratio) to 3.5 when the worst score was compared to the most favourable.

Table 1. Mortality hazard ratios for scores on self-rated health.

self-rated health	coeff	se	hazard ratio	90% PI
fair versus good	0.276	0.206	1.3	(0.9, 1.8)
poor versus good	1.262	0.189	3.5	(2.6, 4.8)

Note: coeff = regression coefficient, se = standard error, 90% PI = 90% precision interval.

The associations between the other characteristics measured at baseline and mortality are presented in table 2. As expected, more men and subjects aged 80-84 were found to have died during the three year period than women and those of a younger age (75-79). No differences in mortality rates were found with respect to

composition of household. Subjects who reported functional disabilities (>2 ADL-HHA disabilities), who used community health services (home help and/or home nursing care), who used informal care, or who did not (or not very often) visit other people were more likely to be deceased after three years than those with more favourable scores on these measures.

Table 2. Associations between baseline characteristics and vital status of subjects after three years (alive or deceased).

baseline characteristic		status after three years			
		alive (n=771)	deceased (n=187)	risk ratio	missing (n)
functional status (ADL-HHA disabilities)	>2	216 (67%)	107 (33%)	3.0	34
	1-2	263 (85%)	41 (15%)		
	0	265 (89%)	32 (11%)		
self-rated health	0-5	125 (62%)	77 (38%)	2.9	100
	6-7	259 (84%)	51 (17%)		
	8-10	302 (87%)	44 (13%)		
number of visits to others per week	0	135 (67%)	66 (33%)	2.8	101
	1-2	338 (82%)	72 (18%)		
	>2	216 (88%)	66 (12%)		
community services:					
- contacts with GP in last 3 months	>2	210 (72%)	82 (28%)	2.0	60
	1-2	314 (85%)	57 (15%)		
	0	202 (86%)	33 (14%)		
- professional care	yes	187 (71%)	75 (29%)	1.8	34
	no	555 (84%)	107 (16%)		
use of informal care	yes	544 (80%)	140 (21%)	1.5	71
	no	174 (86%)	29 (14%)		
age	80-84	230 (75%)	76 (25%)	1.5	0
	75-79	541 (83%)	111 (17%)		
informal care available (if necessary)	no	93 (74%)	32 (26%)	1.4	21
	yes	660 (81%)	152 (19%)		
gender	male	298 (77%)	90 (23%)	1.4	0
	female	473 (83%)	97 (17%)		
number of received visits per week	0	72 (75%)	24 (25%)	1.3	104
	1-2	295 (80%)	72 (20%)		
	>2	318 (81%)	73 (19%)		
composition of household	alone	278 (80%)	69 (20%)	1.1	0
	together	493 (81%)	118 (19%)		

Notes: - Seven subjects who moved to another area during the follow-up period were excluded from the analysis.

- For those variables with more than two answer categories (functional status, SRH, social contacts, and contacts with the GP), the risk ratio was calculated by dividing the proportion of deceased subjects with the worst score by the proportion with the most favourable score.

As a next step we studied whether, once scores on SRH were known, the additional information on some of the other health-related measures improved the prediction of mortality. We considered this to be a prognostic problem, for which the

scores on the health measures provided prognostic information. The discriminative value of this information can be analyzed by the same methods as those commonly used for the evaluation of diagnostic tests.

Logistic regression analysis was used to estimate the probability that subjects were deceased or alive after three years. Just as in a diagnostic test, an appropriate cut-off point can be selected to classify subjects on the outcome of interest (is a person likely to die or survive?). In this case, the cut-off point does not necessarily relate to a score on one specific characteristic. If data on several characteristics are used for the prediction, the cut-off point reflects a specific combination of scores on these characteristics.

Inevitably, though, any choice of a cut-off point leads to misclassification. Its choice therefore depends on the goal of the test. Is the aim to minimize false positive classifications (thereby increasing the prognostic specificity* of the test), or to minimize false negative classifications (thereby increasing the prognostic sensitivity* of the test)? The implications of this choice are interrelated. The choice of the cut-off point influences the proportion of correctly predicted subjects and the sensitivity and specificity of the test. If the sensitivity of the test increases, its specificity decreases, and vice versa.

We first studied the maximum percentage of subjects predicted correctly as being deceased or alive after three years when only information on SRH was available (model 1). Then we looked whether these predictions improved when information was added with respect to gender (model 2), functional status (model 3), recent contacts with the GP (model 4), and use of professional community care (model 5). Gender was included in the analyses as the risk of mortality associated with SRH scores differed for men and women. The other characteristics were selected not only because they were rather strongly associated with three year mortality, but also because they are considered 'more objective measures of health'. We dichotomized the scores on SRH (0-5 and 6-10), functional status (0-2 and >2 disabilities) and contacts with the GP (0-2 and >2 contacts). The data presented in table 2 show that the differences in mortality were small between the intermediate scores and the most favourable scores on these measures (for instance between SRH scores 6-7 and 8-10).

Table 3 presents the results of these analyses. When only scores on SRH were used (model 1), a maximum of 74% of the subjects were correctly predicted as being deceased or alive after three years. When information on gender was added, the percentage increased to 79%, while further information on functional status, contacts with the GP, and use of community services hardly added to the 'maximum prediction'.

Table 3 does not provide insight in the scores, or combination of scores that are associated with an increased predicted probability of not surviving the three year period. In addition, one would like to know the consequences for the sensitivity and specificity when a cut-off point is chosen to divide subjects into two categories (likely to die or likely to survive). Table 4 shows this information, using model 3 as

---

* The prognostic specificity of a test indicates the percentage of subjects who were correctly classified as not developing the disease (in this case as surviving the three year period). The prognostic sensitivity relates to the proportion of subjects who were correctly classified as developing the disease (those who died within the three year period). In the remainder of the text we indicate these parameters as the specificity and sensitivity of a test.

an example. The three characteristics included in this model (SRH, gender and functional status) yield 8 strata of subjects (2×2×2).

Table 3. Maximum proportions of correctly predicted subjects in various models tested.

Model*	Maximum % predicted correctly
1. self-rated health	74%
2. gender added	79%
3. functional status added	80%
4. recent contacts with GP added	80%
5. use of community services added	80%

* Each characteristic listed was added to the previous model. Model 1 included only self-rated health, model 2 contained self-rated health and gender, model 3 self-rated health, gender and functional status, etcetera.

Table 4. Predicted probability of being deceased after three years for the combinations of scores on self-rated health, gender and functional status, and the sensitivity and specificity corresponding to various cut-off points (n=830).

Stratum				predicted probability of being deceased after 3 years	sensitivity	specificity	% of subjects predicted correctly
SRH	gender	funct. status	number of subjects	<i>cut-off point*</i>			
good	female	good	n=302	10%	81%	41%	49%
good	male	good	n=164	13%	69%	63%	64%
good	female	bad	n= 77	21%	59%	72%	69%
bad	female	good	n= 41	23%	54%	77%	72%
good	male	bad	n= 87	26%	41%	86%	77%
bad	male	good	n= 27	29%	35%	89%	78%
bad	female	bad	n= 75	41%	16%	95%	80%
bad	male	bad	n= 57	48%	0%	100%	80%

* The cut-off point can be used to classify subjects into two groups. Subjects with combinations of scores above the lower end of the arrow are predicted to be likely to survive ('good prognosis'), whereas subjects with scores below the lower end of the arrow are predicted to be likely to die ('bad prognosis'). The implications of the various cut-off points for the sensitivity and specificity are marked by the right end of the arrow (→).

Note: SRH = self-rated health; good = scores 6-10, bad = scores 0-5.
Funct. status = functional status; good = 0-2 disabilities, bad = >2 disabilities.

The results show that the predicted probability of dying within three years increases with less favourable scores on the three characteristics. Women who

perceived their health status to be good and who reported no functional disabilities had only a 10% predicted chance to be deceased at the end of the follow-up period, against 48% for men who assessed their health as poor and who had more than two functional disabilities. The three columns at the right of the table show the implications if the information on the three characteristics is used to divide subjects into two categories. If men and women with 'good' scores on both SRH and functional status (the upper two strata) were classified as likely to survive, and subjects with any other combination of scores as likely to die, 64% of the subjects would be correctly predicted. The corresponding sensitivity and specificity would be 69% and 63% respectively. By including other combinations of scores into the category of subjects who are likely to survive, one improves the specificity at the cost of a decreased sensitivity.

The relation between sensitivity and specificity for the various cut-off points in the models tested is illustrated in figure 2 (by means of so-called receiver operator characteristic (ROC) curves). Ideally, both the sensitivity and the specificity of a test are 100%, which is represented by the upper left-hand corner of the figure. The more the curve deviates from this point, the less discriminative the test is. As indicated in table 3, a considerable part of the prediction is established by information on SRH and gender. Including additional information on functional status also improves the prediction to some extent, whereas the curves hardly change when contacts with the GP and use of community services are included as prognostic information.

Figure 2. Relation between sensitivity and specificity in the various models tested.

The data in table 2 showed that subjects who reported more than two functional disabilities had a threefold risk of being deceased after three years compared to those with no disabilities. A similar (crude) risk ratio was found when subjects with poor SRH were compared with subjects who perceived their health status to be good. Because scores on functional status and SRH were also strongly associated (Pearson's $\rho = 0.58$), we wondered whether the results presented in table 3 and figure 2 would change substantially if functional status instead of SRH was the central characteristic of interest in predicting mortality.

When only functional status was included in the regression model, a maximum of 69% of the subjects were correctly classified as being deceased or alive after three years. When information on gender was added, the percentage of correctly classified subjects increased to 75%. Adding the other characteristics to the model (SRH, recent contacts with the GP, and use of community services) naturally led to the same results as models 3 to 5 in table 3.

Discussion

The main goal of this study was to see whether aged persons, by assessing their own health status, could provide relevant information about their vital status in the future. It turned out that they were indeed able to give a fairly good estimate of 'their prognosis': subjects who rated their health status as poor at baseline had an almost threefold risk of dying within three years, compared to subjects who perceived their health to be good. When survival time was taken into account, the risk of mortality for those with a poor health status increased to 3.5. Other studies have reported crude risk ratios between 2.0 and 3.5 for various follow-up periods (Mossey and Shapiro 1982, Kaplan and Camacho 1983, Kaplan et al. 1988, Grand et al. 1990, Ho 1991, Thomas et al. 1992). Comparison with some of the previous studies is hampered by the fact that only risk ratios adjusted for other health measures were presented (Lee and Markides 1990, Idler et al. 1990, Idler and Angel 1990).

In answering the main research question, we did not adjust the estimated association between SRH and mortality for the influence of other baseline characteristics. In contrast to etiologic studies, adjusting the association of interest is not a major issue in prognostic studies. In predicting health outcomes, one aims to optimize the available information, instead of identifying the specific contribution of one factor while adjusting for other factors. In health care practice one also has to deal with information that is not adjusted for other influences.

Although decisions on the need for adjustment depend on the goal of the study, one has to be particularly careful in adjusting SRH scores for other health measures. SRH aims to be an overall expression of various health aspects, such as physical and mental health. Adjusting for these factors easily leads to an 'overcorrection' for, and thus an underestimation of, the influence of SRH.

A second aim of this study was to see whether, once scores on SRH were known, additional information on some other measures of health improved the prediction of mortality. We used logistic regression analysis to explore whether this provided relevant information for practical purposes.

For these purposes one would prefer to use a limited number of easily obtainable characteristics in order to predict relevant health outcomes, such as mortality, dependence on levels of care, and discharge from or admission to institutional care. One of the methods that can be helpful in choosing the optimal set

of characteristics is to study the 'discriminative power' of various models, for which one can look at the relation between sensitivity and specificity in these models.

The advantage of our approach is that insight is obtained into the probability of an outcome that is associated with various combinations of scores on the characteristics included in the model. As was shown, these strata can be ranked with respect to the predicted probability of the outcome of interest. This yields information on, for instance, specific risk groups which may be considered for special attention in order to prevent negative health outcomes.

It is possible, though not necessary, to 'condense' the available information further by, for instance, dichotomizing the information on the characteristics included in the model. If so, the choice of a suitable cut-off point to classify subjects on the predicted outcome of interest depends on the aim of the test. In this, one has to weigh the relevance of the corresponding sensitivity and specificity. In predicting survival one would prefer a conservative approach, giving more weight to specificity than to sensitivity, as one would prefer to avoid, as much as possible, false-negative classifications, i.e. incorrectly predicting that subjects will probably not survive.

In the present study this approach showed that, as expected, subjects who reported no health problems at baseline, or only minor ones, were more likely to survive the three year period than subjects with less favourable scores. It was found that, in addition to scores on SRH, information on gender and functional status improved the prediction of mortality. Including further information on contacts with the GP and the use of community services would not seem to be worthwhile, in view of their marginal contribution to the prediction once data on the other three characteristics are available.

Of the other characteristics recorded at baseline, functional status also turned out to be strongly associated with mortality, as has previously been reported for elderly subjects living at home and for institutionalized elderly people (Warren and Knight 1982, Donaldson and Jagger 1983, Campbell et al. 1985, Grand et al. 1990). In view of the association between scores on functional status and SRH, it was not very surprising that roughly similar results were found when SRH was replaced by functional status in the analyses.

Obviously, the data that we gathered did not produce perfect predictions. However, this was not the main goal of the study. Furthermore, it is generally not an easy task to predict mortality among the aged. On the basis of several studies in which information on many health measures was gathered among large study populations, Deeg (1989) reported that she was unable to explain more than about 20% of the variance in survival time for aged subjects at home.

Nevertheless, the results presented here confirm the presumed relevance of SRH as a predictor of health outcomes among the aged. By simply asking how subjects assess their health status one obtains useful prognostic information. It therefore appears to be an important measure, useful for both health care practice and research among the elderly.

References

- Campbell AJ, Diep C, Reinken J, McCosh L. Factors predicting mortality in a total population sample of the elderly. *Journal of Epidemiology and Community Health* 1985; 39: 337-42.
- Deeg DJH. The feasibility of predicting longevity in the elderly: conceptual and empirical aspects. PhD thesis. Erasmus University, the Netherlands. Delft: Eubron, 1989.
- Donaldson LJ, Jagger C. Survival and functional capacity: a three year follow up of an elderly population in hospitals and homes. *Journal of Epidemiology and Community Health* 1983; 37: 176-9.

- Ferraro KF. Self-ratings of health among the old and the old-old. *Journal of Health and Social Behavior* 1980; 21: 377-83.
- Fillenbaum GG. Social context and self-assessments of health among the elderly. *Journal of Health and Social Behavior* 1979; 20: 45-51.
- Grand A, Grosclaude P, Bocquet H, Pous J, Albarede JL. Predictive value of life events, psychosocial factors and self-rated health on disability in an elderly rural French population. *Social Science and Medicine* 1988; 27: 1337-42.
- Grand A, Grosclaude P, Bocquet H, Pous J, Albarede JL. Disability, psychosocial factors and mortality among the elderly in a rural French population. *Journal of Clinical Epidemiology* 1990; 43: 773-82.
- Greene VL, Ondrich JL. Risk factors for nursing home admissions and exits: a discrete-time hazard function approach. *Journal of Gerontology* 1990; 45: S250-8.
- Ho SC. Health and social predictors of mortality in an elderly Chinese cohort. *American Journal of Epidemiology* 1991; 133: 907-21.
- Idler EL, Angel RJ. Self-rated health and mortality in the NHANES-I epidemiologic follow-up study. *American Journal of Public Health* 1990; 80: 446-52.
- Idler EL, Kasl SV, Lemke JH. Self-evaluated health and mortality among the elderly in New Haven, Connecticut, and Iowa and Washington Counties, Iowa, 1982-1986. *American Journal of Epidemiology* 1990; 131: 91-103.
- Jylhä M, Leskinen E, Alanen E, Leskinen A, Heikkinen E. Self-rated health and associated factors among men of different ages. *Journal of Gerontology* 1986; 41: 710-7.
- Kaplan G, Barell V, Lusky A. Subjective state of health and survival in elderly subjects. *Journal of Gerontology* 1988; 43: S114-20.
- Kaplan G, Camacho T. Perceived health and mortality: a nine-year follow-up of the human population laboratory cohort. *American Journal of Epidemiology* 1983; 117: 292-304.
- Lee DJ, Markides KS. Activity and mortality among aged persons over an eight-year period. *Journal of Gerontology* 1990; 45: S39-42.
- Linn BS, Linn MW. Objective and self-assessed health in the old and very old. *Social Science and Medicine* 1980; 14A: 311-5.
- Mossey JM, Shapiro E. Self-rated health: a predictor of mortality among the elderly. *American Journal of Public Health* 1982; 72: 800-8.
- Rossum E van, Frederiks C, Philipsen H, Kil-van Lierop J, Mantel A, Portengen J, Knipschild P. Design of a Dutch study to test preventive home visits to the elderly. *Nursing Research* 1991; 40: 185-8.
- Thomas C, Kelman HR, Kennedy GJ, Ahn C, Yang C. Depressive symptoms and mortality in elderly persons. *Journal of Gerontology* 1992; 47: S80-7.
- Tissue T. Another look at self-rated health among the elderly. *Journal of Gerontology* 1972; 27: 91-4.
- Warren MD, Knight R. Mortality in relation to the functional capacities of people with disabilities living at home. *Journal of Epidemiology and Community Health* 1982; 36: 220-3.
- Weinberger M, Darnell JC, Tierney WM, Martz BL, Hiner SL, Barker J, Neill PJ. Self-rated health as a predictor of hospital admissions and nursing home placements in elderly public housing tenants. *American Journal of Public Health* 1986; 76: 457-9.
- Wolinsky FD, Callahan CM, Fitzgerald JF, Johnson RJ. The risk of nursing home placement and subsequent death among older adults. *Journal of Gerontology* 1992; 47: S173-82.

Chapter 8

Discussion

This final chapter discusses the findings of our study. A division is made into four sections. In the first section we look back at the ideas behind the preventive home visits and confront these with the results of the study. Do the outcomes support the presumed benefits or do they suggest the need for a modification of the ideas behind the programme? In the next section we examine whether our choices with respect to the study design may have influenced the results (and thus our conclusions as stated in the first section). In this analysis, we focus on the study population, the interventions, the outcome measures and measurements, and the data analysis. In the third section, the results are fitted into the available evidence from other studies on this topic (including several reports that were published after this study had already started). Based on this comparison, as well as on the considerations in the first two sections, we conclude with the implications of our study for nursing practice and future research.

Ideas behind the programme and empirical evidence

It is general believed that the elderly population needs special attention. It is thought that an active community approach is useful in tracing existing, but unknown health problems and risks within this population. If these hidden problems and risks are detected and treated effectively, future health problems and deterioration of prevalent problems may be prevented. Without special consideration for this group, the ageing of the population may lead to a demand for health care resources that will be hard to meet.

This idea was supported by general practice studies in the 1960s and 1970s which reported that medical screening of the elderly population led to the identification of many unknown health problems (Williamson et al. 1964, Fuldauer 1966, Tonino 1969, Huygen 1972, Tulloch and Moore 1979). The beneficial effects of these efforts, however, remained unclear. A large proportion of the (chronic) disorders detected could not be treated effectively. Besides, several studies in the early 1980s argued that the medical disorders of the aged which were presented to general practitioners were only the tip of the iceberg. When elderly non-consulters in general practice were compared with subjects who had recently contacted their GP, no large differences in health status were found between the two groups (Williams 1984, Ebrahim et al. 1984, Williams and Barley 1985).

Because the most important health disorders in the aged consist of chronic diseases, the attention has gradually shifted from the detection of specific diseases to the assessment of the functional abilities of elderly subjects. Preventive home visits by public health nurses reflect this approach. The idea is that it is useful to trace subjects who have no contact with the home nursing care organization. Once these have been traced, repeated assessment of the functional abilities in a broad sense, followed by professional advice and effective referral to other services, is thought to enhance the independent functioning of elderly subjects. Visited subjects are expected to be better off with respect to their health status, and their use of expensive institutional care will be reduced.

The data gathered in this study do not support these presumed benefits of the visits. No effects could be detected as regards the health status of the subjects. This was true for measures of physical and mental health, as well as for more general measures of health and aspects of well-being. Neither was clear evidence obtained that the visits contributed to a reduction of institutional care. Some beneficial effects were found for more specialised forms of care (referral to outpatient clinics and hospital admissions), but the differences per person were not very large over the three year period. No reduction of long term institutional care (nursing homes and homes for the elderly) was found, and the health care expenditures per person had slightly increased in the intervention group.

The results do not show that it is useful to focus this programme on the general population of elderly people living at home. The most convincing explanation for this finding is that the general population of elderly people is 'too healthy' to gain beneficial effects. Moreover, a fairly extensive health care system for the elderly is already available. Both factors would seem to make it difficult for the visits to have a surplus value for subjects whose health status is already fairly good.

Additional analyses showed that the visits seemed to have been effective for subjects with a poor health status at baseline. If this is true, a revision of the original ideas behind the programme is needed. Preventive visits to healthy subjects appear not to be effective, while benefits can only be gained when health problems are already present. Although caution is required in drawing firm conclusions, in view of the relatively small numbers of subjects, the evidence was convincing for several reasons.

A relatively large difference in three year mortality was found in favour of the visited subjects with poor health at baseline. This difference might be expected to be a disadvantage for the intervention group regarding the other (more important) outcome measures. This turned out not to be the case: positive effects were still found, both on the health-related measures and with respect to the use of services. Among other things, this subgroup provided nearly the entire difference in number of hospital days and referrals to outpatient clinics for the total groups.

Secondly, a plausible trend in effects over time was found. For example: differences in hospital admissions already emerged during the first year of intervention, whereas the second and third years hardly added to these differences. It turned out that these benefits in the first year were gained within the subgroup of subjects with poor health. Hardly any differences over time were found for the participants who assessed their health more positively at baseline. This finding indicates that the nurses were able to detect and intervene in the most striking health problems right from the start, and that hardly any effects could be gained among subjects with a (fairly) good health status.

Methodological aspects

Study population

Subjects aged 75-84 who were living at home were eligible for the study. Subjects (and their partners) who received home nursing care at least once a week were excluded from the study. Because these subjects are known to have a less favourable health status, this restriction led to the selection of a more healthy study population. With hindsight, this seems a somewhat paradoxical choice, as the results indicate that the home visits seem to have been effective for those with a poor health status, but not for 'healthy subjects'. Had we known the outcomes of the

study beforehand, we would have included only subjects with a poor health status, instead of excluding some of them from the study.

Nevertheless, there were good reasons for applying this exclusion criterion. In addition to a possible contamination by nursing care beforehand, home visits (at least in the Netherlands) are not aimed at these subjects, but at the population that has no contact with the home nursing care organization. The results show that this is not a useful approach. As such, however, the findings do not affect the internal validity of the study.

One might wonder whether the fairly good health status of the participants (and the social support that seemed to be available for many of them) were related to the specific research area. Would larger effects have been found in other areas? This aspect of the external validity of the study is not a major issue. If the health status and living conditions are about the same in other areas, which seems to be the case for most parts of the Netherlands, similar effects would have been found.

Interventions

The intervention period and frequency of visits were copied from the Danish study (Hendriksen et al. 1984), because these had turned out to be effective (at least with respect to the use of services). Of course, one can only guess at possible effects of a longer intervention period or more frequent contacts with the subjects.

A three year period seemed reasonable for the programme to prove its usefulness. Because no effects were found on most of the outcome measures, neither after 1.5 years nor after three years, it is not very likely that benefits might have appeared in the following years. For those outcomes measures for which it seemed that a prolonged follow-up period might have yielded larger differences between the groups (with regard to, e.g., mortality and hospital admissions), the registration of data was continued for a year after the intervention had ended. Complete data sets are not yet available, but with respect to mortality the numbers of deceased subjects turned out to be similar for the two groups after 3.5 years.

As regards the frequency of visits, four visits a year were scheduled beforehand. As was reported in chapter 3, one out of three subjects in the intervention group received an average of two additional visits. Because in most cases it were the nurses themselves who initiated these extra visits (66% of all extra visits), it seems that those in need of a more intensive follow-up received adequate extra attention.

The home visits were compared with no home visits (i.e., usual care). A disadvantage of this choice was that if positive effects were found, it still remained unclear whether visits by non-professionals might have produced the same effects. Since no convincing benefits for the total population were found, however, it is not likely that (trained) volunteers might have established positive effects. Hence, the study unintentionally provided evidence on both professional and non-professional home visits for the general population of aged persons.

The main difference with the interventions in the Danish study was the structure of the visits. The Danish researchers preferred a more open approach and therefore declined to use a detailed protocol for the visits. We developed some guidelines and instruments to structure the visits to some extent. Although one cannot be sure about this, it does not seem very likely that it was this difference in approach which caused the discrepancy in outcome between the two studies.

Some potential sources of biased outcomes with regard to the interventions are the numbers of drop-outs in the intervention group, contamination of the control group, and differences in the home visits between the three nurses.

The first two sources probably had no substantial impact on the results. The numbers of drop-outs in the intervention group due to other reasons than mortality were small ($n=13$) and nearly all scheduled visits (98%) were carried out by the three nurses. Data collected on the use of home nursing care yielded no indications for a contamination of the control group. Nurses of the home nursing organization were found to have complied with our agreement to pay no unsolicited visits to the participants in either group.

The data gathered on the home visits showed no large differences between the visits by the three nurses. The only difference found concerned referrals to other services. One nurse (with the largest case load) referred more subjects than her colleagues and she referred subjects less frequently to the general practitioner. It is hard to specify the influence of this difference on the results of the study. In comparing the outcomes for the three groups of (randomly allocated) visited participants, however, no differences in outcomes could be detected.

Outcome measurements

We chose to use postal questionnaires to obtain data on the health status of the participants at baseline as well as halfway through and at the end of the intervention period. A clear advantage of this method was that we did not contaminate the control group, as might have occurred if personal interviews had been used. In addition, this allowed a comparison of scores over time on some of the main outcome measures (self-rated health and functional status). Nearly full participation was obtained in the postal follow-up measurements. Chapter 6 has shown that data obtained in this way were of fairly high quality when compared to information gathered by means of personal interviews. Although participants tended to assess their health status slightly less favourably in the postal questionnaire than during interviews, this represented no threat to the internal validity, as data were gathered in the same way for both groups.

The disadvantage of using postal questionnaires at baseline was that no information was recorded at the start with respect to some other primary outcome measures (well-being and mental status). Perhaps we should have been less cautious and included at least some simple questions on these aspects in the postal questionnaires. Few examples were available, however, and we did not want to jeopardize the baseline measurements by experimenting with such questions.

Hence, detailed information on some of the health-related measures was only gathered at the end of the intervention period by means of personal interviews. As far as possible, the interviewers were blinded as to whether the participant had been visited by a nurse or not. Inevitably, some subjects in the intervention group mentioned the home visits at the start of the interview, which, however, probably did not substantially bias the results. It was only after all interviews had been conducted that we informed the interviewers about the actual research question. Up to that point, they were only told that we were interested in the (changes in) health status of elderly people and that part of the population had been visited by public health nurses to gather more detailed information.

Data on the use of services, as well as on mortality, were gathered concurrently during the three year period. The participating services were not informed whether participants were being visited by a nurse or not. Because data in general were

registered by persons who were not involved in decisions on the provision of care, it is not likely that service use was enhanced or hampered in one of the two study groups.

Outcome measures

One of the aims of the intervention was to improve the health status by regular assessment of, and advice regarding the functional abilities of the subjects, including their physical, mental and social functions. Corresponding outcome measures were chosen, such as functional status, depressive complaints, loneliness, self-rated health, and well-being. In more general terms, the visits were expected to enhance the quality of life.

A second goal was to establish a substitution of care: increased community care was expected to lead to a reduction of institutional care. To investigate this, we needed to inventory the proportion of users and their frequency of use with respect to relevant community care and institutional care services. For nearly all services, relevant information on service use was obtained at baseline. Unfortunately, no data were gathered on recent hospital admissions before the start of the experiment. With hindsight, a question on such admissions should have been included in the first postal questionnaire. A limitation of the data gathered on referrals to outpatient clinics was that no distinction could be made between incident and recurrent referrals.

The costs of service use in the two groups were calculated including the fixed (or overhead) costs. It might be argued that these fixed costs are hardly influenced by a (relatively small) change in the number of users or their frequency of use. However, these costs must be taken into account to obtain an impression of the impact of the programme if the visits were to be incorporated into health care on a large scale and over a long period of time. The latter approach was preferred in estimating the effects of the visits on health care expenditures.

Of the health-related measures chosen, the operationalization of well-being and mental status requires some further explanation.

Well-being and mental status

We have not been very orthodox in operationalizing well-being and two measures of mental status. As regards well-being, two of the original five subscales of a Dutch scale for well-being were used. Abbreviated versions of the original scales were constructed for depressive complaints and memory disturbances, on the basis of data gathered in a previous study (Frederiks 1990).

Relevant criteria for the choice of measurement instruments are the validity, consistency, and sensibility of the instrument (Feinstein 1987). We deliberately paid much attention to the latter criterion, which refers to an assessment of, among other things, the purpose of the instrument and the ease with which it can be used. We looked for short instruments, for one thing because we had to take the age of the subjects into consideration. Furthermore, we did not aim to diagnose the participants with respect to depressive complaints and memory disturbances, which in general implies the use of elaborate indexes and trained observers.

Many of the items in the available instruments for measuring depressive complaints resembled those included in the scale for well-being. To avoid the virtual duplication of questions decreasing the well-being of the interviewed subjects, we reduced one of the available instruments (Zung's self-rating depression scale, Zung 1965). There are several short instruments for measuring memory disturbances (see for instance Kahn et al. 1960, Duke University 1978, Folstein et al. 1975, Qureshi and

Hodkinson 1974). From experience with one of these (the abbreviated mental test, Qureshi and Hodkinson 1974), we knew that there were only very few subjects who did not answer correctly questions on, for instance, their date of birth and place of residence. It was often even somewhat embarrassing to administer the complete scale. We therefore decided to reduce the number of (10) items to those five that subjects were most likely to fail.

Of the original five subscales forming the scale for well-being (Tempelman 1987), one subscale ('contacts') was already included in the interview scheme as the scale for loneliness (de Jong-Gierveld and Kamphuis 1985), while the 'health' subscale was sufficiently covered by other questions in the scheme. Of the remaining subscales ('optimism', 'morale', and 'self-respect') the questions on 'self-respect' did not seem to be very appropriate for the population studied. Questions on, for instance, feelings of guilt, being ashamed of oneself, and hating oneself may be of importance to gain insight in someone's well-being, but we felt that elderly people, in general, do not express themselves in these terms.

It is difficult to specify whether and to what extent the validity of the measurements was influenced by the use of these modified scales. If only the original scales measure the characteristics in a valid way, it is obvious that it remains unclear what we measured. However, no gold standard is available for these characteristics. As regards well-being, it seems reasonable to assume that we did not include all relevant indicators of well-being. Hence, it seems more appropriate to assume that only aspects of well-being were measured. With respect to depressive complaints and memory disturbances it seems that a fair impression of possible problems was obtained.

Data analysis

One of the advantages of controlled experiments is that it is usually easy to analyze the data collected. If prognostically comparable groups have been formed, one simply counts and compares the frequencies of interest in the contrasted groups.

A stratified randomization procedure was used to enhance the comparability of the two groups at the start of the study. As far as information was recorded with respect to the initial health status and use of services, most of these characteristics were equally distributed over the two groups. Small baseline differences were found with respect to functional status. Among those subjects in the two groups who had already contact with hospital outpatient clinics at baseline, more subjects in the control group were being treated by an internist. One can only guess at whether other variables which were not (or imprecisely) measured at baseline have biased the outcomes. In view of the baseline information recorded, however, these effects were probably small.

Data on the main outcome measures were analyzed in two ways, the first involving a simple comparison of the scores in the two groups (and an estimation of the precision of the difference in scores between the groups), the second an adjustment of the estimated effects for small baseline differences. Because the two methods yielded similar results, only the unadjusted effect estimates were presented.

The importance of collecting baseline information was illustrated by the data on two community services, home help and meals on wheels. At first sight it seemed that the home visits had a large effect on the frequency of use of both services, whereas further inspection of the data revealed that the differences occurred mainly among those visited subjects who were already using these services at baseline.

The subgroup analysis was performed to explore whether subjects with specific characteristics benefited particularly from the visits. Caution must be exercised, however, in interpreting results obtained from such analyses. If large numbers of subgroups are formed to study all possible outcomes, there is a risk of 'chance capitalization'. One is likely to find a positive effect within one of the subgroups (which is sometimes even difficult to interpret). To avoid such an approach, the subgroup analysis was restricted to a limited number of subgroups, for which it could be theoretically argued that differences in effects might have occurred.

Evidence for the usefulness of home visits

What are the contributions of this study to the evidence so far for the usefulness of programmes for the elderly focussed on assessment and follow-up of their health status?

Literature searches on special programmes for the elderly showed that the number of studies decreases as one goes from more specialized programmes conducted in institutional care to more general community programmes. Many controlled studies have already been conducted (mainly in the United States) on the usefulness of geriatric assessment units in hospitals (for an overview see Rubenstein 1987, although several other studies have been reported since). Studies on the usefulness of programmes in other settings have been rarer. Examples of such studies refer to outpatient geriatric clinics (Williams et al. 1987, Yeo et al. 1987), community care programmes in which one service (e.g. home help) or a combination of services was evaluated for the general population of aged persons (Hughes et al. 1987, Nielsen et al. 1972, Weissert et al. 1980, Zimmer et al. 1985), or for specific patient categories (Bryant et al. 1974, Katz et al. 1968, Bakst and Marra 1955).

We will confine ourselves to community assessment and follow-up programmes for the elderly in which a public health nurse or health visitor played a key role. Non-experimental studies were excluded from the overview because of their susceptibility to biased outcomes. Twelve controlled studies (including our own) were found, eight of which were published after our study had started.

Table 1 presents an overview of the characteristics and main outcomes of the studies. On the basis of the interventions studied, three categories can be distinguished. In the first two studies (Tulloch and Moore 1979, McEwan et al. 1990) the intervention consisted of screening by a public health nurse and subsequent follow-up by a primary health care team. The initial screening was focussed on the functional abilities as well as on medical disorders (e.g. measurement of blood pressure and haemoglobin level). Studies three and four (Infante-Rivard et al. 1988, Bergner et al. 1988) were either focussed on a specific patient category or used a telephone support system instead of home visits. No initial home visits were carried out in the latter study.

The remaining studies dealt with more or less regular home visits by public health nurses or health visitors. Within this category, the first two studies (Luker 1981, Balaban et al. 1988) should be interpreted with caution. Luker used a cross-over design. It is likely that a carry-over effect has occurred after the cross-over. Balaban et al.'s study had some major methodological flaws, such as non-maintenance of the random allocation and contamination of the control group.

Despite the differences between the studies, some trends can be detected in the outcomes. The majority of the studies did not report clear beneficial effects of the interventions studied. Where beneficial effects were reported, they were mostly

Table 1. Overview of controlled studies on community (nursing) assessment and follow-up programmes for the elderly.

authors	study population	contrasted interventions	intervention period	outcome measures	results
screening					
Tulloch and Moore 1979 United Kingdom	subjects aged 70+ from general practice (n=295)	one (screening) visit by public health nurse/ physician and follow-up by primary care team versus usual care	2 years	functional status: socio-econ. problems: use of services: mortality:	no difference no difference increased community care, outpatient clinic and hospital admissions, but fewer hospital days no difference
McEwan et al. 1990 United Kingdom	subjects aged 75+ from general practice (n=296)	one (screening) visit by public health nurse and follow-up by primary care team versus usual care	20 months	functional status: morale: 'perceived health': use of services(?): mortality:	no difference IG scored better IG scored better on some aspects no data presented, but remark that no differences were found slightly decreased
miscellaneous					
Infante-Rivard et al. 1988 Canada	subjects aged 65+ discharged from hospital (n=182)*	telephone support by public health nurse every eight weeks versus usual care	1 year	contacts with physician: use of other services(?):	IG slightly lower contact rate no results reported
Bergner et al. 1988 USA	patients with chronic lung disease aged 40-75, mean age 65 (n=301)	1. respiratory home care nurse 2. standard home care nurse 3. usual care re 1/2: home visits once a month	1 year	functional status: mortality: well-being: walking tolerance: costs:	no difference no difference no difference no difference higher in group 1, compared to groups 2 and 3
home visits					
Luker 1981 United Kingdom	women aged 70+ living alone (n=120)	home visits by health visitor (once a month) versus usual care	4 months**	no. of health problems: life satisfaction:	seemed to have decreased in IG no difference
Balaban et al. 1988 USA	disabled subjects aged 65+ from family practice (n=198)	home visits by physician and nurse versus usual care	2 years	mortality: functional status: hospital admissions:	increased in IG IG slightly worse increased in IG, but reduction of hospital days.

Note: IG = intervention group. * Forty subjects excluded from analyses (results reported on 142 subjects). ** Cross-over design.

Table 1 continued:

authors	study population	contrasted interventions	intervention period	outcome measures	results
Hendriksen et al. 1984 Denmark	random sample of community, aged 75+ (n=572)	home visits by health visitor (four times a year) versus usual care	3 years	use of services: mortality: costs: subjective health:	reduced hospital and nursing home admissions; increased community care reduced reduced no difference†
Vetter et al. 1984 United Kingdom	subjects aged 70+ from general practice (n=600) in rural and urban area	home visits by health visitor (once a year) versus usual care	2 years	functional status: mortality: quality of life: use of services:	IG better in rural area only reduced in urban area only slightly improved in both areas increased community care in urban area only, no difference in institutional care
Vetter et al. 1992 United Kingdom	subjects aged 70+ from general practice (n=674)	home visits by health visitor (once a year) versus usual care	4 years	incidence of fractures:	no difference
Hall et al. 1992 Canada	"frail elderly" aged 65+ enrolled for long term community care programme (LTC) (n=167)	regular home visits by public health nurse in addition to LTC versus standard LTC	3 years	institutionalization: mortality: mental status:	reduced reduced no major difference
Pathy et al. 1992 United Kingdom	subjects aged 65+ from general practice (n=725)	home visits by health visitor to subjects reporting health problems versus usual care‡	3 years	mortality: functional status: life satisfaction self-rated health: use of services:	reduced no difference no difference IG scored slightly better slight reduction hospital days and admissions to nursing homes; community care slightly increased.
Van Rossum et al. the Netherlands	subjects aged 75-84 in community (n=580)	home visits by public health nurse (four times a year) versus usual care	3 years	health status: use of services: mortality: costs:	no difference community care slightly increased, slight reduction hospital admissions, no differences long term institutional care no major difference slightly increased for IG

† Obtained from personal communication. ‡ Only 60% of the intervention group received home visits; results were presented for the total group.

limited to the use of services and mortality; none of the studies showed a consistent benefit of the programme in terms of 'quality of life'. This may indicate that the programmes did indeed not enhance the living conditions of elderly people. On the other hand, it is also possible that the outcome measures were not sufficiently sensitive, or that positive results were masked because outcome measurements were restricted to subjects still living at home at the end of the intervention period. The latter explanation may hold for the Danish (Hendriksen et al. 1984) and the Canadian study (Hall et al. 1992). Both studies showed a reduction of mortality and institutionalization in the intervention group. As a consequence, the intervention groups in these studies contained at the end of the study period relatively more subjects living at home and having a less favourable health status (comparable subjects in the control groups had died or had been institutionalized in the meantime).

Of the interventions studied, the screening programmes for the general population of elderly people do not seem to be very beneficial. The interventions in Vetter et al.'s studies (1984 and 1992) were to some extent similar to these screening programmes. Their initial home visits were also partly focussed on the detection of medical disorders, whereas the (standard) frequency of follow-up visits was low (once a year).

Studies in which the general population was visited more frequently and over a longer period of time, viz. the Danish and our own study, yielded results that were only in partial agreement. Neither showed positive effects on the health status, but the results of the Danish study were more convincing as regards mortality and admissions to institutional care services. Chapters 4 and 5 discussed some possible explanations for the differences. As a result of our exclusion of subjects receiving home nursing care at baseline and as a result of differences in the health care systems (a relatively large proportion of elderly people in the Netherlands live in long term care facilities), our study population may have been healthier at baseline. On the other hand, it might still be true that the two groups in Denmark were not prognostically comparable at baseline, despite randomization.

The results of the last three studies in the table (Hall et al. 1992, Pathy et al. 1992, and our results from the subgroup analyses) indicate that the visits seem to be effective when restricted to subjects with a poor health status. The study population in the Canadian trial resembled our subgroup of subjects with poor health. At baseline, 40% of the Canadian population (average age 78) reported problems in doing light housework, and half of them perceived their health status to be poor to fair. Only a small number of participants in both groups were receiving home nursing care at baseline (about 4%), while about 85% were already receiving home help at the start of the study. In contrast with our study, all participants had been admitted to a long term community care programme, which consisted of assessment of the need for services included in the programme, such as home help, and adult day care. In addition, the intervention group received 'extra regular home visits' (as frequently as needed) by a public health nurse.

The Welsh study (Pathy et al. 1992) was published shortly before this manuscript was finished. Just as in our study, baseline information was obtained by means of postal questionnaires. However, these baseline measurements were restricted to the intervention group. Only those subjects allocated to the intervention group who either reported health problems or did not return the questionnaire were visited and followed up by a health visitor. As a result, only 60% of the intervention group actually received the intervention. These subjects were followed up as

frequently as needed, but the intervention period does not seem to have been identical for all subjects. All subjects allocated to the intervention group were included in the analyses. The results for the total groups were slightly 'better' than those found in our study. Except for self-rated health, no differences in health status were reported between the two groups. Differences in mortality were larger than in our study (18% of the intervention group versus 24% of the control group had died), whereas both studies found a reduction of about 1 hospital day per person per year.

Unfortunately, the lack of detailed baseline information on the control group hindered a separate analysis restricted to those subjects in the intervention group who had actually received the intervention, compared to a subset of the control group with a similar health status at baseline. Since 40% of the intervention group received no visits, it is likely that the results are an underestimation of effects for subjects with a poor health status at baseline.

Summarizing the available evidence on the home visits, it does not seem useful to focus programmes on the general population of elderly people. This is true for both medical screening for specific health disorders and regular home visits by public health nurses or health visitors. If special consideration is to be given to the elderly, regular assessment and follow-up focussing on subjects with a poor health status seems a more effective approach. However, the evidence in this respect has some limitations: the numbers of subjects in the Canadian and our own study were relatively small, and as far as the Welsh study (Pathy et al. 1992) is concerned it is not entirely clear whether the positive effects were indeed established within the group (with poor health) who actually received the programme. Hence, supporting evidence for this approach from a new experiment is warranted.

Implications of the study

As was mentioned above, our findings suggest that it is not useful to focus the home visits on the general population of elderly people. Home visits restricted to subjects with poor health seem to be beneficial, but the evidence in this respect has some limitations. What do these findings imply for nursing practice?

My personal view is that the available evidence is promising enough to continue the visits, albeit only for subjects with poor health. An outline of what these visits might look like is given below. It should be stressed that part of this outline is based on personal opinions, rather than on empirical evidence.

The visits might be focussed on subjects who perceive their health status to be poor. The advantage of self-rated health is that it seems to be a summary expression for various domains of health, whereas other measures of health, such as functional status, often relate to only one aspect of the health status. If, for instance, subjects with functional disabilities do not regard their health status as poor, they may be able to manage their health problems in a satisfactory way. On the other hand, if subjects perceive their health to be poor while reporting no physical disabilities, there might be problems with respect to other health aspects, such as their mental status.

There are no indications that it would be useful to include demographic criteria (age, gender, or composition of household). The results of the present study for the total groups show that the visits seemed to have reduced hospital readmissions. One might therefore consider hospital admissions as a criterion for the visits. However, the difference in hospital admissions and hospital days turned out to be

nearly completely established within the subgroup of subjects who rated their health as poor at baseline. Hence, if the visits are restricted to subjects with poor health, it would not seem necessary to use a separate criterion relating to hospital admissions.

Largely for practical reasons, I would (again) only include those subjects in the programme who are not receiving home nursing care on a regular basis. Unlike those in other countries, public health nurses in the Netherlands provide both curative and preventive care. It would not be very practical if nurses made separate incidental home visits to subjects who were already receiving curative care from the same nurses. Insofar as elements of the home visits are useful for subjects who are already receiving home nursing care, these elements might be incorporated into nursing practice (which is already claimed to be standard practice).

Restricting the visits to subjects who perceive their health status to be poor and who are not receiving home nursing care means that the target population is considerably reduced. Although these are simple criteria, they do imply the necessity to obtain information from the elderly subjects themselves in order to select subjects for the visits. One of the methods for obtaining this information, which has proved its feasibility in this and other studies (Frederiks 1990, Pathy et al. 1992), is a short postal questionnaire. Alternative methods are either expensive and time consuming (personal interviews) or not very suitable for an elderly population (telephone surveys).

Advantages of postal questionnaires in tracing subjects are that they provide information on the selection criteria, one can ask subjects whether they would appreciate the visits, and information can be gathered within a short time at modest costs. Moreover, including other questions on the health status renders a picture of the health status of the population in the area.

What should the intervention look like? Although it is not exactly clear how often subjects should be visited and over what period of time, it seems important to visit subjects several times within the first year. If the period between the visits is relatively long (six months or even longer), it becomes difficult to assess the health status, and to plan and evaluate interventions. One might consider visiting subjects, for instance, three or four times in the first year and then decide on further follow-up. The results within the subgroup of subjects who rated their health status as poor indicated that beneficial effects already appeared during the first part of the intervention period. The frequency of visits might be decreased if there are good reasons to assume that the subject does not need a frequent follow-up anymore, or if it is assessed that subjects will contact the nurse when problems emerge.

As regards the content of the visits, some guidelines are needed to ensure that the visits are carried out in a systematic way. Instruments developed in this study may be of help in this respect, although their usefulness needs further evaluation in practice.

There is some debate in the Netherlands as to the level of expertise required to perform these visits. Up to now, they are performed by both public health nurses and enroled nurses. It seems more important, however, to look at the skills needed to perform the home visits, instead of stressing the formal educational level of the visitors. It is not easy, however, to formulate recommendations with regard to the required skills, as there is no certainty about the effective elements of the visits. Two important, though as yet slightly vague, aspects are the correct assessment of health problems and risks, and the choice of appropriate interventions (including no

interventions). In general terms, the visits appear to require (as does other nursing care) a systematic approach, which relates to the various steps in the nursing process (assessment followed by planning, implementing and evaluating interventions, Yura and Walsh 1988). In addition, data gathered during the home visits have shown that functional status (in a broad sense) and the need for and availability of services were topics frequently discussed during the visits. Hence, the visitor should be well informed about these aspects.

Recommendations for further research

- Although the home visits seem to be useful for subjects with a poor health status, there is still need for more conclusive evidence. It would therefore be relevant to conduct a new experiment. In view of the effects established within relative small study populations (Hall et al. 1992 and our results from the subgroup analyses), the study population need not exceed that which is reasonably manageable (say 100 subjects per contrasted group). Some questions that remain unclear might be addressed in such an experiment. If the home visits are beneficial to subjects with poor health, which interventions are most effective? Would a short and intensive follow-up (several visits in the course of one year) suffice, or are more visits over a longer period needed to achieve the desired effects? Such a study, however, would imply a comparison between three groups.
- The home visits in this study were carried out according to a protocol which combined elements of the interventions in previously conducted studies and some available examples in Dutch nursing practice. It seems useful to test this protocol on a larger scale in nursing practice.
- In the present study, postal questionnaires played an important role in obtaining information on the health status of elderly subjects. In addition to satisfactory response rates, a comparison with data obtained from personal interviews showed that agreement between the answers obtained from the two methods was, in general, fairly good. Some important aspects, however, still need further attention, such as the number of missing data and the extensiveness of the questionnaire.
- This study focussed on only one programme for the elderly. Many other programmes (both professional and non-professional) are being developed in health care to improve the health status and living conditions of elderly people. These are not always assessed as to their merits. The results of our study underline the need for 'formal evaluations' of programmes. Only then can scarce resources be allocated to those programmes that have proved useful.

Personal note

Every investigator has some prior beliefs about the topic he or she studies. Sometimes this is confused with not being objective or being prejudiced. In fact, however, research is about providing evidence to confirm or to change these beliefs.

Beforehand, I was rather optimistic about the likelihood that the home visits would turn out to be effective. Now that I know the results, and in view of the conditions under which the study could be carried out, my belief in the usefulness of these visits for the general population of elderly people has decreased considerably.

The results from the subgroup analyses saved me from becoming a complete non-believer. Despite some limitations to the evidence in this respect, I am rather optimistic about the benefits of the visits for subjects with a poor health status. The main reasons for this optimism relate to the available data from our own, as well as from a few other studies, and the plausibility of the (adjusted) assumptions for the usefulness of the visits for this population.

References

- Bakst HJ, Marra EF. Experience with home care for cardiac patients. *American Journal of Public Health* 1955; 45: 444-50.
- Balaban DJ, Goldfarb NI, Perkel RL, Carlson BL. Follow-up study of an urban family medicine home visit program. *Journal of Family Practice* 1988; 26: 307-12.
- Bergner M, Hudson LD, Conrad DA, Patmont CM, McDonald GJ, Perrin EB, Gilson BS. The cost and efficacy of home care for patients with chronic lung disease. *Medical Care* 1988; 26: 566-79.
- Bryant NH, Candland L, Loewenstein R. Comparison of care and cost outcomes for stroke patients with and without home care. *Stroke* 1974; 5: 54-9.
- Duke University Center for the Study of Aging and Human Development. Multidimensional functional assessment: the OARS methodology. Durham, NC: Duke University, 1978.
- Ebrahim S, Hedley R, Sheldon M. Low levels of ill health among elderly non-consulters in general practice. *British Medical Journal* 1984; 289: 1273-5.
- Feinstein AR. *Clinimetrics*. New Haven/London: Yale University Press, 1987.
- Folstein MF, Folstein S, McHugh PR. Mini-Mental State: a practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research* 1975; 12: 189-98.
- Frederiks CMA. Zorgbehoefte van en zorgverlening aan ouderen. PhD thesis. University of Limburg, the Netherlands. Maastricht: Datawyse, 1990.
- Fuldauer A. Bejaardenonderzoek in een huisartsenpraktijk. PhD thesis. University of Leiden, the Netherlands. Leiden, 1966.
- Hall N, De Beck P, Johnson D, Mackinnon K, Gutman G, Glick N. Randomized trial of a health promotion program for frail elders. *Canadian Journal on Aging* 1992; 11: 72-91.
- Hendriksen C, Lund E, Stromgård E. Consequences of assessment and intervention among elderly people: a three year randomised controlled trial. *British Medical Journal* 1984; 289: 1522-4.
- Hughes SL, Manheim LM, Edelman PL, Conrad KJ. Impact of long-term home care on hospital and nursing home use and cost. *Health Services Research* 1987; 22: 19-47.
- Huygen FJA. Huisarts en wijkverpleegster; proefneming met een eenvoudig gezamenlijk te verrichten onderzoek. *Huisarts en Wetenschap* 1972; 15: 41-6.
- Infante-Rivard C, Krieger M, Petittlerc M, Baumgarten M. A telephone support service to reduce medical care use among the elderly. *Journal of the American Geriatrics Society* 1988; 36: 306-11.
- Jong-Gierveld J de, Kamphuis FH. The development of a Rasch-type loneliness scale. *Applied Psychological Measurement* 1985; 9: 289-99.
- Kahn RL, Goldfarb AI, Pollack M, Peck A. Brief objective measures for the determination of mental status in the aged. *American Journal of Psychiatry* 1960; 117: 326-8.
- Katz S, Vignos PJ, Moskowitz RW, Thompson HM, Svec KH. Comprehensive outpatient care in rheumatoid arthritis. *Journal of the American Medical Association* 1968; 206: 1249-54.
- Luker KA. Health visiting and the elderly. *Nursing Times* 1981; 77: 137-40.
- McEwan RT, Davison N, Forster DP, Pearson P, Stirling E. Screening elderly people in primary care: a randomized controlled trial. *British Journal of General Practice* 1990; 40: 94-7.
- Nielsen M, Blenkner M, Bloom M, Downs T, Beggs H. Older persons after hospitalization: a controlled study of home aide service. *American Journal of Public Health* 1972; 62: 1094-1101.
- Qureshi KN, Hodkinson HM. Evaluation of a ten-question mental test in the institutionalized elderly. *Age and Ageing* 1974; 3: 152-7.
- Pathy MSJ, Bayer A, Harding K, Dibble A. Randomised trial of case finding and surveillance of elderly people at home. *The Lancet* 1992; 340: 890-3.
- Rubenstein LZ. Geriatric assessment: an overview of its impacts. *Clinics in Geriatric Medicine* 1987; 3: 1-15.
- Tempelman CJJ. Welbevinden bij ouderen. Konstruktie van een meetinstrument. PhD thesis. University of Groningen, the Netherlands. Groningen, 1987.
- Tonino FJM. Bejaarden thuis; een sociaal geneeskundig onderzoek van 400 bejaarden te Breda. PhD thesis. University of Nijmegen, the Netherlands. Breda: van de Wijngaard, 1969.
- Tulloch AJ, Moore V. A randomized controlled trial of geriatric screening and surveillance in a general practice. *Journal of the Royal College of General Practitioners* 1979; 29: 733-42.
- Vetter NJ, Jones DA, Victor CR. Effect of health visitors working with elderly patients in general practice: a randomised controlled trial. *British Medical Journal* 1984; 288: 369-72.
- Vetter NJ, Lewis PA, Ford D. Can health visitors prevent fractures in elderly people? *British Medical Journal* 1992; 304: 888-90.

- Weissert WG, Wan TTH, Livieratos BB, Pellegrino J. Cost-effectiveness of homemaker services for the chronically ill. *Inquiry* 1980; 17: 230-43.
- Williams EI. Characteristics of patients aged over 75 not seen during one year in general practice. *British Medical Journal* 1984; 288: 119-21.
- Williams ES, Barley NH. Old people not known to the general practitioner: low risk group. *British Medical Journal* 1985; 291: 251-4.
- Williamson J, Stokoe IH, Gray S, Fisher M, Smith A, McGhee A, Stephenson E. Old people at home: their unreported needs. *Lancet* 1964; 1: 1117-20.
- Williams ME, Williams F, Zimmer JG, Hall WJ, Podgorski CA. How does the team approach to outpatient geriatric evaluation compare with traditional care: a report of a randomized controlled trial. *Journal of the American Geriatrics Society* 1987; 35: 1071-8.
- Yeo G, Ingram L, Skurnick J, Crapo L. Effects of a geriatric clinic on functional health and well-being of elders. *Journal of Gerontology* 1987; 42: 252-8.
- Yura H, Walsh MB. *The nursing process: assessing, planning, implementing, evaluating.* Connecticut/San Mateo: Appleton-Century-Crofts, 1988.
- Zimmer JG, Groth-Juncker A, McCusker J. A randomized controlled study of a home health care team. *American Journal of Public Health* 1985; 75: 134-41.
- Zung WWK. A self rating depression scale. *Archives of General Psychiatry* 1965; 12: 63-70.

Summary

Prevention is said to be better than cure. This is the underlying idea of preventive home visits by public health nurses to elderly people. The visits aim, through regular assessment and follow-up of the functional abilities, to enhance the independent functioning of elderly people living at home. More specifically, it has been claimed that such visits improve the health status of aged persons, and reduce their use of (expensive) institutional care. This dissertation reports on a controlled experiment in the Netherlands, in which we studied whether the visits (as some previous studies had suggested) did indeed accomplish these presumed benefits. After the study has been introduced in chapter 1, chapters 2 to 5 and chapter 8 deal with this central question.

Participants were selected for the study by means of postal questionnaires. The questionnaire was sent out to every person aged 75-84 living at home in one of the southern regions of the Netherlands ($n=1,545$). Of the subjects who completed the questionnaire and who were not receiving home nursing care on a regular basis, 580 were selected for the experiment. These participants were stratified on four prognostic characteristics (self-rated health, gender, composition of household and social class) and then randomly allocated to the intervention or the control group.

The intervention group ($n=292$) was visited four times a year over a period of three years by experienced public health nurses. The nurses were employed specifically for the study, and each subject was visited by the same nurse during the entire intervention period. In addition to the regular visits, extra visits could be paid if necessary. Participants could also contact 'their nurse' by phone every day to discuss health problems. During the visits, which lasted about 45 to 60 minutes, the nurses discussed the health status (in a broad sense) with the participants, and gave information and advice. This included referral to other health care workers (about half of the subjects were advised to contact another service; almost 40% of these referrals were to the general practitioner). The control group ($n=288$) received no home visits, but the subjects in this group could use or apply for all the regular services as before.

To study the effects of the visits on the health status of the participants, the postal questionnaire was sent out again halfway through (after 1.5 years), and at the end of the intervention period to all subjects still alive. The response was 97% on both measurements (among 528 and 493 subjects respectively). Shortly after the last postal measurement, the participants were also interviewed in their homes by independent interviewers (response 92%).

To trace the impact of the visits on the use of services, relevant community and institutional care services concurrently recorded during the three year period whether subjects used their services. These organizations were not informed whether participants were receiving the home visits or not. On the basis of these data, the costs of service use were calculated for each group.

We were unable to demonstrate any beneficial effects of the visits on the health status of the subjects. The intervention group did not show better scores on self-rated health, functional status (activities of daily living and household activities), or various health complaints. As regards self-rated health, for instance, both visited and

non-visited subjects gave themselves, halfway through the study and after three years, an average of about 7 points for their health on a scale ranging from 0 (poor health) to 10 (excellent health). Neither were effects of the visits found with respect to aspects of well-being ('optimism' and 'morale'), loneliness, or measures of mental status (depressive complaints and memory disturbances). It turned out that fewer visited subjects had died during the three year period (14% versus 17% of the control group), but this difference was small and had disappeared after 3.5 years.

In general, the use of community care services increased slightly in the intervention group. More subjects in this group received home help and home nursing care, whereas the contact rate with the general practitioner was similar for the two groups. For some of the services (home help and meals on wheels), large differences in the frequency of use were found. Further analyses revealed that these differences could be attributed mainly to those subjects in the intervention group who had already been profiting from these services at the start of the study.

As far as a reduction in institutional care was found, this was restricted to more specialised forms of care. More subjects in the control group (66% versus 55% of the intervention group) were referred by their general practitioner to hospital outpatient clinics. Subjects in the control group also had a 40% increased chance of being admitted to the hospital (incidence rate ratio 1.4, 90% precision interval from 1.2 to 1.6). Over the three year period, however, the reduction in hospital days was small (about one day per person per year). No differences in long term institutional care were found, in terms of admissions to homes for the elderly and nursing homes.

Finally, a comparison of the costs of the use of community and institutional care showed that the health care expenditures per person were not lower in the intervention group. The expenditures per person in the intervention group exceeded those in the control group by 4%.

The results show that it does not seem useful to focus the preventive home visits on the general population of elderly people living at home. This population is probably 'too healthy' to gain beneficial effects. A second factor that would seem to make it difficult for the visits to accomplish positive effects in this population is that a fairly extensive health care system for the elderly is already available.

In addition to the effects of the home visits on the total study population, we explored whether subjects with specific characteristics benefited more from the regular attention by the visiting nurses. It turned out that the visits seemed to have been effective for subjects with a poor perceived health status at baseline. No large and consistent beneficial effects were found for other subgroups, such as subjects living alone, or participants who reported functional disabilities at the start of the experiment.

When subjects with poor health in the intervention group ($n=57$) were compared with subjects in the control group with a similar health status at baseline ($n=53$), the intervention group scored better on, among other things, self-rated health and functional status (household activities). In addition, 3 year mortality rates were lower among these visited subjects (24% versus 41% of the non-visited persons with poor health).

The use of community care among the visited subjects in this subgroup showed a more striking increase compared to the total groups. Large effects in favour of the intervention group were found with respect to referrals to outpatient clinics and hospital admissions. Nearly the entire difference in number of hospital

days for the total groups turned out to be based within this subgroup. On average, these visited subjects spent 19 days per person less in the hospital during the intervention period (or about 6 days per year). On the other hand, more visited subjects in this subgroup had been admitted to homes for the elderly. Despite the large reduction in hospital days, the health care expenditures per person in the two subgroups were similar.

It was remarkable that positive effects of the visits for subjects with poor health already emerged during the first year of intervention, whereas the second and third years hardly added to these differences. No differences in health status and use of services were found for those participants in the two groups who assessed their health status more positively at baseline. These findings suggest that the nurses were able to detect and intervene in the most striking health problems right from the start, and that hardly any beneficial effects could be gained among subjects with a (fairly) good health status. If this is true, a revision of the original ideas behind the programme is needed. Regular visits to healthy subjects aimed at preventing future health problems appear not to be effective. The data indicate quite the opposite: benefits can only be gained when health problems are already present. As a consequence, this means that the target population for the preventive visits might be considerably reduced.

Hence, if special consideration is to be given to elderly people living at home, regular assessment and follow-up focussing on subjects with a poor health status seems a more effective approach. This is supported by some other recent reports on this matter. However, the evidence in this respect has some limitations, among other things because the numbers of subjects with poor health included in our study were relatively small. A new experiment would therefore be needed to provide supporting evidence for this population.

In addition to the study on the usefulness of preventive home visits to the elderly, this dissertation reports on two 'by-products' of the main study. Firstly, the health status of the subjects, and the changes in that status, were to a large extent recorded by means of postal questionnaires. Chapter 6 discusses the feasibility of this method among aged persons, and it compares data obtained from postal questionnaires with those gathered by means of personal interviews.

Secondly, self-rated health turned out to be a key variable in our experiment on the home visits: it yielded prognostic information on the subjects for whom the visits seemed to have been useful. Previous studies had already suggested that this simple and easily obtainable measure of health can predict relevant health outcomes, such as mortality. Chapter 7 reports on the prediction of mortality on the basis of scores on self-rated health, as well as some other measures of health. For this additional study we used mainly information on those subjects who had participated in the baseline measurement for the main study, but were subsequently not selected for the experiment.

Uitgebreide samenvatting

Voor geïnteresseerde lezers die, zonder het hele proefschrift door te nemen, meer te weten willen komen over het onderzoek is deze uitgebreide Nederlandse samenvatting opgenomen. De opzet en resultaten van het onderzoek naar het nut van preventieve ouderenbezoeken door wijkverpleegkundigen wordt hierin beschreven.

Na een korte schets van de achtergrond van het onderzoek worden de onderzoeksmethoden beschreven. In aansluiting hierop wordt aangegeven op welke wijze de preventieve ouderenbezoeken tijdens het onderzoek uitgevoerd werden. Daarna volgen de resultaten: achtereenvolgens worden de effecten van de bezoeken op de gezondheid, het zorggebruik, en de effecten binnen specifieke subgroepen van de onderzoekspopulatie gepresenteerd. Tot slot volgen de conclusies en aanbevelingen.

Achtergrond

Om bekende redenen wordt van verschillende kanten getracht om de zelfstandigheid van ouderen zo lang mogelijk te handhaven. Preventieve activiteiten kunnen hier mogelijk toe bijdragen. Voorbeelden van dergelijke activiteiten zijn het periodiek geneeskundig onderzoek door de huisarts,¹⁻² het sociaal-medisch screenen van ouderen door de huisarts en wijkverpleegkundige gezamenlijk,³⁻⁴ het psychogeriatrisch screenen van ouderen⁵ en het eenmalig geriatrisch consult vanuit het verpleeghuis⁶⁻⁷ of de geriatrische polikliniek.⁸ Over de effectiviteit van deze vormen van preventie is echter nog weinig bekend.

Dit geldt ook voor het preventief ouderenbezoek door wijkverpleegkundigen. Het gaat hierbij om bezoeken waarbij de wijkverpleegkundige op eigen initiatief ouderen die geen directe hulpvraag hebben, regelmatig bezoekt. De gedachte bij deze preventieve ouderenbezoeken is dat door advisering en verwijzing ten aanzien van gesignaleerde gezondheidsproblemen en -risico's de gezondheid van ouderen bevorderd wordt en institutionalisering vermeden wordt. Binnen het kruiswerk staan deze bezoeken echter onder druk door de toegenomen curatieve zorg en bovendien staat het nut van de bezoeken ter discussie.⁹

Tot nu toe zijn in Nederland nog geen experimenten naar de effecten van preventieve ouderenbezoeken uitgevoerd. In het buitenland is dit in het begin van de jaren tachtig wel gebeurd. In een voorstad van Kopenhagen werd door Hendriksen e.a. een experiment uitgevoerd bij 600 thuiswonende ouderen van 75 jaar en ouder.¹⁰ De ouderen in de interventiegroep werden gedurende een periode van drie jaar (minimaal) om de drie maanden door een "health visitor"* bezocht, terwijl de ouderen in de controlegroep ongemoeid werden gelaten. De tweede studie werd zowel in een stedelijk als plattelandsgebied in Wales verricht door Vetter e.a.¹¹ In beide gebieden werden ook hier circa 600 ouderen (70 jaar en ouder) geselecteerd. De interventie was in dit onderzoek echter veel minder ingrijpend: in beide gebieden werd de interventiegroep gedurende een periode van twee jaar (minimaal) tweemaal

* In tegenstelling tot de "health visitor", die alleen preventieve taken heeft, verricht de wijkverpleegkundige in Nederland zowel preventieve als curatieve taken.

door een health visitor bezocht. Evenals in Denemarken ontving de controlegroep in beide gebieden geen bezoeken.

De resultaten van het Deense experiment waren opzienbarend. De sterfte was in de bezochte groep veel lager en het aantal ziekenhuisopnamen en (in mindere mate) verpleeghuisopnamen was gereduceerd. Het geringere aantal opnamen bleek bovendien, ondanks een toename in het gebruik van thuiszorg (gezinszorg en wijkverpleging), tot aanzienlijke kostenbesparingen te leiden.

In Wales waren de uitkomsten minder eenduidig. De sterfte bleek alleen in de in het stedelijke gebied bezochte groep te zijn afgenomen, terwijl alleen de bezochte ouderen in het plattelandsgebied beter scoorden op de functionele status. In beide gebieden in Wales leek de beoordeling van de kwaliteit van leven in het voordeel van de bezochte groep te zijn.

Omdat de bewijskracht nog onvoldoende werd gevonden om een definitief oordeel uit te kunnen spreken over het nut van preventieve ouderenbezoeken, werd besloten om in Nederland een replicatie-onderzoek uit te voeren.¹² Het onderzoek werd in de regio Weert uitgevoerd (gemeenten Weert, Nederweert en Stramproy). De centrale vraag was of huisbezoeken de gezondheid van en het zorggebruik door ouderen kunnen beïnvloeden.

Onderzoeksopzet

Onderzoekspopulatie

De onderzoekspopulatie werd beperkt tot thuiswonende ouderen in de leeftijd van 75 tot 84 jaar. Mede op basis van de buitenlandse studies vermoedden we dat een eventueel effect leeftijdafhankelijk zou kunnen zijn, met het grootste effect in deze leeftijdsgroep. Ouderen en hun partners die minimaal éénmaal per week wijkverpleegkundige zorg ontvingen, werden van deelname aan het onderzoek uitgesloten. De huisbezoeken zijn niet voor deze categorie ouderen bedoeld. Bovendien is het ook moeilijk voor te stellen dat een incidenteel huisbezoek meerwaarde kan hebben in situaties waarin al vrij intensief wijkverpleegkundige hulp wordt ontvangen.

Als onderzoeksgebied werd het verzorgingsgebied van de Kruisvereniging Weert e.o. gekozen (circa 60.000 inwoners). Enkele voordelen van dit gebied waren de aanwezigheid van een overzichtelijk voorzieningenpakket, waarin geen grote veranderingen op stapel stonden, terwijl er geen ander onderzoek onder ouderen plaatsvond. Bovendien was er grote bereidheid bij de plaatselijke voorzieningen en overheid om aan het onderzoek mee te werken.

Om ouderen voor de studie te selecteren en vooraf gegevens over hun gezondheidstoestand en zorggebruik te verzamelen is een schriftelijke enquête uitgevoerd. De vragenlijst werd toegezonden aan alle thuiswonende ouderen in het onderzoeksgebied tussen de 75 en 84 jaar ($n=1545$). De vragen betroffen de selectiecriteria en belangrijke prognostische kenmerken van de ouderen (gezondheidsbeleving, functionele status, gebruik van professionele en informele hulp). In een begeleidende brief werd het doel van de studie, de selectieprocedure en de gevolgen van deelname uitgelegd. Alleen de ouderen die de vragenlijst invulden en schriftelijk kenbaar maakten mee te willen doen aan het experiment, werden in de verdere selectieprocedure opgenomen.

De response op de enquête was hoog: 1285 van alle benaderde ouderen (85%) retourneerden de vragenlijst. Van hen waren er 1182 bereid om aan het verdere onderzoek deel te nemen. Nadat de ouderen en hun partners die hulp van het

kruiswerk ontvingen (n=126), evenals ouderen die in een klooster woonden* (n=20) waren uitgesloten, werd een random steekproef van 580 ouderen getrokken. De ervaringen in de buitenlandse studies leerden dat deze omvang voldoende groot was om mogelijke effecten aan te kunnen tonen.

Om de vergelijkbaarheid van de onderzoeksgroepen te verhogen werden de geselecteerde ouderen vóór de randomisatie gestratificeerd op de volgende prognostische kenmerken: geslacht, samenlevingsvorm, gezondheidsbeleving en sociale klasse. De randomisatie vond binnen elk stratum plaats met behulp van de computer. Vervolgens werden de ouderen die aan de interventiegroep waren toegewezen, wederom door het lot verdeeld over de wijkverpleegkundigen die de huisbezoeken gingen uitvoeren.

Controle op de randomisatie liet zien dat deze goed gelukt was. Vrijwel alle vooraf gemeten kenmerken waren goed verdeeld over de beide groepen. Dit was niet alleen het geval voor de kenmerken waarop vooraf gestratificeerd was, maar ook voor onder meer leeftijd, de beschikbaarheid en het gebruik van informele zorg, het gebruik van gezinszorg, recente huisartscontacten en sociale contacten (tabel 1). Alleen met betrekking tot de functionele status (ADL en huishoudelijke activiteiten (HHA)) bleek de interventiegroep enigszins in het voordeel te zijn.

Tabel 1. Procentuele verdeling van enkele kenmerken in de interventie- en controlegroep bij de voormeting.

kenmerk		interventiegroep (n=292)	controlegroep (n=288)
leeftijd	75-79	72%	73%
	80-84	28%	27%
functionele status:†			
ADL	0	91%	86%
	1-5	10%	14%
HHA	0	38%	35%
	1-2	39%	39%
	3-5	23%	27%
gebruik gezinszorg	ja	19%	20%
	nee	81%	80%
huisartscontacten in laatste 3 maanden	0-1	54%	56%
	> 1	46%	44%
mantelzorg (zo nodig) beschikbaar	ja	86%	88%
	nee	14%	12%

† Bij zowel de ADL als de huishoudelijke activiteiten (HHA) is naar 5 activiteiten gevraagd. Door aan iedere activiteit die niet zelfstandig uitgevoerd kon worden een punt toe te kennen, werd voor beide schalen een score tussen 0 (geen beperkingen) en 5 punten (erg beperkt in functioneren) berekend.

Vergeleken interventies

Evenals in het Deense experiment werden de ouderen in de interventiegroep gedurende een periode van drie jaar minimaal vier keer per jaar bezocht. Zonodig

* De in een klooster verblijvende ouderen werden uitgesloten, omdat zij niet helemaal als zelfstandig wonend kunnen worden beschouwd.

konden extra huisbezoeken worden uitgevoerd. Daarnaast bestond voor deze ouderen dagelijks de mogelijkheid om telefonisch contact op te nemen met de wijkverpleegkundige (telefonisch spreekuur). Voor het onderzoek werden drie ervaren wijkverpleegkundigen (2 FTE) aangesteld die - om het protocol voor de interventie zo goed mogelijk uit te kunnen voeren - niet belast werden met andere zorgtaken. Deelnemers werden gedurende de gehele interventieperiode steeds door dezelfde wijkverpleegkundige bezocht. Zeven ouderen (2%) weigerden de huisbezoeken, nadat ze hier in een eerder stadium wel toestemming voor hadden gegeven.

Gemiddeld duurden de bezoeken zo'n 50 minuten. Tijdens het huisbezoek vond geen lichamelijk onderzoek plaats, maar de gezondheid werd met de ouderen besproken, adviezen werden verstrekt en waar nodig werd de oudere aangeraden om contact op te nemen met een andere hulpverlener.¹³ Een nadere beschrijving van de inhoud van de huisbezoeken volgt na de onderzoeksopzet.

De controlegroep werd gedurende de interventieperiode ongemoeid gelaten. De ouderen in deze groep konden een beroep blijven doen op alle beschikbare voorzieningen in de regio. Om te vermijden dat de controlegroep vergelijkbare interventies als de interventiegroep zou ontvangen, werd met de kruisvereniging afgesproken dat medewerkers van deze organisatie gedurende het onderzoek geen ongevraagde huisbezoeken bij 75-84 jarigen zouden uitvoeren.

Effectmaten

Het onderzoek richtte zich op twee hoofdvragen: bevorderen preventieve ouderenbezoeken de gezondheid en voorkómen zij institutionalisering? De belangrijkste effectmaten m.b.t. de gezondheid waren: gezondheidsbeleving, functionele status, welbevinden, en aspecten van de geestelijke toestand, zoals eenzaamheid, depressieve klachten en geheugenstoornissen (zie tabel 2). Daarnaast werd de sterfte in beide groepen geregistreerd, maar aan deze uitkomst werd in vergelijking met de andere gezondheidsmaten minder belang gehecht. Er is dus vanuit gegaan dat de bezoeken primair 'de kwaliteit van het leven' zouden moeten verbeteren in plaats van bijvoorbeeld de levensduur te verlengen.

Informatie over de gezondheidsmaten werd, behalve aan het begin, ook halverwege (d.w.z. na anderhalf jaar) en aan het eind van de interventieperiode verzameld middels schriftelijke enquêtes. Uitgebreidere informatie hierover werd (aansluitend op de laatste schriftelijke enquête) tijdens mondelinge interviews na drie jaar verkregen.

De respons op deze metingen was steeds zeer bevredigend. Zowel aan de schriftelijke tussenmeting als aan de eindmeting werkte 97% van de ouderen mee (respectievelijk 528 en 493 ouderen konden voor deze metingen benaderd worden). Aan de mondelinge interviews werkte 92% van de ouderen mee.

Om de effecten op het zorggebruik te kunnen vaststellen werden (met instemming van alle deelnemers) continu gegevens verzameld over het gebruik van gezondheidszorg- en welzijnsvoorzieningen. Voor deze registratie werd de medewerking verkregen van alle relevante voorzieningen voor ouderen, zoals de gezinszorg, wijkverpleging, de huisartsen, het riagg, tafeltje-dek-je, het ziekenhuis, het verpleeghuis en het verzorgingstehuis. Om te bezien of de bezoeken ook tot kostenbesparingen leidden, werden bovendien de kosten van het zorggebruik in beide groepen berekend.

Alle deelnemers werden steeds voor de schriftelijke en mondelinge effectmetingen benaderd, dus zowel de thuiswonende ouderen als degenen die in de loop van de tijd in het verzorgings- of verpleeghuis werden opgenomen.

Voorzover mogelijk werden de effectmetingen geblindeerd. De mondelinge interviews na drie jaar werden uitgevoerd door onafhankelijke interviewers, die van tevoren niet wisten tot welke groep de te interviewen persoon behoorde. De registratie van het zorggebruik werd zoveel mogelijk uitgevoerd door medewerkers van de betreffende voorzieningen. Dit gebeurde aan de hand van de namen en adressen van de deelnemers, waarbij echter de code van de onderzoeksgroep ontbrak.

Tabel 2. Belangrijkste effectmaten en meetmomenten.

	effectmaten	metingen
gezondheid	gezondheidsbeleving	schriftelijke enquêtes en interviews
	functionele status: – ADL – huishouden	
	welbevinden*	interviews
	eenzaamheid ¹⁵	
	depressieve klachten** geheugenstoornissen**	
zorggebruik	sterfte	continue registratie
	gebruik van extra- en intramurale voorzieningen	continue registratie door voorzieningen
	kosten-effectiviteit	

* Voor het meten van welbevinden werden twee subschalen ('optimisme' en 'weerbaarheid') gebruikt van een meer omvattende schaal voor welbevinden.¹⁴

** Op basis van eerder uitgevoerd onderzoek bij thuiswonende ouderen¹⁶ werden verkorte versies van bestaande schalen voor depressieve klachten¹⁷ en geheugenstoornissen¹⁸ geconstrueerd (met respectievelijk 4 en 5 items in plaats van de originele 20 en 10 items).

Data-analyse

Hoewel er tijdens de interventieperiode al gegevens voorhanden waren over de mogelijke effecten (gebruik van voorzieningen en schriftelijke tussenmeting), werden alle analyses uitgesteld tot na de interventieperiode. Hiermee werd vermeden dat de bij het onderzoek betrokken personen beïnvloed zouden worden door kennis van de interim-resultaten. De zeven ouderen in de interventiegroep die de huisbezoeken weigerden werden in de analyse betrokken als behorende tot de interventiegroep.

Voor de meeste effectmaten kon een gemiddelde score voor de twee groepen berekend worden (bijvoorbeeld een gemiddelde score voor gezondheidsbeleving, het gemiddelde aantal ligdagen in het ziekenhuis, etc.). De schatting van het verschil in score tussen de twee groepen werd gecorrigeerd voor kleine prognostische verschillen tussen de groepen bij de start van het onderzoek. Deze correctie leverde echter geen wezenlijk andere resultaten op dan de ongecorrigeerde effectschattingen. Daarom worden alleen deze laatste schattingen van het verschil tussen de groepen hier gepresenteerd, met het 90% precisie interval (90% PI).

De huisbezoeken

Bij de beschrijving van de onderzoeksopzet is kort ingegaan op de huisbezoeken. Voor een goede beoordeling van wat de bezoeken nu precies behelsden wordt hieronder aangegeven hoe de bezoeken in het kader van het onderzoek uitgevoerd werden. Bovendien worden enkele gegevens gepresenteerd die tijdens de bezoeken geregistreerd werden, zoals besproken onderwerpen en verwijzingen naar andere voorzieningen.

Inhoud van het bezoek

De uitvoering van de bezoeken werd vastgelegd in een protocol, waarvoor verschillende 'bronnen' gebruikt werden. Met de onderzoekers van de eerder uitgevoerde studies werd de door hen gehanteerde werkwijze uitgebreid besproken. Van de andere kant streefden we ernaar dat de bezoeken niet te veel zouden afwijken van de Nederlandse praktijk. Daarom werden de in het werkveld gebruikte protocollen geïnventariseerd. Tot slot bespraken we onze ideeën over de bezoeken met deskundigen in het veld.

De onderzoekers in Denemarken¹⁰ en Wales¹¹ bleken voor een verschillende benadering gekozen te hebben. De bezoeken in de Deense studie waren niet erg gestructureerd. Deze onderzoekers vonden een vertrouwensrelatie met de ouders belangrijk. De 'bezoeker' moest in de eerste plaats een aandachtig luisteraar zijn en verder vertrouwden ze voor een groot deel op 'de klinische blik' van de verpleegkundige om problemen en risico's te onderkennen.

De bezoeken in Wales daarentegen waren veel gestructureerder. Het (jaarlijkse) bezoek werd vooral gezien als een screeningsinstrument, waarvoor uitgebreide lijsten met mogelijke problemen werden gebruikt. Behalve voor het vastleggen van mogelijke problemen werden deze lijsten ook gebruikt om de interventies van de verpleegkundige te evalueren.

Een overzicht van de in Nederland gehanteerde werkwijzen liet een nogal divers beeld zien. Gedetailleerd uitgewerkte protocollen waren er nauwelijks en de mate waarin preventieve ouderenbezoeken uitgevoerd werden verschilde nogal per regio en zelfs binnen organisaties.¹⁹ Er bestonden verschillende doelgroepen en ook de frequentie van de bezoeken varieerde. Bovendien kregen we de indruk dat het vaak ontbrak aan richtlijnen voor de verpleegkundigen bij de uitvoering van de bezoeken. De 'bagage' beperkte zich veelal tot een checklist of aandachtspuntenlijst waarin vragen over te bespreken onderwerpen (zoals de functionele status en medicijngebruik) waren opgenomen.

Het geheel overziende vonden we de benaderingswijze in het Deense onderzoek te vaag en de aanpak in Wales te gestructureerd. Daarom besloten we tot een benadering die elementen van beide vormen bevatte en die tevens zoveel mogelijk rekening hield met de praktijk van de wijkverpleging.

De volgende uitgangspunten voor de bezoeken werden opgesteld:

- Preventie wordt in brede zin opgevat. Uitgaande van de traditionele definitie zijn de bezoeken zowel op primaire, secundaire als tertiaire preventie gericht.
- Daar het accent van verpleegkundig handelen ligt op het terrein van het zelfzorgvermogen van cliënten, zijn de bezoeken niet primair bedoeld om te screenen op specifieke ziekten. Er wordt tijdens de bezoeken dan ook geen lichamelijk onderzoek uitgevoerd, maar de gezondheid wordt in brede zin met de ouders besproken, adviezen worden gegeven en zonodig wordt ouders ook aangeraden om contact op te nemen met een andere hulpverlener.

- Het moet mogelijk zijn om de ontwikkelde methode (het protocol) in de toekomst te kunnen implementeren in de praktijk.
- We streefden naar een balans tussen een systematische benadering en enige vrijheid voor de verpleegkundige om naar eigen inzicht te kunnen handelen. Het bezoek moet dus meer zijn dan een vrijblijvend gesprek, zonder dat de inhoud tot in detail wordt voorgeschreven.
- Omdat de bezoeken bedoeld zijn om het zelfstandig functioneren van ouderen te bevorderen, dienen beslissingen door de ouderen zelf genomen te worden (oftewel een medicaliserend effect moet vermeden worden).

Op basis van deze algemene uitgangspunten werd de inhoud van het bezoek verder uitgewerkt. Een onderscheid werd gemaakt tussen het eerste bezoek en de vervolfbezoeken. Het eerste bezoek was niet erg gestructureerd; naast een kennismaking en toelichting op het onderzoek was het de bedoeling om een eerste indruk van de gezondheid en leefsituatie van de oudere te verkrijgen. In de vervolfbezoeken kon gedetailleerd ingegaan worden op specifieke onderwerpen. Hiervoor werd een volgorde in aandachtspunten opgesteld:

- (1) Eerst wordt ingegaan op het onderwerp dat door de oudere zelf aangedragen wordt.
- (2) Vervolgens worden de tijdens het vorige bezoek gegeven adviezen (inclusief verwijzingen naar andere voorzieningen) geëvalueerd.
- (3) Een of enkele onderwerpen worden dan in detail doorgenomen.
- (4) Daarna worden veranderingen t.a.v. reeds eerder besproken onderwerpen geïnterviewd (bijvoorbeeld verandering van medicatie).
- (5) Tot slot wordt het bezoek samengevat en worden er afspraken gemaakt voor het volgende bezoek.

Voor de uitvoering van de bezoeken werd gebruik gemaakt van twee 'hulpmiddelen': een checklist en bijbehorende stroomdiagrammen. De checklist (5 pagina's) bevatte vragen over relevante onderwerpen, zoals de functionele status, de woning, voeding, sociale contacten, en het gebruik van hulp. Schema 1 bevat als voorbeeld de vragen in de checklist over het medicijngebruik.

Schema 1. Vragen in de checklist over medicijngebruik.

Gebruikt U medicijnen (welke en dosering)? (kunt U deze laten zien)	....
Door wie zijn deze medicijnen voorgeschreven?	.....
Hoe bewaart U ze?	.....
Hoe oud zijn ze?	.....
Vindt U dat ze 'helpen'?	.....
Heeft U de bijsluiter(s) gelezen?	.....
Vergeet U de medicijnen wel eens in te nemen?	.....
Gebruikt U ook medicamenten die niet door een arts zijn voorgeschreven?	.....

Hoewel een checklist enige ondersteuning voor de verpleegkundige biedt, blijft het toch wat vaag wat nu in welke situatie het beste geadviseerd kan worden. Daarom werden voor de in de checklist opgenomen onderwerpen zogenaamde stroomdiagrammen ontwikkeld. Deze bieden richtlijnen hoe een onderwerp systematisch doorgenomen kan worden en bovendien bevatten ze o.a. suggesties

voor mogelijke oplossingen indien zich een probleem voordoet. Figuur 1 laat het stroomdiagram voor medicijngebruik zien. De andere diagrammen zijn op dezelfde wijze opgezet.

Figuur 1. Stroomdiagram voor medicijngebruik.

De diagrammen vormden een ondersteuning voor de drie verpleegkundigen. Ze werden alleen bij de voorbereiding en uitwerking van de bezoeken gebruikt. Benadrukt moet worden dat ze niet tijdens het bezoek met de ouderen doorgesproken werden.

Behalve ter ondersteuning van de verpleegkundigen bij de uitvoering van de bezoeken, dienden de checklist en stroomdiagrammen ook om de interventie tot op zekere hoogte te standaardiseren. Met het oog op deze standaardisatie werden de bezoeken ook wekelijks in de vorm van casuïstiek met de verpleegkundigen besproken.

Het telefonisch spreekuur (iedere morgen tussen 8.30 en 9.30 uur) bood ouderen de mogelijkheid om contact op te nemen met de verpleegkundige om bijvoorbeeld advies te vragen, of veranderingen in de gezondheid te bespreken. In de praktijk werd hier niet zo vaak gebruik van gemaakt. Gemiddeld werden de verpleegkundigen eens per twee weken telefonisch geconsulteerd, waarbij overigens vaak familieleden van de betreffende ouderen belden. Toch bleek tijdens de eindinterviews dat de ouderen deze service op prijs hadden gesteld. Waarschijnlijk vonden ze het prettig dat ze contact konden opnemen 'voor het geval dat'.

Gegevens over de bezoeken

De verpleegkundigen noteerden van ieder bezoek enkele gegevens op een voorgedeed formulier, zoals de besproken onderwerpen en verwijzingen naar andere hulpverleners. Hieronder volgt een samenvatting van de verzamelde gegevens.

Uitgevoerde bezoeken en tijdsbesteding

Zoals eerder aangegeven, werden de ouderen in de interventiegroep ($n=292$) gedurende een periode van drie jaar driemaandelijks bezocht door de verpleegkundigen. In totaal werden 3059 (geplande) bezoeken uitgevoerd. Een klein deel van de bezoeken (2%) kon geen doorgang vinden, bijvoorbeeld wegens afwezigheid van de oudere of ziekte van de verpleegkundige. Zeven ouderen (2%) weigerden alsnog de bezoeken nadat ze hier in een eerder stadium wel toestemming voor hadden gegeven. In principe werden de bezoeken (anders dan in de praktijk) gecontinueerd wanneer ouderen in het verzorgingshuis of verpleeghuis werden opgenomen. Bij vijf (psycho-geriatrische) patiënten bleek dit in de loop van de tijd echter niet meer mogelijk te zijn.

Indien nodig werden extra bezoeken uitgevoerd. Over de gehele periode werd één op de drie ouderen ($n=96$) in totaal 174 keer extra bezocht. In de meeste gevallen (66%) nam de verpleegkundige zelf het initiatief tot deze bezoeken, bijvoorbeeld omdat ze de reguliere periode van drie maanden te lang vond met het oog op de gezondheid van de oudere, of omdat er een ziekenhuisopname had plaatsgevonden. Dertig procent van de extra bezoeken werd door de oudere of een familielid aangevraagd, en de overige bezoeken (4%) door een andere persoon.

De bezoeken duurden gemiddeld zo'n 45 à 60 minuten. De mediane* tijdsduur van de bezoeken nam af van 70 minuten aan het begin tot 50 minuten in het laatste anderhalf jaar. De tijd die aan overige met het bezoek samenhangende activiteiten werd besteed (reistijd, voorbereiding en administratieve verwerking) bedroeg gezamenlijk zo'n 26 minuten en deze was constant over de gehele periode.

---

* De mediaan geeft het getal aan, waar 50% van de 'scores' onder en 50% van de 'scores' boven ligt.

Besproken onderwerpen en verwijzingen naar andere hulpverleners

Van ieder bezoek werden die drie onderwerpen vastgelegd, waaraan tijdens het bezoek de meeste tijd werd besteed. Tabel 3 geeft een overzicht van alle geregistreerde onderwerpen. Bij de interpretatie moet er echter rekening mee worden gehouden dat de geregistreerde onderwerpen niet per definitie de meest belangrijke onderwerpen hoeven te zijn.

De functionele status bleek een vaak besproken thema te zijn. Tot deze categorie behoren de ADL- en huishoudelijke activiteiten, de mobiliteit, incontinentie, en hulpmiddelen. Ook de beschikbaarheid van en de behoeften aan professionele zorg (15%) en informele zorg (2%) kwam vaak ter sprake (in totaal 17% van alle geregistreerde onderwerpen). Andere vaak besproken onderwerpen betroffen sociale contacten (zorgen om de gezondheid van de partner en kinderen inbegrepen), de lichamelijke gezondheid (o.a. zintuigen), en de gezondheidstoestand in het algemeen.

Tabel 3. Besproken onderwerpen tijdens de bezoeken.

onderwerp	eerste jaar	tweede jaar	derde jaar	totaal
functionele status	19%	18%	19%	18%
professionele en informele zorg	11%	17%	21%	17%
sociale contacten/relaties	13%	12%	14%	13%
fysieke gezondheid	12%	11%	9%	11%
algemene gezondheidstoestand	13%	9%	6%	9%
woning/buurt	6%	9%	7%	7%
geestelijke toestand	4%	4%	5%	4%
voeding	9%	5%	4%	6%
tijdsbesteding	6%	4%	5%	5%
medicijngebruik	6%	5%	4%	5%
overig	3%	6%	7%	6%
totaal	102%	100%	101%	101%

De helft van de bezochte groep ($n=154$) werd in totaal 290 keer, of gemiddeld twee keer, geadviseerd om contact op te nemen met een andere voorziening (tabel 4). Bijna 40% van deze verwijzingen betrof de huisarts. Ouderen werden ook vaak verwezen naar vrijwilligersorganisaties, zoals welzijnscentra en tafeltje-dek-je, terwijl minder vaak dan verwacht verwezen werd naar de gezinszorg en wijkverpleging.

De verwijzingen werden in het eerstvolgende bezoek geëvalueerd. In de helft van de gevallen (53%) werd het advies van de verpleegkundige opgevolgd en leidde dit ook tot de hulp die men aangevraagd had. In 13% van de gevallen werd het advies weliswaar opgevolgd, maar werd de hulp (nog) niet gehonoreerd door de voorziening. In 10% van de verwijzingen werd het advies niet opgevolgd, maar vond de oudere een andere oplossing voor het probleem (bijvoorbeeld particulier betaalde hulp in plaats van geadviseerde gezinszorg).

Een op de vier verwijzingen (24%) werd niet door de ouderen opgevolgd. Dit betrof vaak de vrijwilligersorganisaties (33% van de verwijzingen naar deze organisaties werden niet opgevolgd), 'meer bewegen voor ouderen' (64%), de gezinszorg (28%), en, in mindere mate, de huisarts (18%).

Tabel 4. Verwijzingen naar andere voorzieningen.

voorziening	aantal verwijzingen			
	eerste jaar	tweede jaar	derde jaar	totaal
huisarts	56	30	25	111 (38%)
vrijwilligersorganisaties	13	11	14	38 (13%)
wijkverpleging	9	5	9	23 (8%)
gezinszorg	11	4	5	20 (7%)
opticiën/audiçiën	6	8	4	18 (6%)
'meer bewegen voor ouderen'	9	2		11 (4%)
specialist	5	4	2	11 (4%)
gemeente/bouwvereniging	3	5	3	11 (4%)
verzorgingshuis	3	3	5	11 (4%)
tandarts	5	3	1	9 (3%)
pedicure	4	2	3	9 (3%)
centrum voor hulpmiddelen	4	2	1	7 (2%)
riagg	1		1	2 (1%)
overig	2	6	1	9 (3%)
totaal	131 (n=101)	85 (n=68)	74 (n=59)	290 (100%) (n=154)

Verschillen in de huisbezoeken tussen de drie verpleegkundigen

Van de drie wijkverpleegkundigen die de bezoeken uitvoerden, werkte er één full-time en twee werkten half-time. Bij de verdeling van de interventiegroep over de drie verpleegkundigen werd rekening gehouden met hun dienstverband: de full-time aangestelde verpleegkundige bezocht 146 ouderen, terwijl de beide anderen respectievelijk 74 en 72 ouderen bezochten.

Zoals eerder aangegeven, was het protocol voor de huisbezoeken deels bedoeld om de bezoeken enigszins te standaardiseren (d.w.z. dat de bezoeken op dezelfde wijze door de drie verpleegkundigen uitgevoerd zouden worden). Om te zien of dit ook inderdaad het geval was, zijn de gegevens over de bezoeken van de drie verpleegkundigen vergeleken.

Er kwamen geen grote verschillen tussen de bezoeken van de verpleegkundigen aan het licht. Gemiddeld besteedden ze evenveel tijd aan de bezoeken en ook de verdeling van de besproken onderwerpen kwam goed overeen. Er kwam alleen een verschil naar voren met betrekking tot de verwijzingen naar andere hulpverleners. Eén van de verpleegkundigen (met de meeste ouderen) verwees meer ouderen: 60% van haar groep versus 47% en 43% voor de andere twee verpleegkundigen. Bovendien verwees zij in vergelijking met haar collega's ouderen minder vaak naar de huisarts, en vaker naar andere voorzieningen (vooral vrijwilligersorganisaties en de opticiën en audiçiën). Het is niet eenvoudig om aan te geven of dit verschil in verwijzingen van invloed is geweest op de uitkomsten van het onderzoek. Wanneer de effecten van de bezoeken per verpleegkundige bekeken werden, vonden we echter geen verschillen tussen de drie groepen bezochte ouderen.

Meningen van de ouderen over de bezoeken

Tijdens de eindinterviews werden aan de bezochte ouderen enkele vragen gesteld over de huisbezoeken (232 van de oorspronkelijke 292 ouderen werden geïnterviewd). Bijna alle ouderen (96%) hadden de bezoeken op prijs gesteld. Ze waren ook tevreden over de gemiddelde duur van het bezoek (93%) en de frequentie van viermaal per jaar (96%).

De meerderheid van hen vond dat ze baat bij de bezoeken hadden gehad: 47% vond dat ze veel, en 35% zei dat ze enigszins profijt van de bezoeken hadden ondervonden. Wanneer vervolgens naar een specificatie van dit profijt gevraagd werd bleek dat 47% van alle genoemde voordelen 'een prettig gesprek met de verpleegkundige' betrof. Goede adviezen over de gezondheid (inclusief het gebruik van zorg en hulpmiddelen) maakte 26% van de genoemde voordelen uit, terwijl 18% de mogelijkheid betrof om vragen over de gezondheid te kunnen stellen.

Een vrij groot deel van de interventiegroep (71%) gaf aan dat zij, indien deze mogelijkheid geboden werd, wederom bereid zou zijn om een verpleegkundige regelmatig te ontvangen. Zeventien procent van de ondervraagde ouderen dacht dat zij hier niet meer opnieuw voor zouden kiezen, terwijl 13% nog niet zeker wist wat ze zouden beslissen.

Deze vragen werden alleen aan de bezochte ouderen gesteld. We waren echter ook benieuwd naar de mening van de ouderen in de controlegroep over de huisbezoeken (221 ouderen uit deze groep werden geïnterviewd). Van deze ouderen zei 29% dat ze regelmatig bezoek van een wijkverpleegkundige op prijs zouden stellen en 13% twijfelde hierover ("misschien"). Een behoorlijk groot deel van de ondervraagde ouderen in de controlegroep leek dus niet zo erg enthousiast over dergelijke bezoeken. Hierbij moet overigens wel bedacht worden dat alle ouderen in de controlegroep bij de start van het onderzoek bereid waren om preventief bezocht te worden.

Effecten van de bezoeken op de gezondheid

Bij de resultaten t.a.v. de gezondheid wordt eerst ingegaan op de sterfte in beide groepen; (grote) verschillen in sterfte kunnen de resultaten op de andere uitkomstmaten immers beïnvloeden. Daarna wordt achtereenvolgens ingegaan op de gezondheidsbeleving, functionele status, welbevinden en de aspecten van de geestelijke toestand.

Sterfte

Er kwamen geen grote verschillen in sterfte tussen de twee groepen naar voren (tabel 5). Na twee jaar was in beide groepen 11% van de ouderen overleden. Na drie jaar was 14% van de interventiegroep (n=42) en 17% van de controlegroep (n=50) overleden. Hoewel in de bezochte groep dus iets minder ouderen overleden, waren de uiteindelijke verschillen niet groot. Deze geringe verschillen in sterfte zullen geen grote invloed hebben op de resultaten ten aanzien van de overige effectmaten.

Tabel 5. Cumulatieve sterfte in de interventie- en controlegroep gedurende drie jaar.

	interventiegroep	controlegroep
1 ^e jaar	15 (5%)	16 (6%)
2 ^e jaar	33 (11%)	32 (11%)
3 ^e jaar	42 (14%)	50 (17%)

Gezondheidsbeleving

Bij de gezondheidsbeleving gaat het om een door de ouderen toegekend rapportcijfer voor hun gezondheid tussen de 0 (zeer slechte gezondheid) en 10 punten (uitstekende gezondheid). Zowel na anderhalf als na 3 jaar bleken er nauwelijks verschillen tussen de twee groepen in gezondheidsbeleving te bestaan (tabel 6). Gemiddeld gaven de ouderen in beide groepen zichzelf ongeveer een 7 voor hun gezondheid op de verschillende meetmomenten.

Tabel 6. Gemiddelde scores op gezondheidsbeleving in de beide groepen.

meting	interventie groep	controle groep	verschil (90% PI)
start	7,2	7,2	0,0 (-0,2, 0,2)
1,5 jaar	7,2	7,1	0,1 (-0,2, 0,4)
3 jaar	6,9	6,8	0,1 (-0,2, 0,4)
3 jaar (interviews)	7,0	7,1	-0,1 (-0,2, 0,4)

Halverwege en aan het eind van het onderzoek vroegen we of de gezondheid verbeterd dan wel verslechterd was in vergelijking met de situatie bij de start van de studie. Deze veranderingen werden niet verschillend beoordeeld door bezochte en niet-bezochte ouderen. Ook kwamen er geen verschillen tussen de beide groepen naar voren op de vraag in hoeverre men zelf invloed kon uitoefenen op de gezondheidstoestand.

Functionele status

Ook in de functionele status, uitgedrukt in ADL- en huishoudelijke beperkingen, kwamen er geen verschillen tussen de bezochte en niet-bezochte groep naar voren (tabel 7). Na drie jaar bleken de ouderen in beide groepen gemiddeld 0,5 ADL activiteiten en 2 huishoudelijke activiteiten niet meer zelfstandig uit te kunnen voeren.

Tabel 7. Gemiddelde scores op de functionele status (ADL en huishoudelijke beperkingen) in beide groepen.

meting (score)*	interventie groep	controle groep	verschil (90% PI)
ADL-beperkingen (0-5 punten)			
start	0,1	0,2	-0,1 (0,0, 0,2)
1,5 jaar	0,3	0,3	0,0 (-0,1, 0,1)
3 jaar	0,6	0,5	0,1 (0,0, 0,2)
3 jaar (interviews)	0,5	0,5	0,0 (-0,2, 0,2)
huishoudelijk beperkingen (0-5 punten)			
start	1,5	1,6	-0,1 (-0,1, 0,3)
1,5 jaar	2,0	2,0	0,0 (-0,3, 0,3)
3 jaar	2,2	2,3	-0,1 (-0,2, 0,4)
3 jaar (interviews)	2,0	2,0	0,0 (-0,3, 0,3)

* De onderstreepte score geeft de meest gunstige score aan.

Tijdens de mondelinge interviews na drie jaar werden met het oog op de lichamelijke gezondheid van de ouderen, behalve over de functionele status, ook vragen gesteld over het vóórkomen van klachten, zoals vermoeidheid en kortademigheid. Tevens werd naar het gehoor en het gezichtsvermogen, alsmede naar duizeligheid, slaapproblemen en valpartijen gevraagd. Op al deze kenmerken verschilden de beide groepen niet van elkaar. Ter illustratie worden in tabel 8 de resultaten met betrekking tot enkele gezondheidsklachten weergegeven.

Tabel 8. Het vóórkomen van gezondheidsklachten in het laatste half jaar van de interventieperiode (n=232 in de interventiegroep en n=221 in de controlegroep).

klacht	groep	frequentie van vóórkomen			
		(bijna) nooit	soms	vaak	overleden*
hoofdpijn	interventie	177 (65%)	35 (13%)	20 (7%)	41 (15%)
	controle	176 (65%)	34 (13%)	11 (3%)	48 (18%)
vermoeidheid	interventie	126 (46%)	60 (22%)	46 (17%)	41 (15%)
	controle	127 (47%)	60 (22%)	33 (12%)	48 (18%)
prikkelbaar- heid	interventie	184 (67%)	41 (15%)	7 (3%)	41 (15%)
	controle	173 (65%)	43 (16%)	4 (2%)	48 (18%)
kortademig- heid	interventie	167 (61%)	41 (15%)	24 (9%)	41 (15%)
	controle	159 (59%)	41 (15%)	21 (8%)	48 (18%)

* Het aantal overleden ouderen wijkt iets af van de in tabel 5 gepresenteerde aantallen, omdat één persoon uit de interventiegroep en twee personen uit de controlegroep kort na het interview overleden, maar voordat de interventieperiode beëindigd was.

Welbevinden, eenzaamheid en aspecten van de geestelijke toestand

Gegevens over het welbevinden, eenzaamheid en de geestelijke toestand werden alleen verzameld tijdens de mondelinge interviews na drie jaar. Met betrekking tot het welbevinden bleek dat de interventiegroep gemiddeld wat slechter op 'weerbaarheid' en iets beter op 'optimisme' scoorde (tabel 9). Per saldo kwamen er met betrekking tot het welbevinden echter geen duidelijke verschillen in het voordeel van de bezochte groep naar voren. Bezochte ouderen voelden zich ook niet minder eenzaam en depressieve klachten en geheugenstoornissen kwamen bij deze ouderen niet minder vaak voor.

Tabel 9. Gemiddelde scores op welbevinden, eenzaamheid en aspecten van de geestelijke toestand in beide groepen.

effectmaat (score)†		interventie groep	controle groep	verschil (90% PI)
welbevinden:				
optimisme	(0-20)	11,7	11,5	0,2 (−0,6, 1,0)
weerbaarheid	(0-20)	15,1	15,7	−0,6 (−1,4, 0,2)
eenzaamheid	(0-11)	2,1	1,9	0,2 (−0,2, 0,6)
depressieve klachten	(4-16)	6,9	6,8	0,1 (−0,2, 0,4)
geheugenstoornissen	(0- 5)	4,3	4,4	−0,1 (−0,3, 0,1)

† De onderstreepte scores geven de meest gunstige score per effectmaat aan.

Effecten van de bezoeken op het zorggebruik

De tweede hoofdvraag van het onderzoek betreft de vraag of preventieve ouderenbezoeken het zorggebruik kunnen beïnvloeden. Eerst wordt ingegaan op de extramurale voorzieningen. Daarna volgen de intramurale voorzieningen en tot slot wordt kort ingegaan op de kosten van het zorggebruik in beide groepen.

Per voorziening wordt steeds het aantal personen in beide groepen aangegeven dat in de loop van de interventieperiode een beroep op de betreffende voorziening heeft gedaan. Daarnaast wordt de frequentie van het zorggebruik vermeld. Als samenvattende maat wordt het gemiddelde gebruik op twee 'niveaus' gepresenteerd: enerzijds wordt naar het gemiddelde zorggebruik van de gebruikers gekeken ('per gebruiker'), en anderzijds naar het gemiddelde gebruik wanneer alle personen in iedere groep in de berekening worden opgenomen ('per persoon'), dus inclusief de ouderen die geen gebruik van de voorziening hebben gemaakt. Dit gemiddelde gebruik onder alle personen van iedere groep is op zich een relevantere maat, omdat het een indruk geeft van de effecten op populatie-niveau.

Extramurale voorzieningen

Gezinszorg en wijkverpleging

Wat meer ouderen in de interventiegroep dan in de controlegroep, respectievelijk 35% en 31%, deden een beroep op de gezinszorg (tabel 10). De bezochte groep ontving ook meer uren hulp: gemiddeld 180 uur per persoon vergeleken met 159 uur in de controlegroep, een verschil van 13%.

Uit nadere analyses bleek overigens dat het verschil in ontvangen uren gezinszorg vooral naar voren kwam bij de ouderen die bij de start van het onderzoek al gebruik maakten van gezinszorg. Voor degenen die tijdens de interventieperiode in zorg kwamen, werd geen duidelijk verschil in de frequentie van hulp gevonden.

Tabel 10. Het cumulatieve gebruik van gezinszorg in de interventie- en controlegroep.

	interventiegroep (n= 292)		controlegroep (n=288)	
	aantal gebruikers	aantal uren	aantal gebruikers	aantal uren
start	53 (18%)		52 (18%)	
1 jaar	76 (26%)	17.031	72 (25%)	15.479
2 jaar	90 (31%)	34.402	82 (29%)	30.693
3 jaar	101 (35%)	52.529	90 (31%)	45.820
gedurende drie jaar:				
per gebruiker		520		509
per persoon		180		159
verschil (90% PI)		+ 21 (-22, 64)		

Zoals verwacht kon worden, ontvingen meer ouderen in de interventiegroep zorg van de kruisvereniging (45% versus 38% van de ouderen in de controlegroep, zie tabel 11). Het gemiddelde aantal contacten met de wijkverpleging was bij de

gebruikers in de bezochte groep echter lager dan in de controlegroep (29 versus 37 contacten), waardoor per saldo geen verschil in het gebruik per persoon in iedere groep naar voren kwam (gemiddeld 13 versus 14 contacten per persoon).

Tabel 11. Het cumulatieve gebruik van wijkverpleging in de interventie- en controlegroep.

	interventiegroep (n= 292)		controlegroep (n=288)	
	aantal gebruikers	aantal contacten	aantal gebruikers	aantal contacten
start	–	–	–	–
1 jaar	62 (21%)	768	53 (18%)	804
2 jaar	95 (33%)	2.052	80 (28%)	2.078
3 jaar	131 (45%)	3.779	108 (38%)	3.947
gedurende drie jaar:				
per gebruiker		29		37
per persoon		13		14
verschil (90% PI)				+ 1 (–4, 5)

Uit gegevens die tijdens de interviews na drie jaar werden verkregen bleek dat de interventiegroep vaker gebruik maakte van hulpmiddelen. Aanpassingen in de woning, zoals steunen in de douche en de toilet, kwamen ook vaker in de woningen van de bezochte ouderen voor. Deze verschillen waren niet zo groot als naar alle ouderen in beide groepen gekeken werd, maar verschillen kwamen duidelijker naar voren als rekening werd gehouden met de functionele status van de ouderen. Bij de ouderen in de twee groepen die aangaven taken niet meer zelfstandig te kunnen uitvoeren, gebruikten bezochte ouderen vaker een hulpmiddel, en aanpassingen in de woning kwamen bij deze ouderen ook vaker voor.

Huisartsconsulten en verwijzingen naar de specialist

Vrijwel alle ouderen in beide groepen hadden gedurende de interventieperiode één of meerdere keren contact met hun huisarts (tabel 12).^{*} Gemiddeld consulteerden de ouderen in beide groepen even vaak hun huisarts (zo'n 17 keer in drie jaar). Deze consulten leidden in de interventiegroep echter minder vaak tot een verwijzing naar de specialist: 55% van de bezochte ouderen en 66% van de niet-bezochte ouderen werden minimaal éénmaal door de huisarts naar een specialist verwezen (tabel 13). Het aantal verwijzingen per persoon was voor beide groepen gelijk.

Informatie over het gebruik van medicijnen werd niet met hulp van de huisartsen, maar tijdens de mondelinge interviews na drie jaar verzameld. Op dat moment gebruikte 80% van de interventiegroep en 76% van de controlegroep één of meer door een arts voorgeschreven medicijnen. Het gemiddeld aantal verschillende medicijnen dat gebruikt werd (inclusief de niet-gebruikers), lag in de interventiegroep iets hoger: 2,6 versus 2,4 medicijnen per persoon. Er werden geen duidelijke

^{*} Informatie over huisartscontacten en verwijzingen naar de specialist kon verzameld worden over 240 ouderen in de interventiegroep (82%) en 253 ouderen in de controlegroep (88%).

verschillen tussen de twee groepen gevonden in het type voorgeschreven medicijnen.

Tabel 12. Het cumulatieve aantal huisartscontacten in de interventie- en controlegroep.

	interventiegroep (n= 240)		controlegroep (n=253)	
	aantal gebruikers	aantal contacten	aantal gebruikers	aantal contacten
1 jaar	221 (92%)	1.487	220 (87%)	1.676
2 jaar	229 (95%)	2.890	242 (96%)	3.151
3 jaar	230 (96%)	4.185	246 (97%)	4.431
gedurende drie jaar: per persoon		17,4		17,5
verschil (90% PI)				+ 0,1 (-2, 2)

Tabel 13. Het cumulatieve aantal verwijzingen naar de specialist in beide groepen.

	interventiegroep (n= 240)		controlegroep (n=253)	
	aantal personen	aantal verwijzingen	aantal personen	aantal verwijzingen
start*	90 (38%)	130	98 (39%)	137
1 jaar	63 (26%)	91	91 (36%)	135
2 jaar	105 (44%)	212	137 (54%)	267
3 jaar	132 (55%)	333	166 (66%)	381
Gedurende drie jaar: per verwezen persoon		2,5		2,3
per persoon		1,4		1,5
verschil (90% PI)				+ 0,1 (-0,2, 0,4)

* T.a.v. het gebruik van poliklinische hulp bij de start van het onderzoek werd aan de huisartsen gevraagd of ouderen in de drie maanden voorafgaande aan het onderzoek onder behandeling van een specialist waren.

Overige extramurale voorzieningen

Bij de overige extramurale voorzieningen (tafeltje-dek-je, riagg en fysiotherapie) kwamen geen verschillen naar voren in het aantal personen in beide groepen dat van deze voorzieningen gebruik had gemaakt. De frequentie van het gebruik lag voor tafeltje-dek-je en fysiotherapie echter hoger in de interventiegroep, terwijl geen grote verschillen in het aantal contacten met het riagg werden gevonden. Evenals bij het gebruik van gezinszorg bleek het verschil in ontvangen maaltijden van tafeltje-

dek-je bij de ouderen in de interventiegroep naar voren te komen, die bij de start van het onderzoek al een beroep op deze voorziening deden.

Intramurale voorzieningen

Ziekenhuis

Gedurende de interventieperiode werden wat minder ouderen in de interventiegroep in het ziekenhuis opgenomen: 41% versus 46% van de ouderen in de controlegroep (tabel 14). In totaal verbleef de interventiegroep 3.838 dagen in het ziekenhuis, terwijl dit aantal voor de controlegroep 4.789 bedroeg: een verschil van 951 ligdagen in het voordeel van de bezochte groep, oftewel 3,5 dagen per persoon gedurende drie jaar.

Tabel 14. Het cumulatieve aantal ziekenhuisopnamen en ligdagen in beide groepen.

	interventiegroep (n=292)			controlegroep (n=288)		
	aantal personen	opna- men	ligdagen	aantal personen	opna- men	ligdagen
1 jaar	45 (15%)	59	1.318	64 (22%)	88	2.189
2 jaar	88 (30%)	131	2.971	108 (38%)	188	3.603
3 jaar	121 (41%)	189	3.838	133 (46%)	253	4.789
Gedurende drie jaar:						
per gebruiker		1,6			1,9	
per opname			20,3			18,9
per persoon		0,6	13,1		0,9	16,6
verschil (90% PI)						3,5 (-0,7, 7,9)

Dit verschil kwam niet tot stand doordat bezochte ouderen per opname gemiddeld minder lang in het ziekenhuis verbleven. Ook kwamen er geen duidelijke verschillen qua opname-diagnoses naar voren. Het blijkt dat het verschil m.n. is opgetreden doordat in de interventiegroep minder heropnamen plaatsvonden dan in de controlegroep. Tabel 15 laat zien dat de winst in ziekenhuisdagen tot stand kwam binnen een kleine groep ouderen die meer dan tweemaal gedurende de interventieperiode opgenomen werd.

Tabel 15. Opnamedagen in het ziekenhuis naar aantal opnamen.

	interventiegroep (n=292)			controlegroep (n=288)		
aantal opnamen	aantal personen	opna- men	ligdagen	aantal personen	opna- men	ligdagen
0	171 (59%)	–	–	155 (54%)	–	–
1	77 (26%)	77	1.845	70 (24%)	70	1.701
2	30 (10%)	60	1.066	36 (13%)	72	1.227
>2	14 (5%)	52	927	27 (9%)	111	1.861

Verzorgingshuis en verpleeghuis

Voor de meer permanente vormen van institutionalisering (verzorgingshuis- en verpleeghuisopnamen) werden geen verschillen in het voordeel van de interventiegroep gevonden. In de interventiegroep werden 20 ouderen (7%) in het verzorgingshuis opgenomen en 7 ouderen (2%) in het verpleeghuis. In de controlegroep waren deze aantallen respectievelijk 18 ouderen (6%) en 5 ouderen (2%). Ook in de verblijfsduur in beide instellingen werden geen grote verschillen tussen de twee groepen gevonden.

Kosten van het zorggebruik

Indien preventieve ouderenbezoeken het zorggebruik beïnvloeden, dan is het van belang om te bezien of hiermee ook kosten bespaard worden. Daarom zijn de kosten van het zorggebruik voor beide groepen berekend (tabel 16). Hierbij is uitgegaan van de integrale kosten van het hulpaanbod van de voorzieningen in het betreffende onderzoeksgebied. Voor de voorzieningen waarvoor (een deel van) deze informatie niet voorhanden was, zijn schattingen voor de werkelijke kosten gemaakt (wijkverpleging, huisartsenhulp en ligdagen in het ziekenhuis). Omdat alleen de verwijzingen naar de specialist geïnventariseerd zijn, zonder dat bekend is hoe vaak de ouderen een specialist vervolgens geconsulteerd hebben, zijn de kosten van de poliklinische specialistische hulp niet in de berekening opgenomen.

Tabel 16. Geraamde kosten zorggebruik in de interventie- en controlegroep (gulden).

	interventiegroep	controlegroep	Vershil per persoon
extramurale voorzieningen	2.530.724	2.209.147	+ 13%
intramurale voorzieningen	2.938.532	3.355.193	- 14%
huisbezoeken*	393.981		
totaal	5.863.237	5.564.340	
per persoon	20.080	19.321	+ 4%

* In de kosten van de (geplande en extra) huisbezoeken is de reistijd en de tijd besteed aan administratie inbegrepen.

Zoals tabel 16 laat zien, hebben de huisbezoeken geen kosten bespaard. Per persoon lagen de gemiddelde kosten van het zorggebruik in de interventiegroep 4% hoger dan in de controlegroep.

Effecten van de bezoeken in subgroepen

Naast de effecten van de bezoeken op de gehele onderzoekspopulatie, waren we ook benieuwd of er ouderen met specifieke kenmerken aan te wijzen waren die (wel) baat bij de bezoeken hadden gehad. Om dit te onderzoeken werd de populatie ingedeeld op een aantal kenmerken bij de start van het onderzoek. Deze subgroepen werden geformeerd op basis van de volgende kenmerken: leeftijd (75-79 en 80-84 jaar), geslacht, samenlevingsvorm (alleenstaand of samenwonend), huishoudelijke beperkingen (0, 1-2, of 3-5 beperkingen), en gezondheidsbeleving (rapportcijfer tussen 0-5, 6-7, of 8-10 punten). Subgroepen op basis van ADL

beperkingen werden niet in de analyses betrokken, omdat vanuit de meeste ouderen geen beperkingen op dit terrein aangaven bij de start.

Vervolgens werden per subgroep aparte analyses voor de bezochte en niet-bezochte ouderen uitgevoerd. Zo kon bekeken worden of bijvoorbeeld mannen meer profijt van de bezoeken hebben gehad dan vrouwen, of alleenstaande ouderen meer dan samenwonende ouderen. Tabel 17 geeft een samenvatting van de resultaten binnen subgroepen voor de belangrijkste gezondheidsmaten. De plus- en mintekens in de tabel hebben betrekking op de interventiegroep. Een plusteken geeft een klein (+) dan wel groot (++) verschil in het voordeel van de bezochte groep aan. Andersom geven de mintekens (- en --) een nadelig verschil aan. Indien geen 'score' is aangegeven werden er geen verschillen tussen bezochte en niet-bezochte ouderen gevonden.

Tabel 17. Samenvatting van effecten op de gezondheid binnen subgroepen.

subgroep (baseline)	gezond- heids- beleving	HHA*	ADL	welbe- vinden	een- zaam- heid	depres- sie	geheue- gen	sterfte
leeftijd								
75-79	+							
80-84					-			
geslacht								
mannen		-			-			
vrouwen	+	+						+
samenlevingsvorm								
alleen	+							+
samen			+					
huishoudelijke beperkingen								
0								
1-2	+							
3-5	+			-	-	-		
gezondheidsbeleving								
0- 5	++	++				+	+	++
6- 7			+					
8-10								

* HHA = huishoudelijke activiteiten.

Er kwamen geen duidelijke verschillen tussen 'jongere' en 'oudere' ouderen naar voren. Vrouwen lijken wat meer profijt van de bezoeken gehad te hebben dan mannen, terwijl er, anders dan verwacht, geen grote voordelen voor alleenstaande ouderen gevonden werden. Dit geldt ook wanneer naar de effecten gekeken werd voor degenen die bij de start van het onderzoek veel (3-5) huishoudelijke beperkingen aangaven.

De enige subgroep waarin overtuigende effecten gevonden werden betreft degenen die bij de start ontevreden waren over hun gezondheid (rapportcijfer 0-5). Tot deze groep behoorden 57 ouderen in de interventiegroep en 53 ouderen in de controlegroep. Bezochte ouderen in deze subgroep scoorden beter op gezondheidsbeleving en huishoudelijke beperkingen na anderhalf en na drie jaar, en minder bezochte ouderen waren overleden (zie tabel 18). Bovendien bleken zij ook,

zij het in mindere mate, gunstiger te scoren op depressieve klachten en geheugenstoornissen.

Tabel 18. Veranderingen in scores op gezondheidsbeleving en huishoudelijke beperkingen na 1,5 en 3 jaar, voor ouderen die zichzelf bij de start een onvoldoende voor hun gezondheid gaven (score 0-5) en voor hen die zichzelf een voldoende gaven (score 6-10).

effectmaat		rapportcijfer 0-5*				rapportcijfer 6-10*			
		beter	gelijk	minder	over- leden**	beter	gelijk	minder	over- leden**
gezondheidsbeleving									
1,5 jaar	interventie	48%	25%	8%	19%	25%	28%	39%	8%
	controle	37%	27%	12%	25%	21%	30%	43%	6%
3 jaar	interventie	44%	22%	11%	24%	17%	27%	44%	12%
	controle	29%	18%	12%	41%	15%	23%	49%	12%
huishoudelijke beperkingen									
1,5 jaar	interventie	21%	33%	27%	19%	9%	46%	37%	8%
	controle	14%	28%	34%	24%	13%	47%	34%	6%
3 jaar	interventie	20%	32%	24%	24%	8%	40%	40%	12%
	controle	12%	16%	32%	40%	12%	37%	39%	13%

* 57 ouderen in de interventiegroep en 53 ouderen in de controlegroep gaven zichzelf bij de start een onvoldoende voor hun gezondheid (score 0-5). In beide groepen beoordeelden 235 ouderen hun gezondheid als redelijk tot (zeer) goed (score 6-10).

** Kleine verschillen in de percentages overleden ouderen worden veroorzaakt door ontbrekende gegevens met betrekking tot gezondheidsbeleving en huishoudelijke beperkingen.

Ook bij het gebruik van voorzieningen kwamen alleen grote verschillen naar voren binnen de subgroep van ouderen die bij de start ontevreden waren over hun gezondheid (tabel 19). Het gebruik van thuiszorg nam bij de bezochte ouderen in deze categorie duidelijker toe in vergelijking met de resultaten voor de gehele onderzoekspopulatie. Het aantal huisartscontacten was vrijwel gelijk in beide groepen, maar er werden minder bezochte ouderen naar de specialist verwezen (61% versus 79% in de controlegroep) en ook het aantal verwijzingen per persoon was lager in de bezochte groep (1.7 versus 2.2 verwijzingen per persoon in de controlegroep).

Grote verschillen in het voordeel van de preventief bezochte ouderen met een minder goede gezondheid werden vooral in ziekenhuisopnamen gevonden. Minder bezochte ouderen werden opgenomen (47% versus 74% in de controlegroep) en per persoon werd een winst van 19 ligdagen behaald. Vrijwel het totale verschil in het aantal ligdagen dat voor de gehele onderzoekspopulatie gevonden werd (zie tabel 14) blijkt in deze relatief kleine subgroep naar voren te komen.

Opmerkelijk is dat daarentegen meer bezochte ouderen in het verzorgingshuis opgenomen werden (21% versus 13%) en gemiddeld verbleven deze ouderen ook tweemaal zo lang in het verzorgingshuis (3.4 versus 1.9 maand per persoon). Er werden bij deze ouderen geen verschillen in verpleeghuisopnamen gevonden.

Ondanks de relatief omvangrijke reductie van het aantal ziekenhuisdagen bleken de kosten van het totale zorggebruik vrijwel gelijk te zijn voor bezochte en niet-bezochte ouderen (per persoon 37.000 gulden in beide groepen).

Tabel 19. Gebruik van voorzieningen door de ouderen die zichzelf een onvoldoende voor hun gezondheid gaven bij de start van het onderzoek (score 0-5).

		interventiegroep (n=57)			controlegroep (n=53)		
voorziening		aantal gebruikers	frequentie gebruik (gemiddelde)*		aantal gebruikers	frequentie gebruik (gemiddelde)*	
gezinszorg (uren hulp)	start	24 (42%)			18 (34%)		
	3 jaar	34 (60%)	18.820	(330)	28 (53%)	12.864	(242)
tafeltje-dek-je (maaltijden)	start	2 (4%)			3 (6%)		
	3 jaar	5 (9%)	2.774	(49)	9 (17%)	1.253	(24)
wijkverpleging (contacten)	3 jaar	34 (60%)	1.233	(22)	27 (51%)	1.122	(21)
huisarts:**							
- contacten	3 jaar	42 (96%)	1.015	(23)	46 (96%)	1.039	(22)
- verwijzingen naar specialist	start	25 (57%)			27 (56%)		
	3 jaar	27 (61%)	74	(1,7)	38 (79%)	105	(2,2)
fysiotherapie** (contacten)	3 jaar	24 (50%)	1.716	(36)	18 (44%)	595	(15)
ziekenhuis (ligdagen)	3 jaar	27 (47%)	1.134	(20)	39 (74%)	2.043	(39)
verzorgingshuis (maanden)	3 jaar	12 (21%)	191	(3,4)	7 (13%)	103	(1,9)
verpleeghuis (maanden)	3 jaar	2 (4%)	14	(0,3)	2 (4%)	15	(0,3)

* Het gemiddelde gebruik van zorg werd over alle ouderen in iedere groep berekend (dus inclusief degenen die geen beroep op de voorziening deden).

** Gegevens over huisartscontacten en verwijzingen naar de specialist hebben betrekking op 44 ouderen in de interventiegroep en 48 ouderen in de controlegroep. De gegevensverzameling m.b.t. fysiotherapie betrof 48 ouderen in de interventiegroep en 41 ouderen in de controlegroep.

Bij de gehele onderzoekspopulatie kwamen verschillen in zowel verwijzingen naar de specialist als in ziekenhuisdagen vooral in het eerste jaar van de interventieperiode tot stand, terwijl in de resterende periode weinig aan deze verschillen werd toegevoegd (zie tabellen 13 en 14). Uit tabel 19 blijkt daarentegen dat het grootste deel van de winst op deze terreinen behaald werd bij de ouderen die bij de start ontevreden over hun gezondheid waren. We waren daarom benieuwd of de gevonden verschillen in de tijd 'samenvielen' met de effecten in deze subgroep. Hiervoor werden de gegevens over de verwijzingen en ziekenhuisdagen apart bekeken werden voor ouderen die bij de start ontevreden over hun gezondheid waren (rapportcijfer 0-5) en voor degenen die redelijk tot zeer tevreden over hun gezondheid waren (rapportcijfer 6-10).

Het bleek dat het verschil in ziekenhuisdagen inderdaad niet alleen behaald werd bij de ouderen met een slechte gezondheid bij de start, maar ook dat deze verschillen vanaf de start in deze subgroep ontstonden. Dergelijke verschillen in de tijd kwamen bij de ouderen met een betere gezondheid nauwelijks voor en na drie jaar was zowel het aantal opgenomen ouderen als het aantal ligdagen exact gelijk voor deze bezochte en niet-bezochte ouderen. Voor de verwijzingen naar de specialist werd deze trend, zij het wat minder overtuigend, eveneens gevonden.

In de overige geformeerde subgroepen werden, evenals bij de effecten op de gezondheid, geen grote (en consistente) verschillen in het zorggebruik gevonden. Alleen bij de bezochte ouderen met (3-5) huishoudelijke beperkingen werd een vergelijkbare reductie van het aantal ziekenhuisdagen gevonden als bij de ouderen die zichzelf een onvoldoende voor hun gezondheid gaven.

Tot slot kan opgemerkt worden dat de score op gezondheidsbeleving zowel bij de préstratificatie als in de subgroepanalyses in drie groepen werd ingedeeld. De indeling van deze score was gebaseerd op de gangbare interpretatie van rapportcijfers. Scores van 5 of lager, 6 of 7, en 8 of hoger komen overeen met een onvoldoende, redelijke en goede beoordeling. Hoewel een onvoldoende betrekking heeft op een cijfer van vijf of lager, gaven veruit de meeste ouderen die tot deze categorie behoorden zichzelf een vier of een vijf (gemiddelde score 4,7); scores beneden de 4 punten kwamen dus nauwelijks voor.

We vroegen ons af of een andere indeling van de score op gezondheidsbeleving tot andere resultaten zou leiden. Het ging hierbij vooral om de vraag of positieve effecten ook gevonden werden indien we de categorie met een slechte gezondheidsbeleving zouden uitbreiden met het rapportcijfer 6. Dit bleek niet op te gaan; verschillen tussen bezochte en niet-bezochte ouderen werden alleen gevonden wanneer het cijfer 5 als afkappunt werd gekozen. Dit duidt erop dat de respondenten het rapportcijfer voor hun gezondheid inderdaad in overeenstemming met de gangbare betekenis interpreteerden.

Discussie

De gedachte bij de preventieve ouderenbezoeken is dat het zinvol is om ouderen die niet bekend zijn bij de kruisvereniging 'op te sporen'. Regelmatig bezoek aan deze ouderen, waarbij de gezondheid in brede zin wordt doorgesproken en adviezen gegeven worden t.a.v. gesignaleerde gezondheidsproblemen en -risico's, zou vervolgens de gezondheid van de ouderen kunnen bevorderen en institutionalisering vermijden, dan wel uitstellen. Voor een groot deel zijn deze veronderstelde effecten in dit onderzoek niet uitgekomen.

Er konden geen effecten op de gezondheid van de ouderen aangetoond worden in termen van o.a. gezondheidsbeleving, functionele status, gezondheidsklachten, (aspecten van) welbevinden en de geestelijke toestand. De sterfte lag in de interventiegroep weliswaar lager, maar dit verschil was klein. Bij het zorggebruik kwam naar voren dat de interventiegroep in het algemeen wat meer gebruik maakte van extramurale voorzieningen. Deze toename reduceerde echter slechts ten dele het gebruik van intramurale voorzieningen. Enige positieve effecten werden gevonden op het gebruik van specialistische zorg (verwijzingen naar de specialist en ziekenhuisopnamen). Over de gehele periode gezien betrof dit echter een gering verschil: de reductie van het aantal ziekenhuisdagen was bijvoorbeeld circa een dag per oudere per jaar. Er werd geen verschil in langdurige

institutionalisering gevonden (verzorgingshuis- en verpleeghuisopnamen). Bovendien bleken de kosten van het zorggebruik in de interventiegroep niet lager te liggen.

De vraag is nu waarom er geen duidelijke effecten konden worden aangetoond. Het onderzoek kon immers onder vrijwel optimale omstandigheden uitgevoerd worden: ervaren en gemotiveerde verpleegkundigen voerden de bezoeken uit en de medewerking van de onderzoekspersonen en zorgorganisaties was uitstekend.

Het is mogelijk dat er in werkelijkheid wel positieve effecten waren, maar dat deze in dit onderzoek niet aangetoond konden worden. Hierbij kan aan de volgende aspecten gedacht worden. De meetinstrumenten om de gezondheid in kaart te brengen waren mogelijk onvoldoende 'gevoelig' om bestaande verschillen te kunnen aantonen. De verschillen tussen de groepen waren echter vrijwel nihil, of de gegevens middels schriftelijke vragenlijsten of middels interviews verzameld werden, of in de vorm van een uitgebreide schaal of via een korte directe vraag.

Een andere verklaring zou kunnen zijn dat de effecten verschillen per verpleegkundige. Dit bleek echter niet het geval te zijn. Wanneer de uitkomsten in de bezochte groep per verpleegkundige bekeken werden, bleken de resultaten voor de drie groepen bezochte ouderen hetzelfde te zijn.

Men kan ook aan zogenaamde 'interventie-effecten' denken. De bezochte ouderen bespraken regelmatig hun gezondheid met de verpleegkundige, waardoor ze zich mogelijk wat makkelijker over hun gezondheidsproblemen uitdrukten dan de ouderen die deze bezoeken niet ontvingen. Deze redenering volgend zouden de bezochte ouderen relatief slechter op de verschillende gezondheidsmaten scoren, waardoor in werkelijkheid bestaande verschillen in de gezondheid tussen de beide groepen niet naar voren kwamen.

Tot slot zou een rol kunnen spelen dat de interventieperiode te kort (en/) of de frequentie van bezoek te laag was. De periode van drie jaar lijkt echter een redelijke termijn en met betrekking tot de bezoekfrequentie werd alleen een minimaal aantal bezoeken vooraf vastgelegd. Het gegeven dat één op de drie ouderen extra bezocht werd (gemiddeld zo'n tweemaal per persoon) duidt er echter op dat indien een intensievere begeleiding nodig werd geacht, deze ook plaatsvond.

De meest plausibele verklaring voor de resultaten is ons inziens dat de populatie thuiswonende ouderen in het algemeen 'te gezond' is, waardoor het moeilijk is om middels preventieve bezoeken de toch al redelijk tot goede gezondheid van de ouderen positief te beïnvloeden. Bovendien speelt waarschijnlijk een rol dat er al een uitgebreid pakket van voorzieningen voor ouderen beschikbaar is, waardoor er geen grote aantallen ouderen zijn die noodzakelijke zorg moeten ontberen.

Enkele andere gecontroleerde studies gericht op de algemene populatie van ouderen lieten ook geen duidelijke voordelen van de bezoeken zien. In de eerder gememoreerde studie in Wales¹¹ werden weinig consistente effecten van de bezoeken gevonden. In een recente studie van deze onderzoekers kwamen geen positieve effecten van de bezoeken naar voren, al werd slechts over de effecten op het voorkómen van fracturen gerapporteerd.²⁰ Tegenvallende effecten werden ook gerapporteerd in twee experimenten waarin de algemene populatie ouderen door een verpleegkundige (en deels door een huisarts) gescreend werd, en daarna onder behandeling bleef van een multidisciplinair eerstelijns team.^{21,22} Hoewel niet helemaal vergelijkbaar geldt dit ook voor een studie waarin regelmatig telefonisch contact met ouderen werd onderhouden, in plaats van in de vorm van huisbezoeken.²³

Het Deense experiment,¹⁰ dat qua interventieperiode en bezoekfrequentie met ons onderzoek overeenkwam, liet deels overtuigender effecten van de bezoeken zien. Een substitutie-effect kwam in het Deense onderzoek duidelijker naar voren en ook werd er een groter verschil in sterfte gevonden. Uit persoonlijke gesprekken met de Deense onderzoekers bleek echter dat ook zij geen positieve effecten op de gezondheid van de ouderen gevonden hadden (hetgeen echter niet werd gepubliceerd).

Deze discrepantie in resultaten is niet met zekerheid te duiden; mogelijk bestonden er verschillen in de gezondheidstoestand van de onderzochte ouderen in Denemarken en Nederland. Hierbij kan een rol gespeeld hebben dat in ons onderzoek, in tegenstelling tot het Deense onderzoek, ouderen die bij de start al wijkverpleegkundige zorg ontvingen (en die dus een minder goede gezondheid hadden) voor het onderzoek werden uitgesloten. Daarnaast verblijven in Nederland relatief veel ouderen in een verzorgings- of verpleeghuis (respectievelijk circa 7% en 2,5% van de ouderen boven de 65 jaar).^{24,25} Van de andere kant is het ook mogelijk dat de twee groepen in het Deense experiment, ondanks de toewijzing door het lot, bij de start van de studie niet goed vergelijkbaar waren.

Wanneer de resultaten van dit onderzoek en van eerder uitgevoerde studies op een rijtje gezet worden, dan is de bewijskracht naar onze mening onvoldoende om het uitvoeren van preventieve huisbezoeken bij de algemene populatie van thuiswonende ouderen aan te bevelen.

De bezoeken lijken daarentegen wel zinvol te zijn geweest voor ouderen die bij de start van het onderzoek een minder goede gezondheid hadden. Enige voorzichtigheid is echter geboden met het oog op het aantal ouderen dat tot deze subgroep behoorde (circa 55 ouderen in beide groepen). Desondanks zijn de gevonden effecten voor deze categorie ouderen om een aantal redenen overtuigend.

In de subgroep waren minder bezochte ouderen na drie jaar overleden. Men zou verwachten dat deze uitkomst de resultaten op de andere (en in onze ogen belangrijkere) effectmaten nadelig zou beïnvloeden. Immers, indien minder bezochte personen overlijden zijn er aan het eind van het onderzoek meer ouderen met een relatief slechte gezondheid nog in leven. Doordat vergelijkbare ouderen in de controlegroep inmiddels overleden zijn, blijven er in deze groep dus meer ouderen met een relatief goede gezondheid over. Ondanks dit 'nadeel' voor de interventiegroep werden er toch positieve effecten gevonden, zowel op verschillende gezondheidsmaten als met betrekking tot het zorggebruik.

Op de tweede plaats werd een plausibele trend in effecten in de tijd gevonden. Zo traden voor de totale onderzoekspopulatie verschillen in ziekenhuisopnamen in het eerste jaar op, terwijl deze verder niet veranderden in het tweede en derde jaar. Later bleek niet alleen dat de reductie van ziekenhuisdagen vrijwel geheel behaald werd bij ouderen met een minder goede gezondheid bij de start, maar dat deze winst bij hen ook vanaf het begin van de studie behaald werd. Bij de ouderen die positiever over hun gezondheid oordeelden (rapportcijfer 6-10) kwam geen enkel verschil in ziekenhuisopnamen naar voren. Dit duidt erop dat de verpleegkundigen aanwezige problemen signaleerden en effectief 'behandelden', terwijl er geen effecten behaald konden worden bij ouderen die al een redelijk tot goede gezondheid hadden.

Tot slot komt de bevinding dat de bezoeken mogelijk wel zinvol zijn voor ouderen met een minder goede gezondheid overeen met de resultaten van twee recent gepubliceerde studies. In een Canadees experiment bij ouderen (n=167) met gezondheidsproblemen ("frail elderly") bleek in de groep die regelmatig (zo vaak als

nodig) door een verpleegkundige bezocht werd zowel institutionalisering als sterfte verminderd te zijn.²⁶ Ook een recent gepubliceerde studie in Wales wees in deze richting.²⁷ In dit onderzoek (n=725) werd ook een schriftelijke enquête gebruikt om ouderen te selecteren en informatie over hun gezondheid te verzamelen. Vervolgens werden alleen die ouderen in de interventiegroep bezocht die problemen met hun gezondheid rapporteerden, of die de vragenlijst niet hadden teruggestuurd (samen circa 60% van de ouderen). Resultaten werden echter voor de gehele populatie gerapporteerd, ongeacht of ze al dan niet bezocht waren door de verpleegkundige. De interventiegroep scoorde na drie jaar beter op gezondheidsbeleving en minder ouderen in deze groep waren overleden (18% versus 24% in de controlegroep), terwijl er geen verschillen op andere gezondheidsmaten gevonden werden. Verschillen in ziekenhuisdagen kwamen overeen met het in dit onderzoek gevonden verschil (circa 1 dag per oudere per jaar). Er werden geen resultaten apart gerapporteerd voor de ouderen die ook daadwerkelijk de interventie ontvangen hadden (vergeleken met een subgroep uit de controlegroep met een zelfde gezondheidstoestand bij de start). Waarschijnlijk zijn de gerapporteerde overall effecten echter een onderschatting van het effect bij de ouderen die bij aanvang van de studie een slechte gezondheid hadden.

Implicaties

Preventieve ouderenbezoeken vanuit het kruiswerk lijken niet zinvol voor de algemene populatie van ouderen. Wanneer extra aandacht aan thuiswonende ouderen wordt gegeven, zou deze beperkt kunnen worden tot ouderen die al gezondheidsproblemen hebben. De consequentie hiervan is dat niet alleen de doelpopulatie aanzienlijk gereduceerd kan worden, maar dat ook de ideeën over deze vorm van preventie bij ouderen in een ander daglicht komen te staan. Immers, primaire preventie gericht op relatief gezonde ouderen lijkt weinig effectief, terwijl er wel winst behaald lijkt te kunnen worden indien gezondheidsproblemen reeds aanwezig zijn (secundaire en tertiaire preventie).

De bewijskracht voor het nut van de bezoeken voor ouderen met een minder goede gezondheid heeft echter enkele beperkingen. De aantallen ouderen in ons onderzoek (rapportcijfer 0-5) en in het Canadese experiment²⁶ waren relatief gering, en bij de studie in Wales²⁷ is het niet helemaal zeker of de positieve effecten inderdaad behaald werden bij de ouderen met een slechte gezondheid bij de start van het onderzoek. Nader onderzoek bij deze categorie ouderen is derhalve gewenst.

Indien preventieve bezoeken in de toekomst gericht worden op ouderen met gezondheidsproblemen, kunnen de bevindingen van dit onderzoek nuttig zijn bij de concrete invulling van de bezoeken. Zo zou de score op gezondheidsbeleving een criterium voor de bezoeken kunnen worden. Het voordeel van deze maat is dat ze niet een afspiegeling van één, maar van verschillende gezondheidsaspecten lijkt te zijn (zowel de lichamelijke als geestelijke toestand bijvoorbeeld).^{28,29} Indien alleen de lichamelijke gezondheid als criterium gekozen zou worden, is het mogelijk dat ouderen, ondanks lichamelijke beperkingen (uitgedrukt in de functionele status bijvoorbeeld), toch tevreden over hun gezondheid zijn. Deze ouderen kunnen zich wellicht zonder de bezoeken redden. Andersom bestaat de mogelijkheid dat ouderen ogenschijnlijk een goede gezondheid hebben, terwijl ze desondanks ontevreden over hun gezondheid zijn, hetgeen op problemen op het psychische of sociale vlak kan duiden.

Er kwamen geen duidelijke aanwijzingen naar voren om demografische criteria voor de bezoeken te hanteren (leeftijd, geslacht en samenlevingsvorm), zodat het bijvoorbeeld niet zinvol lijkt om de bezoeken alleen op ouderen boven de 75 jaar te richten. Een ander criterium, dat op dit moment in de praktijk soms gehanteerd wordt, is het bezoeken van recent uit het ziekenhuis ontslagen ouderen. De resultaten van de subgroepanalyses lieten echter zien dat de winst in ziekenhuisdagen vooral behaald werd bij ouderen die zichzelf een onvoldoende voor hun gezondheid gaven. Gezien deze overlap zal het merendeel van de ontslagen ouderen voor wie de bezoeken mogelijk zinvol zijn, al opgespoord worden middels het criterium van gezondheidsbeleving.

Deels om praktische redenen zouden ouderen die reeds in zorg bij de kruisvereniging zijn, voor de bezoeken uitgesloten kunnen worden. Hoewel op dit moment onder andere nog onduidelijk is of in de toekomst curatieve en preventieve taken door verschillende deskundigheidsniveaus uitgevoerd gaan worden, ligt het niet voor de hand om ouderen die al curatieve zorg ontvangen, daarnaast apart preventief te laten bezoeken door dezelfde verpleegkundige (of verzorgende). Voorzover elementen van het huisbezoek nuttig zijn voor ouderen die al curatieve zorg ontvangen, zouden deze elementen in de 'reguliere zorg' ingebouwd kunnen worden.

Een mogelijkheid om ouderen voor de bezoeken te selecteren is het (regelmatig) verzenden van een korte schriftelijke vragenlijst. Deze methode bleek in deze, alsook in andere studies,^{16,27} een bruikbare benadering. Er kan immers informatie over de selectie-criteria verkregen worden, men kan ouderen naar hun mening over (c.q. toestemming voor) de huisbezoeken vragen en de gegevens kunnen in korte tijd tegen relatief geringe kosten verzameld worden. Bovendien wordt door het opnemen van enige aanvullende vragen over de gezondheid een redelijk beeld verkregen van de gezondheidssituatie van ouderen in het betreffende gebied.

Het is op basis van dit onderzoek niet mogelijk om de meest effectieve bezoekperiode en -frequentie aan te geven. Daar effecten bij de ouderen met een minder goede gezondheid al in de eerste helft van de interventieperiode optraden, kan overwogen worden om ouderen in ieder geval in het begin regelmatig te bezoeken (bijvoorbeeld vier keer gedurende een jaar) en daarna te beslissen over de noodzaak (en frequentie) van verdere bezoeken. Indien beoordeeld wordt dat de situatie dit 'toelaat' en afgesproken wordt dat ouderen contact zullen opnemen indien zich (nieuwe) problemen voordoen, zouden de bezoeken beëindigd kunnen worden.

Tot slot lijkt het van belang om enige richtlijnen voor een systematische uitvoering van de bezoeken op te stellen. Mogelijk kunnen onderdelen van het voor dit onderzoek ontwikkelde protocol hiervoor gebruikt worden. Daar het protocol door slechts drie verpleegkundigen (en in een specifieke onderzoekssetting) gehanteerd werd, lijkt het zinvol om dit protocol op grotere schaal in de praktijk te toetsen.

Literatuur

1. Fuldauer A. Bejaardenonderzoek in een huisartsenpraktijk. Proefschrift Rijksuniversiteit Leiden, 1966.
2. Tonino FJM. Bejaarden thuis; een sociaal geneeskundig onderzoek van 400 bejaarden te Breda. Proefschrift Katholieke Universiteit Nijmegen. Breda: van de Wijngaard, 1969.
3. Huygen FJA, Schreurs BGW. Huisarts en wijkverpleegster; proefneming met een eenvoudig gezamenlijk te verrichten bejaardenonderzoek. Huisarts en Wetenschap 1972; 15: 41-6.

4. Bakker C. Periodiek geneeskundig onderzoek van bejaarden in een huisartspraktijk. Huisarts en Wetenschap 1985; 28: 55-7 (supplement H & P 9).
5. Fuldauer A, Heringa SJ, Peeters Th, Weustink G, Willems H. Het screenen van bejaarden. Maandblad voor de Geestelijke Volksgezondheid 1983; 3: 201-15.
6. Willemse PMA. Geriatrische zorg in de huisartspraktijk. Het eenmalig consult. Medisch Contact 1981; 22: 667-9.
7. Brouwer W. Het eenmalig geriatrisch consult. Medisch Contact 1983; 26: 140-4.
8. Fockert JA de. De geriatrische polikliniek van een algemeen ziekenhuis. Medisch Contact 1985; 10: 294-6.
9. Rossum HJL van, Frederiks CMA. Heeft preventief ouderenbezoek door wijkverpleegkundigen zin? De Nederlandse discussie en buitenlands onderzoek. Tijdschrift voor Gerontologie en Geriatrie 1988; 19: 3-6.
10. Hendriksen C, Lund E, Stromgård E. Consequences of assessment and intervention among elderly people: a three year randomised controlled trial. British Medical Journal 1984; 289: 1522-4.
11. Vetter NJ, Jones DA, Victor CR. Effect of health visitors working with elderly patients in general practice: a randomised controlled trial. British Medical Journal 1984; 288: 369-72.
12. Rossum E van, Frederiks C, Philipsen H, Kil-van Lierop J, Mantel A, Portengen J, Knipschild P. Design of a Dutch study to test preventive home visits to the elderly. Nursing Research 1991; 40: 185-8.
13. Rossum HJL van, Frederiks CMA, Portengen J. Preventief ouderenbezoek door wijkverpleegkundigen. In: Crebolder HFJM en Visser APH (red). Ouderenzorg in Limburg. Amsterdam: Thesis, 1990.
14. Tempelman CJJ. Welbevinden bij ouderen. Konstruktie van een meetinstrument. Proefschrift Rijksuniversiteit Groningen. Groningen, 1987.
15. Jong-Gierveld J de, Kamphuis FH. The development of a Rasch-type loneliness scale. Applied Psychological Measurement 1985; 9: 289-99.
16. Frederiks CMA. Zorgbehoefte van en zorgverlening aan ouderen. Proefschrift Rijksuniversiteit Limburg. Maastricht: Datawyse, 1990.
17. Zung WWK. A self rating depression scale. Archives of General Psychiatry 1965; 12: 63-70.
18. Qureshi KN, Hodgkinson HM. Evaluation of a ten-question mental test in the institutionalized elderly. Age and Ageing 1974; 3: 152-7.
19. Castelein E, Kerkstra A, Philipsen H. Preventieve huisbezoeken bij ouderen door de wijkverpleging. Verpleegkunde 1990/1991; 4: 201-11.
20. Vetter NJ, Lewis PA, Ford D. Can health visitors prevent fractures in elderly people? British Medical Journal 1992; 304: 888-90.
21. Tulloch AJ, Moore V. A randomized controlled trial of geriatric screening and surveillance in a general practice. Journal of the Royal College of General Practitioners 1979; 29: 733-42.
22. McEwan RT, Davison N, Forster DP, Pearson P, Stirling E. Screening elderly people in primary care: a randomized controlled trial. British Journal of General Practice 1990; 40: 94-7.
23. Infante-Rivard C, Krieger M, Petitclerc M, Baumgarten M. A telephone support service to reduce medical care use among the elderly. Journal of the American Geriatrics Society 1988; 36: 306-11.
24. Centraal Bureau voor de Statistiek. Statistisch jaarboek 1992. Den Haag: SDU/uitgeverij, CBS-publicaties, 1992.
25. SIG. Jaarboek verpleeghuizen 1990. Utrecht: SIG, 1991.
26. Hall N, De Beck P, Johnson D, Mackinnon K, Gutman G, Glick N. Randomized trial of a health promotion program for frail elders. Canadian Journal on Aging 1992; 11: 72-91.
27. Pathy MSJ, Bayer A, Harding K, Dibble A. Randomised trial of case finding and surveillance of elderly people at home. The Lancet 1992; 340: 890-3.
28. Tissue T. Another look at self-rated health among the elderly. Journal of Gerontology 1972; 27: 91-4.
29. Jylhä M, Leskinen E, Alanen E, Leskinen A, Heikkinen E. Self-rated health and associated factors among men of different ages. Journal of Gerontology 1986; 41: 710-7.

Dankwoord

Ook voor dit onderzoek geldt dat het niet door één persoon verricht is. Op de eerste plaats wil ik alle ouderen danken die gedurende een aantal jaren bereidwillig aan het onderzoek hebben meegewerkt. De huisbezoeken, waar het in dit project allemaal om draaide, werden deskundig en met veel enthousiasme uitgevoerd door Roos Dekkers-Beemer, José Moonen-Strous en Leny Snellen. Het verliep allemaal vlekkeloos; het leek alsof jullie nooit anders gedaan hadden. Voor mij was het erg motiverend om met jullie intensief in de praktijk te kunnen samenwerken. Ik dank jullie voor de boeiende 'Ospelse tijd'.

Onderzoeksgegevens komen zeker niet aanwaaien. Winnie van Oorschot-van de Sande zorgde ervoor dát de gegevens binnen kwamen. Ze ontwikkelde ook programmatuur om de vele databestanden toegankelijk te maken voor de analyses. Bovendien regelde ze op prima wijze vele andere zaken. Winnie, je hebt een grote klus, vaak onder tijdsdruk, uitstekend geklaard.

Het is onmogelijk om alle personen en organisaties in de regio Weert die belangrijke bijdragen aan het onderzoek geleverd hebben, apart te bedanken. Medewerkers van de extra- en intramurale voorzieningen, de gemeenten Weert, Nederweert en Stramproy en het (voormalige) Centraal Ziekenfonds Limburg registreerden de gegevens over het zorggebruik en de sterfte. De ouderenverenigingen waren behulpzaam bij het uitvoeren van de schriftelijke enquêtes. De interviewsters verzamelden met veel inzet gegevens over de gezondheid van de deelnemers aan het onderzoek.

Een belangrijke factor was de goede samenwerking met het Limburgse kruiswerk. Alle medewerkers van de Districtsvereniging Midden-Limburg en Het Provinciaal Samenwerkingsverband wil ik hiervoor hartelijk danken. Christien Kooijman was intensief betrokken bij de inhoudelijke uitwerking van de huisbezoeken. Jacques Trienekens leerde ons wat een computer allemaal kan (en niet kan). Ook de leden van de begeleidingscommissie van het onderzoek wil ik danken voor de constructieve samenwerking in de afgelopen jaren.

Het onderzoek moest binnen vier maanden op de rails staan. De onderzoeksgroep, bestaande uit medewerkers van het Limburgse kruiswerk en de universiteit, leek wel een 'task force'. In de eerste maanden vergaderden we wekelijks, veelal in de avonden. Later werd dit iets minder, maar gedurende lange tijd kwamen we nog maandelijks bij elkaar. Als beginnend onderzoeker kun je hier alleen maar van dromen.

Netty Kil-van Lierop was vanaf het eerste uur enthousiast over het project en wist dit op zeer korte termijn over te brengen op de overige medewerkers van de (voormalige) Kruisvereniging Weert. Na de beëindiging van haar carrière in het kruiswerk nam Jannie Wiskerke op uitstekende wijze haar plaats in de onderzoeksgroep in. Ik dank jullie beiden voor de waardevolle bijdragen aan het project.

Zonder de bevlogen inbreng van Toon Mantel had het onderzoek niet volgens de regels van het onderzoeksspel in de praktijk uitgevoerd kunnen worden. Zijn plotselinge overlijden in mei 1990, kort na zijn pensionering, was een grote schok. De samenwerking met Ko Portengen was een waar genoegen. Ko, in de eerste jaren heb je veel energie in het onderzoek gestopt. Nadat je van baan en woonplaats

veranderde, werd de samenwerking natuurlijk minder intensief, maar we bleven, en ik hoop blijven, contact houden.

Hans Philipsen en Paul Knipschild, mijn promotoren, zijn beiden intensief bij alle stadia van het onderzoek betrokken geweest. Hans, je kennis over en grote onderzoekservaring op het terrein van de thuiszorg zijn zowel voor het onderzoek als voor dit proefschrift erg belangrijk geweest. Paul, als geen ander weet jij mensen enthousiast te maken voor onderzoek. Je leerde me dat onderzoek ook een creatieve aangelegenheid is en je wees op het belang om nieuwe in plaats van platgetreden paden in te slaan. Bovendien bekeek je de vele conceptteksten niet alleen razendsnel, je wist ze ook om te toveren tot leesbare geschriften.

De belangrijke rol van Carla Frederiks, mijn co-promotor, is moeilijk kort samen te vatten. Na mijn afstuderen kon ik ruim een jaar ervaring opdoen in haar promotieonderzoek. Tijdens die periode initieerde zij ook dit onderzoek. In de afgelopen jaren heeft ze continu laten zien waar het bij het begeleiden van onderzoekers op aan komt. Nooit was haar iets teveel en feilloos voelde ze aan wanneer een interventie geïndiceerd was. Naast haar voortreffelijke inhoudelijke coaching hebben we samen ook veel plezier beleefd. Carla, ik heb onze samenwerking altijd als een groot voorrecht beschouwd.

Met veel plezier heb ik de afgelopen jaren bij de vakgroep Epidemiologie doorgebracht. Het secretariaat, met name Riny Bodifée, dank ik voor alle ondersteuning. Sacha van de Crommert was behulpzaam bij het ontwikkelen van computerprogrammatuur en het invoeren van de onderzoeksgegevens. Thum Aarts verzorgde op professionele wijze de lay-out van het proefschrift, waarbij hij zich niet door een millimeter meer of minder van de wijs liet brengen. Thum, danke! Op de achtergrond stond Ad Vissers altijd paraat om materiële en financiële problemen op te lossen.

Met velen heb ik regelmatig van gedachten gewisseld over het onderzoek. Met name wil ik Riekie de Vet, Marian Maaskant, Pieter Leffers en Fons Kessels hiervoor bedanken. Fons lag soms zelfs wakker van de addertjes onder het analysegras, waarna hij geduldig de ins en outs van enkele analysetechnieken uitlegde. Ook Lex Volovics adviseerde me over de data-analyse. Gerben ter Riet voorzag het manuscript van 'puntig commentaar'. Jan Klerkx maakte van het Nederlandse Engels echt Engels en hij deed dit altijd snel en nauwgezet. Renée van Rossum ontwierp met smaak de omslag van het proefschrift.

Vanaf het begin was Margreet te Wierik mijn onderzoeksmaatje. Vooral in het eerste jaar was onze kamer voor haar geen rustige werkplek. Altijd was ze bereid om over het onderzoek te discussiëren en om bij te springen als de nood aan de man kwam. Margreet, ik denk met veel plezier en waardering terug aan onze onderzoeksjaren.

Mijn ouders stonden en staan altijd voor me klaar. Ik dank jullie voor deze steun en warme belangstelling. Dit geldt ook voor Peter Fiselier, een vriend waar ik altijd op kan terugvallen.

Er is enige resistentie nodig bij de partner van een met het proefschriftvirus geïnfecteerde onderzoeker. Vaak riep ik dat het slechts tijdelijk iets drukker was. Joke, je was vooral in het laatste jaar bereid om qua gezelligheid en taakverdeling in huis genoeg te nemen met respectievelijk veel minder en (iets!) meer. Jouw steun en opgewekte karakter waren niet te onderschatten factoren bij het tot stand komen van dit boekje.

Curriculum Vitae

Erik van Rossum was born in 1962 in Weert, the Netherlands. He completed secondary school ("Atheneum") at the Bisschoppelijk College in his home town in 1980. After trying to learn more about communication (HEAO in Eindhoven), he changed his plans and started in 1981 to study Health Sciences at the University of Limburg in Maastricht. He graduated in May 1986 with a specialization in health policy and administration. After that he did his military service in a 'civilized' way at the Department of Epidemiology, University of Limburg. During this period he assisted in a research project studying the care needs and service use of elderly people, and was involved in educational activities for the Faculty of Health Sciences. From 1988 until 1992 he was a research fellow at the same department, during which period he conducted the study reported in this thesis. At present, he is assistant professor at the Department of Epidemiology.

Erik van Rossum werd in 1962 te Weert geboren. Na het behalen van zijn VWO-diploma aan het Bisschoppelijk College te Weert (1980) studeerde hij een jaar communicatie in Eindhoven (HEAO). Daarna startte hij met de studie Gezondheidswetenschappen aan de Rijksuniversiteit Limburg (RL) te Maastricht. In mei 1986 studeerde hij af met als afstudeerrichting Beleid en Beheer van Gezondheidszorgvoorzieningen. Daarna vervulde hij zijn vervangende dienstplicht bij de vakgroep Epidemiologie van de RL. Hij was als assistent betrokken bij een onderzoek naar de zorgbehoefte van en zorgverlening aan ouderen. Daarnaast verzorgde hij onderwijstaken voor de Faculteit der Gezondheidswetenschappen. Van 1988 tot en met 1992 verrichtte hij als toegevoegd onderzoeker bij de vakgroep Epidemiologie de studie die in dit proefschrift beschreven is. Momenteel is hij als universitair docent verbonden aan dezelfde vakgroep.

Effects of preventive home visits to the elderly

Erik van Rossum

It has been claimed that preventive home visits by public health nurses improve the health status of elderly people and reduce their use of (expensive) institutional care. The merits of these visits were assessed in a controlled experiment in the Netherlands among about 600 elderly subjects (aged 75-84). Half of the subjects were visited four times a year over a three year period by experienced nurses, whereas the other subjects received no visits. This thesis describes the design and results of the experiment.

Preventieve ouderenbezoeken door wijkverpleegkundigen zouden de gezondheid van ouderen bevorderen en het gebruik van (dure) intramurale zorg voorkómen. Of dit inderdaad het geval is werd onderzocht in een gecontroleerd experiment onder circa 600 ouderen (75-84 jaar). De helft van hen werd gedurende een periode van drie jaar driemaandelijks preventief bezocht door ervaren wijkverpleegkundigen. De andere helft ontving geen bezoeken. Dit proefschrift beschrijft de opzet en de resultaten van het experiment. In aanvulling op de Engelse tekst is een uitgebreide Nederlandse samenvatting opgenomen.