

General practice

Effects of preventive home visits to elderly people living in the community: systematic review

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website
extra

A table with details
of the preventive
home visits
appears on the
BMJ's website

www.bmj.com

Abstract

Objective To assess the effects of preventive home visits to elderly people living in the community.

Design Systematic review.

Setting 15 trials retrieved from Medline, Embase, and the Cochrane controlled trial register.

Main outcome measures Physical function, psychosocial function, falls, admissions to institutions, and mortality.

Results Considerable differences in the methodological quality of the 15 trials were found, but in general the quality was considered adequate.

Favourable effects of the home visits were observed in 5 out of 12 trials measuring physical functioning, 1 out of 8 measuring psychosocial function, 2 out of 6 measuring falls, 2 out of 7 measuring admissions to institutions, and 3 of 13 measuring mortality. None of the trials reported negative effects.

Conclusions No clear evidence was found in favour of the effectiveness of preventive home visits to elderly people living in the community. It seems essential that the effectiveness of such visits is improved, but if this cannot be achieved consideration should be given to discontinuing these visits.

Introduction

The development of effective preventive interventions aimed at the maintenance of health and autonomy of elderly people living in the community has received much attention in the past two decades. In both North America and north west Europe a substantial number of randomised controlled trials have examined the effects of preventive interventions on elderly people living in the community. We focus on one specific category of these interventions: preventive home visits.

On the basis of the definition of comprehensive geriatric assessment by Stuck,¹ we defined preventive home visits as visits to independently living elderly people, which are aimed at multidimensional medical, functional, psychosocial, and environmental evaluation of their problems and resources. This evaluation results in specific recommendations aimed at reducing or treating the observed problems and preventing new ones.

In 1993 Stuck et al performed a meta-analysis of randomised controlled trials examining the effects of five types of comprehensive geriatric assessment,¹ one of which concerned elderly people living at home. This kind of geriatric assessment at home is fairly comparable to preventive home visits. The authors concluded that assessment of elderly people at home seems to have some positive effects on mortality, residential status (a higher percentage living at home), and number of hospital admissions. Owing to conflicting results and the small number of trials included in the analyses, however, many aspects of the potential effectiveness of such interventions remained unclear. In the past seven years a substantial number of new randomised controlled trials have been performed to gain more insight into the effects of preventive home visits to elderly people living in the community. Our systematic review provides an updated and elaborated qualitative analysis of available such trials. Given the considerable heterogeneity of the interventions we decided not to pool the data of the trials. Pooling the data in case of heterogeneity might lead to oversimplified conclusions.^{2,3} We aimed to summarise the effects of preventive home visits on physical function, psychosocial function, falls, admissions to institutions, and mortality in elderly people living in the community and to assess the methodological quality of the trials included.

Methods

Search strategy

We identified randomised controlled trials by searching Medline (1966 to May 1999), Embase (1989 to March 1999), and the Cochrane Controlled Trials Register and by screening references given in relevant systematic reviews and identified trials. No language restrictions were imposed. For the selection of randomised controlled trials the first stage of the search strategy recommended by the Cochrane Collaboration⁴ was used in conjunction with a specific search for the intervention and population at issue. We used the key words "geriatric assessment," "home visit," "health visit," and "health screening" combined with the exploded MeSH term "aged" and any of the words "prevent," "screen," "health education," or "health

promotion.” We used wild card characters to ensure that all forms of words were included.

Selection of articles

We included articles in two stages. At the first stage all articles were included that described randomised controlled trials studying the effects of interventions consisting of home visits to elderly people living in the community aged 65 and over. Inclusion criteria were applied independently by two reviewers (JCMvH and JPMd) to the abstracts, titles, and keywords of the references retrieved by the literature search. Subsequently, the full text of the included articles was retrieved, and author, institution, and journal name were removed from the copies. At the second stage the two reviewers applied the following additional inclusion criteria to the “blinded” articles to make a final selection of articles for review: (a) the home visits were aimed at prevention or reduction of problems and risks related to ageing; (b) during the home visits an (multidimensional) evaluation of problems and resources in at least two of the following categories was performed: medical, functional, psychosocial, or environmental. This evaluation resulted in specific recommendations aimed at reducing or treating the observed problems and preventing new ones; (c) the home visits were not exclusively aimed at patients who had been discharged from hospital; (d) the home visits were not exclusively aimed at helping patients to cope with a specific illness; and (e) data on at least one of the following outcome measures were presented: physical function, psychosocial function, falls, admissions to institutions, and mortality. Disagreement between the reviewers was resolved by consensus.

Criteria based analysis

To assess the methodological quality of the included trials we used an adapted version of the criteria list by van Tulder et al (box).⁵

The quality assessments were performed independently by the two reviewers, with “blinded” copies of the articles. The maximum quality score for each study was 19 (“yes,” 1 point; “partly,” 0.5 points; and “no” or “unclear,” 0 points). Disagreement between the reviewers was resolved by consensus.

Data extraction

The reviewers independently extracted the following data from the articles on a structured form: country, number of subjects in each study group, characteristics of subjects, duration of follow up, characteristics of the intervention, and results regarding physical function, psychosocial function, falls, admissions to institutions, and mortality.

Results

Search strategy

Overall, 244 abstracts were screened resulting in the first stage inclusion 29 of potentially relevant articles.^{6–33} After applying the second stage inclusion criteria to the full text of these articles, 16 studies remained. One study¹⁴ was an elaboration of a previously published study, so we decided only to review the previous one. We finally included 15 studies.^{9 11 13 15 17 18 19 23 25 26 29 31–33}

Criteria list for assessment of methodological quality of trials

Patient selection

- Were the eligibility criteria clearly specified?
- Was a method of randomisation performed?
- Were the groups similar at baseline regarding the most (potential) prognostic indicators?

Interventions

- Were the index and control interventions explicitly described?
- Were providers of regular care blinded to the intervention?
- Were there no cointerventions?
- Was there good compliance in all groups?
- Were the respondents blinded to the intervention?

Outcome measurement

- Was outcome assessment blinded to the intervention?
- Were most outcome measures relevant?
- Were there no adverse effects of the intervention on the participants?
- Was the withdrawal or drop out rate acceptable?
- Was the withdrawal or drop out random?
- Were short term follow up measurements performed?
- Were long term follow up measurements performed?
- Was the timing of the outcome assessment in both groups comparable?

Statistics

- Was the sample size for each group described?
- Did the analysis include an intention to treat analysis?
- Were point estimates and measures of variability presented for the primary outcome measures?

Methodological quality of the included studies

Table 1 shows the methodological quality of the 15 studies. The quality scores ranged from 29% to 71%, with a mean score of 54%. The main shortcomings of the studies were in the areas of blinding the regular providers of care to the intervention, reporting on the presence or absence of cointerventions, reporting on compliance to the intervention, blinding of the subjects to the intervention, blinding of outcome assessors, handling of drop outs, and intention to treat analysis. In less than 50% of the studies, all these criteria were partly or completely fulfilled.

Characteristics of the interventions

The main characteristics and objectives of the included trials can be found on the website. Substantial differences are seen between the interventions of the 15 trials. In most of the trials the intervention was aimed at the general population of elderly people aged 65 or over, without a specific selection. Six trials focused on subjects aged 75 or over.^{9 15 18 23 25 26} In only one trial was the intervention aimed at subjects with specific risk factors.²⁹ In nine trials the interventions lasted more than two years,^{9 13 15 19 23 26 31 32} and in seven trials the intervention consisted of at least two visits a

Table 1 Methodological quality of trials examining effects of preventive home visits to elderly people living in community

Study	Quality score				Total (%) score (maximum 19)
	Patient selection (maximum 3)	Interventions (maximum 5)	Outcome measurement (maximum 8)	Statistics (maximum 3)	
Carpenter et al ⁹	2.5	0.5	5.0	2.5	10.5 (55)
Fabacher et al ¹¹	3.0	1.5	3.5	2.0	10.0 (53)
Hall et al ¹³	3.0	1.0	6.5	1.0	11.5 (61)
Hendriksen et al ¹⁵	2.5	3.0	6.5	0.5	12.5 (66)
Luker ¹⁷	1.5	1.0	3.0	0.0	5.5 (29)
McEwan et al ¹⁸	2.0	2.0	5.5	1.5	11.0 (58)
Pathy et al ¹⁹	1.5	1.5	5.5	3.0	11.5 (61)
Van Rossum et al ²³	3.0	1.0	5.5	2.5	12.0 (63)
Sorensen and Sivertsen ²⁵	1.0	1.0	3.5	1.5	7.0 (37)
Stuck et al ²⁶	3.0	1.5	5.5	3.0	13.0 (68)
Tinetti et al ²⁹	3.0	3.0	5.5	2.0	13.5 (71)
Vetter et al, Gwent ³¹	2.5	0.5	4.0	1.5	8.5 (45)
Vetter et al, Powys ³¹	2.5	0.5	4.0	1.5	8.5 (45)
Vetter et al ³²	2.5	0.5	4.5	2.5	10.0 (53)
Wagner et al ³³	2.0	2.0	4.5	1.0	9.5 (50)
Total (%) for category	35.5 (79)	20.5 (27)	72.5 (60)	26.0 (58)	154.5 (54)

year.^{9 11 15 17 23 26 29} In general, preventive home visits were tailored to the needs of the individual subjects. In nine trials, however, special attention was given to tailoring the intervention to the needs of the subjects by making the number of visits variable and dependent on the specific needs of the subjects.^{9 13 15 19 23 29 31 32}

Outcomes of the studies

The main results of the included studies are shown in table 2. Overall, 94 outcome measures were investigated, all of which could be classed in one of the following five categories: physical function, psychosocial function, falls, admission to institutions, and mortality. Eight trials reported at least one (significant) favourable effect of the intervention,^{9 11 15 17–19 26 29} five trials reported no effects,^{13 23 25 32 33} and in the two combined trials of Vetter et al a favourable effect was reported in Gwent but no effects were reported in Powys.³¹ None of the trials reported negative effects.

In five of the 12 trials^{9 11 17 18 19 23 25 26 29 31 33} investigating the effects of the intervention on physical functioning, the intervention group showed a major improvement in at least one measure of physical functioning: basic or instrumental activities of daily living,^{11 26} self rated health or health problem status,^{17 19} and balance, gait, and toilet transfer skills.²⁹

Eight studies investigated psychosocial function (including satisfaction with life).^{13 17 18 19 23 25 31} In only one trial were favourable effects observed (attitude to own ageing, loneliness, isolation and emotional reaction) in the intervention group.¹⁸

Six trials investigated the number of falls.^{9 11 23 29 32 33} In two of these a significant reduction in the number of falls was observed in the intervention group.^{9 29}

Seven trials investigated admissions to institutions.^{11 15 19 23 25 26 29} In two of these a significant reduction was observed in admissions to hospital¹⁵ and permanent nursing homes.²⁶

Three of the 13 trials^{9 11 15 18 19 23 25 26 29 31–33} that investigated mortality showed a significantly lower

mortality rate in the intervention than control group (in Gwent in the case of Vetter et al³¹).^{15 19}

Discussion

No clear evidence exists for the effectiveness of preventive home visits to elderly people living in the community. The observed effects of the interventions are considered to be fairly modest and inconsistent, especially as preventive home visits are costly and time consuming. This indicates a need for further improvement in the effectiveness of preventive home visits to make these interventions more beneficial in the long term. If substantial improvements in effectiveness cannot be achieved, consideration should be given to discontinuing such visits.

Although we found considerable differences in the methodological quality of the 15 trials—scores ranged from low (29%) to good (71%)—generally, the quality was considered adequate. Considerable methodological improvements are, however, still possible in the blinding of outcome assessors, handling of drop outs, checking for cointerventions, assessing and reporting compliance to the intervention, and performing intention to treat analyses.

Methodological issues

Our results might be criticised for several reasons. Firstly, although several different search strategies were used to detect relevant trials it is possible that we failed to detect unpublished outcome data, owing to publication bias. Such bias arises when non-significant or negative outcome data are selectively omitted from publication. The potential effect of publication bias on the outcomes of our review might therefore be a further weakening of the already rather modest evidence for the effectiveness of preventive home visits.

Secondly, because some of the trials seem to be underpowered,^{11 13 17} it is possible that we slightly underestimated the effectiveness of the visits. Pooling the data of the trials could have shed more light on this issue, but owing to the considerable heterogeneity of the interventions we thought this was not justified.

Implications

To improve the effectiveness of preventive home visits it is important to gain a better understanding of the relation between specific characteristics of the home visits and favourable outcomes. Based on the information available, however, we could not reliably assess this mainly because of the multidimensional character of the interventions, which makes it difficult to distinguish the active elements from the total set of programme elements.

Several other factors complicate the analysis of the relation between specific intervention characteristics and favourable outcomes. Firstly, most trials provide only general information about the characteristics of the intervention. Secondly, most trials provide little or no information about the extent to which the intervention programmes were implemented according to plan. Unsuccessful implementation of the intervention protocol could have diminished the effects of (potentially effective) interventions. Thirdly, in most

Table 2 Effects of preventive home visits to elderly people living in the community. Values are numbers in intervention (control) group

Study (country)	Follow up period	No	Physical function	Psychosocial function	Effect on falls	Admissions to institutions during follow up	Mortality in follow up period
Carpenter et al ⁸ (UK)	3 years	272 (267)	No significant effects on disability score	Not assessed	Significant favourable effects: 12 (36)*	Not assessed†	Not significant
Fabacher et al ¹¹ (USA)	1 year	131 (123)	Significant favourable effects on instrumental activities of daily living; no significant effects on activities of daily living	Not assessed	Not significant	No significant effects on admissions to hospital and nursing homes	Not significant
Hall et al ¹³ (Canada)	3 years	81(86/81)	Not assessed	No significant effects on Memorial University happiness scale, health locus of control, MacMillan health opinion index, University of California at Los Angeles loneliness scale, social readjustment rating scale	Not assessed	Not assessed‡	Not assessed‡
Hendriksen et al ¹⁵ (Denmark)	3 years	285 (287)	Not assessed	Not assessed	Not assessed	Significant favourable effects for admissions to hospital: 219 (271); no significant effects on admissions to nursing homes	Significant favourable effects for subjects in intervention group: 56 (75)
Luker ¹⁷ (UK)	5 months	60 (60)	Significant favourable effects on health problem status	No significant effects on life satisfaction index-A	Not assessed	Not assessed	Not assessed
McEwan et al ¹⁸ (UK)	20 months	151 (145)	No significant effects on elicited health problems, activities of daily living§, energy, pain, sleep, or mobility	Significant favourable effects on attitude to own ageing, loneliness, isolation, emotional reaction; no significant effects on agitation	Not assessed	Not assessed	Not significant
Pathy et al ¹⁹ (UK)	3 years	369 (356)	Significant favourable effects on self rated health; no significant effects on Townsend score or Nottingham health profile	No significant effects on life satisfaction index	Not assessed	No significant effects on admission to hospital, or long term institutional care	Significant favourable effects for subjects in intervention group: 67 (86)
Van Rossum et al ²³ (Netherlands)	3 years	292 (288)	No significant effects on self rated health, health complaints, instrumental activities of daily living, or activities of daily living	No significant effects on wellbeing, loneliness, or depressive complaints	Not significant	No significant effects on admission to hospital¶ or long term institutional care	Not significant
Sorensen and Sivertsen ²⁵ (Denmark)	3 years	585 (777/140)	No significant effects on subjective health or functional ability	No significant effects on loneliness or quality of life	Not assessed	No significant effects on admission to hospital or institutional care	Not significant
Stuck et al ²⁶ (USA)	3 years	215 (199)	Significant favourable effects on basic activities of daily living; no significant effects on instrumental activities of daily living	Not assessed	Not assessed	Significant favourable effects on admission to permanent nursing home: 9 (20); no significant effects on admission to hospital or short term nursing home	Not significant
Tinetti et al ²⁹ (USA)	1 year	153 (148)	Significant favourable effects on impairments in balance, toilet transfer skills, and gait; no significant effects on sickness impact profile (ambulation and mobility), postural hypotension, or impairments in leg strength or motion and arm strength or motion	Not assessed	Significant favourable effects: 52 (68)**	No significant effects on admissions to hospital	Not significant
Vetter et al ³¹ (Gwent, UK)	2 years	296 (298)	No significant effects on physical disability or mobility	No significant effects on anxiety scores, depression, quality of life, or social contacts	Not assessed	Not assessed	Significant favourable effects: 35 (60)
Vetter et al ³¹ (Powys, UK)	2 years	281 (273)	No significant effects on physical disability or mobility	No significant effects on anxiety scores, depression, quality of life, or social contacts	Not assessed	Not assessed	Not significant
Vetter et al ³² (UK)	4 years	350 (324)	Not assessed	Not assessed	Not significant	Not assessed	Not significant
Wagner et al ³³ (USA)	2 years	635 (317/607)	No significant effects on restricted activity days††, bed days, or medical outcomes study physical limitations scale	Not assessed	Not significant	Not assessed	Not significant

*Number of falls in month before interview.

†Substantial difference between study and control group in number of admissions in three year study period (335 v 252), but no significance test of this difference was reported; there were, however, significantly more long term (>6 months) admissions in control group.

‡Hall et al tested the difference between "living at home" v "died or admitted to facility": this difference was significant between intervention group and first control group.

§In one of 10 measured activities of daily living a significant reduction in experienced problems was observed; this difference, however, was also present at baseline.

¶Van Rossum also calculated risk of being admitted to hospital (subjects in control group had 40% increased risk of being admitted to hospital); this difference was significant.

**Number of falls during one year follow up.

††Only exception was that experimental group had significantly lower proportion of participants who reported an increased number of restricted activity days than visit only group.

What is already known on this topic

A meta-analysis of randomised controlled trials in 1993 examined the effects of five different types of comprehensive geriatric assessment, one of which concerned elderly people living in the community (preventive home visits). Owing to conflicting results and the small number of studies included, however, many aspects of the potential effectiveness of this kind of home visit remained unclear

In the past seven years a substantial number of new randomised controlled studies have been performed

What this study adds

Little evidence exists in favour of the effectiveness of preventive home visits to elderly people living in the community

Previous indications that preventive home visits have favourable effects on mortality and the number of hospital admissions were not confirmed by the results of this review

trials sufficient information was lacking about the compliance of the subjects to the interventions. A low compliance can negatively influence the effectiveness of the interventions and can also be an indicator of poor tailoring of the interventions to the needs of the subjects. Finally, the selection of the target populations could also have played a role in determining the level of success of the interventions. Fourteen of the trials in our review were targeted at the general population of elderly people living in the community. Only one intervention was aimed at the selection of elderly people with specific risk factors for health problems (falls).²⁹ This short term intervention showed some promising results in reducing the number of falls and risk factors for falls, especially among subjects with impairment in balance or transfer skills and those who took four or more prescription drugs at baseline. This stresses the importance of choosing the right target populations in future programmes for home visits.

Considering the lack of insight into the predictors of programme success, we expect that it will be a difficult task to make improvements in the effectiveness of preventive home visits to elderly people living in the community.

Contributors: JCMvH devised and instigated the study and performed the literature searches and with JPMD identified the articles from the literature search that met the inclusion criteria for this study, scored the methodological quality and effectiveness of the trials, and performed the data extraction. The paper was written by JCMvH, JPMD, EvR, HFJMC, and LPdew. HFJMC will act as guarantor for the paper.

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