



In-home preventive comprehensive geriatric assessment (CGA) reduces mortality—A randomized controlled trial

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ABSTRACT

The study should prove the effectiveness of a preventive in-home CGA regarding mortality and time able to stay in the community. We performed a randomized controlled trial with a mean follow-up of 6.2 years. The home visits were performed in Germany. 1620 community-living persons aged 70 years and older ($n = 630$ intervention; 990 controls) from 20 general practitioner surgeries were visited. The intervention was performed by trained medical students it included a CGA using the STEP-tool (standardized assessment of elderly people in primary care in Europe; a combination of a structured questionnaire and a structured physical examination) and additional tests, followed by recommendations for the general practitioner. The controls received usual general practitioner care. Follow-up visit was made at mean 6.2 years after randomization. The main outcome parameters were mortality and time able to stay at home. Follow-up-rate was 75%. In COX-regression-analyses, a 20% reduction of mortality and a 22% lower risk of nursing-home admission were shown in the intervention group at the follow up. Despite the main limitations of the study (general practitioners volunteered to participate, follow-up-rate <80%, possible performance of geriatric assessments also in the control group, intervention group had poorer health status than the control group, adherence to recommendations from the assessment was not verified) we conclude that the implementation of a preventive geriatric assessment into primary care in Germany seems to be reasonable.

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1. Introduction

The demographic changes in Western societies force politicians, health systems and physicians to develop alternative solutions to current care, because elderly people acquire a higher burden of diseases due to increased multimorbidity (Tacken et al., 2011).

Obviously, the group of people named as “old” is very heterogeneous, containing everything from healthy elderly to terminally ill persons. Among the solutions to help general practitioners to provide good quality care cost-effectively for healthcare systems, the in-home preventive geriatric assessment is one of the key developments. Despite numerous studies that investigated the effects of in-home preventive geriatric assessment (Elkan et al., 2001; Huss, Stuck, Rubenstein, Egger, & Clough-Gorr, 2008; Stuck, Egger, Hammer, Minder, & Beck, 2002; van Haastregt, Diederiks, van, de Witte, & Crebolder, 2000) or the effects of different forms of CGA (Beswick et al., 2008; Ploeg et al., 2005;

Stuck, Siu, Wieland, Adams, & Rubenstein, 1993) there remained questions about their actual benefits for the elderly patient.

Since the introduction of geriatric assessments several countries have included home-visiting programs in their usual healthcare (e.g. Denmark and The Netherlands) whereas others (e.g. Great Britain) have abolished them as they were not successful (Iliffe & Orrel, 2006). It requires considerable resources like time, manpower, organization and money to conduct regular in-home preventive geriatric assessments. Before introducing them into a health care system their effectiveness should be proven. In Germany a short version of the CGA was introduced into usual general practice (GP). It mandatorily includes the assessment of the global health and functional state using e.g. Barthel-Index, the assessment of the fall risk using e.g. Timed “up & go”-Test and the assessment of cognitive disorders using e.g. Mini Mental State Examination (KBV, 2011). The introduction of this short geriatric assessment was performed without studies giving evidence of any positive effects. As the German health system differs in many aspects from the systems in other countries (free access to medical specialists, patients can visit as many doctors as they want), there was an urgent need for trials in Germany (Meinck, Lubke, Lauterberg, & Robra, 2004).

Our investigation was based on the STEP-tool (standardized assessment of elderly people in primary care in Europe). The STEP

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group identified eight health domains to be considered in a preventive assessment: client's perspective and attitudes, physical state, functional state, significant symptoms, mental function, social circumstances, medication, and primary preventive issues (Junius & Fischer, 2002; Sandholzer, Hellenbrand, Renteln-Kruse, Van, & Walker, 2004; Sandholzer, Hellenbrand, & v Renteln-Kruse, 2002). The STEP-tool contains a questionnaire for the patient and a structured examination carried out by the practice nurse and general practitioner. We supplemented the STEP-tool by additional tests and analyzed the influence of the assessment toward mortality and time able to stay in the community.

The aim of the recent work was to examine whether a preventive in-home geriatric assessment is effective in the German primary care system.

2. Methods

2.1. Study participants and randomization

All general practitioners in the area of Göttingen (Lower Saxony, Germany) listed in the "Kassenärztliche Vereinigung" records were contacted (the "Kassenärztliche Vereinigung" (Association of Statutory Health Insurance Physicians; ASHIPs) coordinates ambulatory care in Germany). Twenty of them volunteered to participate and were asked to keep records over three months for every patient older than 70 years, documenting the following information: age, gender, marital status, living arrangement, diseases, disability, state of health, impaired vision, defective hearing, dementia, mobility and general condition, home visits by the general practitioner, referrals and admissions to hospital. In a recent review it was reported that predictors for nursing home admission with strong evidence were increased age, low self-rated health status, functional and cognitive impairment, dementia, prior nursing home placement and a high number of prescriptions. Predictors for nursing home admission with inconsistent results were male gender, low education status, low income, stroke, hypertension, incontinence, depression and prior hospital use (Luppa et al., 2010). Therefore we included a broad spectrum of variables that can possibly affect nursing-home admission or death. This recruiting period took place from 1991 to 1993. In total, 1620 patients gave their consent and were recruited. A stratified sample on the basis of the patient's state of health was randomly drawn by the general practitioner forming the intervention group. The state of health was rated by his general practitioner. It was six-graded: healthy, slight disorders, chronically ill, care level 1, 2 or 3 (depending on the amount of help patients needed daily). To avoid loss of power from drop-outs and considering economic efficiency (according to Dumville, Hahn, Miles, & Torgerson, 2006) we assigned 630 patients to the group who received the geriatric assessment (intervention group) and 990 patients to the control group. Exclusion criteria were death, move and refusal before or at the appointed time for the intervention. The sample size was calculated on a 0.8 power.

In 1992, 200 patients from the intervention group were visited at home and a geriatric assessment was performed. Two hundred and ninety-six patients were not visited because they were on the waiting list (intervention group 2). One hundred and thirty-four persons had died, moved or refused participation. In 1995, 236 patients of the intervention group received an assessment, 100 of them for the second time (Fig. 1).

In 1999, all patients' data were updated and all living persons received a final home visit. Ninety-four persons were lost to follow up in the intervention group and 311 in the control group (patients were labeled as lost if there was no information toward their disposition). In all, there were 536 analysable patients in the intervention group (126 alive, 410 deceased). The COX-regression

for survival in the intervention group was performed using the data of 524 patients (12 missing values out of 536). The COX-regression for community time in the intervention group was performed using the data of 402 patients (134 out of 536 had previously lived in nursing homes or values were missing). There was a total of 679 analysable patients in the control group (190 alive, 489 deceased). The COX-regression for survival in the control group was performed using the data of 645 patients (34 missing values out of 679). The COX-regression for community time in the control group was performed using the data of 595 patients (84 out of 679 had previously lived in nursing homes or values were missing).

2.2. Intervention

Home visits with CGA were performed using the STEP-assessment (Sandholzer et al., 2004) and each of the following additional tests: Barthel-Index (Mahoney & Barthel, 1965), Lambeth-disability screening questionnaire (McDowell, Martini, & Waugh, 1978), Tinetti-gait score (Tinetti, 1986), Hamilton Depression Rating Scale (Hamilton, 1960), Hospital anxiety and depression scale (Zigmond & Snaith, 1983), Mini Mental State Examination (Folstein, Folstein, & McHugh, 1975), Hierarchic Dementia Scale (Cole & Dastoor, 1996), clock drawing test (Sunderland et al., 1989; Watson, Arfken, & Birge, 1993) and COOP-Charts (Nelson et al., 1987). Four specially trained medical students performed all of these tests. The training was done by the director of this trial and included supervisions of the first twenty patients per student. The STEP-assessment consists of standardized questions concerning functional (mobility and falls) and social status, life style, physical (history, medication and current problems) and mental (depression and dementia) status. The STEP-assessment also includes a short physical examination, taking pulse and blood pressure, and the inspection of homes toward safety hazards and help for daily living. Up to 1 h was needed to complete an assessment. Spouses, caregivers or children were asked for further information when necessary and available. An overview of all documented problems of each patient of the intervention group was given to the patient's GP. Also the recommendations – made by a geriatric experienced GP-trainee under supervision of the geriatric experienced director of the study – were handed to the GPs. The GPs were responsible for implementing them. GPs were asked to rate every patient's state of health regardless of which group the patient belonged to. Control subjects received usual care including home visits by their GP when necessary. In the context of the German health care system, usual care means that the patients should consult their GP at first but they can also directly consult specialists. All the patients have in principal equal access to the necessary health care resources. Geriatric assessments are hardly performed in German GP routine. Assessments took place in 1992 and 1995. A period of five to seven years was chosen for the follow-up (mean follow-up: 6.2 years), closing the data acquisition in 1999 with a home visit for all remaining patients in order to obtain final information about primary outcome measures.

2.3. Outcome measures and statistical analysis

Main outcome parameters were mortality, nursing-home admission and time able to stay at home. Data were collected by interview from general practitioner's records, patients and family members. Analyses were conducted according to the "intention-to-treat" principle. Statistical analysis included χ^2 tests, variance analyses and COX-regression. For survival analysis COX-regression was performed controlling for age, gender and state of health at baseline. Exact date of death was available for all

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