New insights from the Danish preventive home visit trial

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Published online: 2 August 2007
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This issue contains a series of analytic papers stemming from a recent Danish controlled trial of preventive home visitation for community living elders. The senior author, Carsten Hendriksen, is a long-time pioneer developer and evaluator of systematic preventive home visit programs. In the early 1980s, Hendriksen and colleagues performed the classic Roedovre study in suburban Copenhagen, which showed that quarterly preventive home visits can reduce mortality, nursing home admissions and hospital visits, while improving function and actually saving money (Hendriksen et al. 1984). Over subsequent years, Drs. Hendriksen, Schroll, Avlund, Vass and colleagues have continued the Danish preventive home visit study tradition and expanded the scope and substance of the programs with a number of interesting follow-up studies. These valuable studies and reports helped convince the Danish government (as well as those of a few other countries) to institute a national policy of preventive geriatrics incorporating home visitation. Beginning in 1998, Danish national policy has required two annual home visits to every person aged 75 and older with the goal of preserving independence and functional ability by support of personal resources and networking. These visits are usually carried out by nurses and deal with both health and social issues, although the exact details of local programs have been left fairly flexible. As a result of the flexibility, there has been much variability among municipalities as to program characteristics, what components are included, and how

much emphasis is placed on medical concerns (Vass et al. 2002).

Soon after starting the Danish national policy, it was apparent that many communities needed more direction to optimally implement the preventive programs, and as a result, the present team of investigators initiated a multi-site controlled trial to try to understand the best ways to organize the program and to determine which components seem to be most important. They designed a unique quasi-experimental controlled trial in which willing municipalities would be randomly assigned to usual care or to receive a special education program for health visitors and local general practice physicians (GPs) as well as use of a standardized assessment tool. Of the 50 eligible municipalities invited to participate, 34 agreed, and half of them (17) were assigned to each group. The initial study population included 5,788 home-dwelling persons aged 75 and 80 at baseline. The details of this study and the first 3 year outcomes have been already reported (Vass et al. 2002, 2005). At 3 years, the 80 year-old in the intervention municipalities had significantly higher functional status than those in control municipalities, adjusting for baseline differences. Similarly, the 80-year-old in the intervention municipalities had significantly fewer nursing home days at follow-up than those in control municipalities. However, neither effects were significant in the 75-year old cohort, nor were there any effects seen on survival.

This issue's papers

The current series of papers expand upon the findings of the main study outcome paper in several ways. Two of them present functional outcome data extended out to the 4.5-year follow-up [one on general functional decline

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patterns (Vass et al. 2007a, b), and another on physical activity (Poulsen et al. 2007)]. A third paper examines another secondary outcome “tiredness in daily activities” (Avlund et al. 2007). And the fourth paper explores the possible co-role of municipal organization type on achieving positive outcomes (Vass et al. 2007a, b).

The paper on functional decline patterns creates an interesting typology for functional maintenance and decline over a 4.5-year period. Among the 75-year-old cohort, two-thirds did not show measurable decline, but among the 80-year-old cohort over half did decline. Among those who declined, the authors defined four patterns: progressive (gradual) decline, catastrophic (sudden major) decline, reversible decline, and mixed pattern. Being in the intervention program was associated with significantly reduced risk of progressive decline, and actually accepting and receiving the offered home visits was associated with a significantly decreased risk of catastrophic decline. While there were no other specific program-associated significant associations, there was greater risk of catastrophic decline among men versus women and among persons living alone versus not living alone. Moreover, as expected, the 80-year-old cohort was significantly more likely to decline in all 4 categories than the 75-year-old cohort. While these decline effects were all in the expected direction, the categorizations provide new insights and information as to how preventive interventions can work.

The paper looking at physical activity effects from the intervention was more equivocal, showing an effect only in the 80-year-old subgroup, with that effect being moderate at best. Some of the reasons behind the small measured effect were discussed by the authors—the most important being a rather insensitive activity measure combined with relatively little program emphasis on physical activity.

The symptom construct of “tiredness in daily activities” was examined in the third paper. While a large majority of subjects were not “tired” at baseline, those who were “tired” were more likely to be “not tired” at 3-year follow-up if they were in intervention group municipalities (28% of intervention group 80 year-olds ceased being “tired” vs. 14% of control 80-year-olds). Although this effect was small, and only was seen in the older group, it is consistent with a benefit from the intervention. However, whether this association is a direct result of the intervention on activity levels or mood or whether it is more related to another intervening variable remains unclear.

A qualitative analysis was performed in the fourth paper, which categorized municipality management styles into two main types: “framework management” (18 municipalities) and “management by rules” (15 municipalities). The former is more individualized and flexible but requires a higher skill level of staff, while the latter is more homogeneous and less demanding of high levels of

staff training. (One municipality was categorized into another style, but it was not analyzed separately.) About half of each municipality type was assigned to intervention and control groups. The focus-group based analysis showed distinct advantages and disadvantages for each management style, and this should be helpful for future municipalities to best match their own characteristics with a program style. Thus, this is an exploratory study that should provide grist for a variety of future studies.

Comparison with previous studies

Where do these data fall within the literature on multidimensional geriatric assessment for both frail and independent elders? We know from a multitude of studies and several meta-analyses that multidimensional geriatric assessment, when combined with appropriate follow-up in an organized program, can result in many improved processes and outcomes of care (Stuck et al. 1993; Rubenstein and Stuck 2001). These proven benefits include improved diagnostic accuracy and prescribing patterns, better functional and psychological status, longer survival, and reduced use of nursing homes and hospital days. This geriatric assessment and follow-up can take place in a number of settings, including hospital units, outpatient clinics, and home-visit programs. Each program type has advantages and disadvantages. For example, hospital units can provide a more intensive level of diagnosis and intervention than the other sites but are generally more expensive. Home visit programs are the most convenient for patients/clients but involve considerable additional time from providers and limitations as to what technology can be delivered in the home. Hospital units usually are most appropriate for delivering acute and sub-acute care to carefully targeted frail or acutely ill elders, while home visit programs are most appropriate for preventive care services to non-acutely ill elders or to those for whom a home inspection is especially desired. The current studies clearly are most comparable with the data on preventive home visits.

In the 2002 meta-analysis on preventive home visits, Stuck et al. pooled data from 18 controlled trials published between 1984 and 2001 (Stuck et al. 2002). The papers included programs in seven countries (Denmark, UK, Netherlands, Switzerland, USA, Canada and Australia). Home visits were usually performed by nurses or health visitors, although physicians, rehabilitation therapists, and lay volunteers were sometimes used. Common outcomes reported included effects of the program on nursing home admission, functional status decline, and mortality. Most of the individual studies were relatively small and tended to report positive trends for these outcomes, rather than

statistically significant results. However, when the studies were pooled in the meta-regression analysis, there were statistically significant reduction of nursing home admissions for trials of programs providing more than nine follow-up visits over the 1- to 3-year follow-up period (risk ratio [RR] = 0.66 [95% CI 0.48–0.92]), statistically significant reduced risk of functional decline among subjects in trials providing multidimensional geriatric assessment and follow-up as part of the intervention (RR, 0.7; 95% CI 0.64–0.91), and statistically significant reduced mortality among subjects in the trials with the lowest age tertile (mean age 72.7–77.5 years) (RR, 0.76; 95% CI 0.65–0.88). These subgroup analyses had all been identified in advance to test a priori hypotheses (rather than being fit to match the data), and they are all intuitively consistent. The authors concluded that preventive home visits are most effective if they include multi-dimensional geriatric assessment and multiple follow-up home visits, and target the young-old as well as the older-old population.

Results of the current studies from Denmark would at first glance seem to be somewhat at odds with the Stuck et al. (2002) meta-analysis results, in that the benefits on function and nursing home reduction occurred in the older rather than the younger cohort, and there were no apparent effects on survival. However, the current interventions provide only two follow-up visits annually and do not target or exclude any substantial groups of elders. Moreover, the current studies could be characterized as effectiveness evaluations in real-life settings—within a national healthcare system that has substantial limitations in budget and staffing levels and abilities—while most of the studies included in the meta-analysis were single-site efficacy trials that were generally at higher per-capita

budgets and had more academically oriented staffing. As a result, the current studies complement the meta-analysis and provide additional insights as to how preventive home visits for older adults can work in the real world.

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