Health promotion for frail older home care clients

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Aim. This paper reports a study evaluating the comparative effects and costs of a proactive nursing health promotion intervention in addition to usual home care for older people compared with usual home care services alone.

Background. An ageing population, budget constraints and technological advances in many countries have increased the pressure on home care resources. The result is a shift in nursing services from health promotion to meet the more pressing need for postacute care. For frail older people with long-term needs, these changes combine to create a fragmented system of health service delivery, characterized by providing nursing on demand rather than proactively.

Methods. A two-armed, single-blind, randomized controlled trial was carried out with older people ≥75 years and eligible for personal support services through a home care programme in Ontario, Canada. Participants were randomly allocated either to usual home care (control) or to a nursing (experimental) group. In addition to usual home care, the nursing group received a health assessment combined with regular home visits or telephone contacts, health education about management of illness, coordination of community services, and use of empowerment strategies to enhance independence. The data were collected in 2001–2002.

Results. Of the 288 older people who were randomly allocated at baseline, 242 (84%) completed the study (120 nursing group; 122 control group). Proactively providing older people with nursing health promotion, compared with providing

nursing services on-demand, resulted in better mental health functioning ($P = 0{\cdot}009$), a reduction in depression ($P = 0{\cdot}009$), and enhanced perceptions of social support ($P = 0{\cdot}009$) at no additional cost from a societal perspective.
Conclusions. Home based nursing health promotion, proactively provided to frail older people with chronic health needs, enhances quality of life while not increasing the overall costs of health care. The results underscore the need to re-invest in nursing services for health promotion for older clients receiving home care.

Keywords: Center for Epidemiological Studies in Depression Scale, health economics, health promotion, home care, nursing, older people, randomized controlled trial, research report, SF-36

Introduction

An ageing population, technological advances and budget constraints have led to major healthcare reforms worldwide. Extensive reform initiatives have given rise to fewer acute care hospitals and increasing pressure to continue to expand and enhance home care services for older, more vulnerable, and frail individuals within the confines of economic constraint (Bergman *et al.* 1997, Anderson & Hussey 2000, United Nations, Department of Economic and Social Affairs, Population Division 2002). Formal home care has expanded, such that the proportion of persons over 65 receiving home care now substantially outweighs the proportion receiving health services through residential institutions (Anderson & Hussey 2000). The result of these trends is increasing competition for scarce home care resources. Home care programmes have responded to this increased demand for their services by shifting the provision of care from health promotion and preventive functions, for individuals with chronic health needs, to substitution functions to meet the more pressing need for postacute care (Soderstrom *et al.* 1999, Merlis 2000). Notably, nursing is the professional service most frequently reported as being reduced or eliminated by home care programmes for older people with chronic needs (Phillips 1988, Canadian Nurses Association 1998).

Substitution of relatively inexpensive home care nursing services for inpatient acute care offers the prospect of considerable cost savings, as well as improved health outcomes (Soderstrom *et al.* 1999, Johri *et al.* 2003).Yet the efficiency resulting from this shift from preventive nursing functions to acute care substitution functions remains unclear (Parr 1996, Jacobzone 2000). On the contrary, a number of studies, done mostly in a national system of health insurance, suggest that for older people with chronic health needs, these trends combine to create a fragmented system of healthcare delivery, characterized by providing health services on-demand rather than a comprehensive and proactive system of care (Browne *et al.* 2001b, Johri *et al.* 2003). Typically, on-demand care is less effective and more costly than providing comprehensive care. Delays or errors in detecting and responding to chronically ill older people's changing health needs can contribute to more complications, cause functional decline and negative changes in quality of life (Fletcher & Bulpitt 2000), and an increased demand for healthcare services (Browne *et al.* 2001b).

Older adults, and in particular frail older adults, are particularly vulnerable. In Canada, 75–80% of home care users are older adults (Roos *et al.* 2001). They are typically over 75 years of age, and have co-occurring health problems, which are acute and chronic in nature, as well as functional disabilities. Their social support networks are frequently overextended or at risk of breaking down (Johri *et al.* 2003). Additionally, the prevalence of depression among those receiving home care is estimated to be between 26% and 44% – at least twice that among older people in general (Illife *et al.* 1993). These factors lead to comparatively greater risk for increased morbidity, institutional and general health service utilization and death (Gill & Sharpe 1999).

Recent reports on the future direction of health policy in Canada (Kirby & LeBreton 2002, Romanow 2002, Health Canada 2003) emphasize the need to coordinate and target home care services based on evidence about the most beneficial and efficient mix of services (type of provider and dose). This evidence is needed to ensure that the most appropriate services are available to those who most need them, to ensure the best health outcomes (Shapiro 2003). However, there is little information available to inform policy makers as they attempt to restructure how home care services are provided (Soderstrom *et al.* 1999, Fassbender 2000).

Background

Home care nurses are well placed to promote the health of frail older people and carry out preventive functions (Byles 2000, Elkan *et al.* 2001). Although there is promising evidence from trials conducted to evaluate the effects and

costs of preventive in-home nursing care of older people in terms of reducing hospital admissions and lengths of stay (Hendriksen *et al.* 1984, Zimmer *et al.* 1985, Hall *et al.* 1992, Pathy *et al.* 1992, Bernabei *et al.* 1998), improving functional status (Pathy *et al.* 1992, Stuck *et al.* 1995, Bernabei *et al.* 1998, Stuck *et al.* 2000), reducing mortality (Hendriksen *et al.* 1984, Vetter *et al.* 1984, Hall *et al.* 1992, Pathy *et al.* 1992), decreasing admission to long-term institutional care (Gunner-Svensson *et al.* 1984, Zimmer *et al.* 1985, Hall *et al.* 1992, Stuck *et al.* 1995, Bernabei *et al.* 1998,), reducing depression (Bernabei *et al.* 1998), increasing use of health and social services (Hendriksen *et al.* 1984, Vetter *et al.* 1984, Pathy *et al.* 1992, van Rossum *et al.* 1993, Stuck *et al.* 1995, 2000), reducing cost (Hendriksen *et al.* 1984, Zimmer *et al.* 1985, Stuck *et al.* 1995, Bernabei *et al.* 1998, Stuck *et al.* 2000), and improving caregiver outcomes (Zimmer *et al.* 1985), there are methodological shortcomings in many of these studies.

There is a lack of research that documents the effectiveness of an in-home health promotion intervention on quality of life, mental health (depression), perceptions of social support, or examines specific sub-groups of home care recipients who benefit most (Markle-Reid 2002). Although several of the studies suggested cost savings, the costs are limited to reductions in admissions to institutions rather than examining the use and costs of the full range of health services. Economists argue that the effect of a home care service on society as a whole should be considered when making decisions about the use of that service (Gold *et al.* 1996).

The interventions in these trials are limited in their primary focus on preventive care strategies rather than on health promotion. To date, research in this area has largely taken a deficit approach, focussing on illness and disease prevention strategies, to minimize the risks of chronic diseases and debilitation associated with ageing (Pender *et al.* 2002) vs. a strengths orientation focussing on health promotion and expanding an individual's positive potential for health (Caelli *et al.* 2003). Yet the data suggests that a combination of approaches is needed to enhance health and well-being and contribute to maximizing older person's independence (Hodgson *et al.* 1996, World Health Organization 1998, McWilliam *et al.* 2000). Furthermore, many of the interventions are staffed by different types of providers in addition to nursing (i.e. lay community workers and geriatricians), thus, limiting their ability to identify how the type and quality of nursing involvement contributes to the outcomes of the studies.

This study was designed to address these gaps in knowledge by examining the comparative effects and costs of a proactive nursing health promotion intervention for frail older home care clients in addition to usual home care, compared with usual home care services alone. The rationing of professional nursing services for home care clients with chronic needs allowed for a natural comparison of the effects of a proactive service with the effects of on-demand use of these services. Our hypothesis was that this model of care delivery would result in improved functional health status and quality of life, a reduction in depression, and an increase in coping and perceptions of social support at no additional cost from a societal point of view.

Conceptual model

The model of vulnerability (Rogers 1997) provided the theoretical basis for the development and evaluation of a proactive nursing health promotion intervention. Vulnerability is a net result of an interaction between the person's personal resources (cognitive, emotional, intellectual and behavioural) and their environmental supports (social, material and cultural), both of which, along with biological characteristics (age, gender and genetic endowment), are determinants of health. Within an individual, personal resources and environmental supports intersect, as shown in Figure 1, and can be synergistic and cumulative (Browne *et al.* 2001b). The base of the triangle represents the degree of vulnerability (Rogers 1997), and thus also their health status and quality of life. Based on published evidence (Browne *et al.* 1999), we hypothesized that the costs of health and

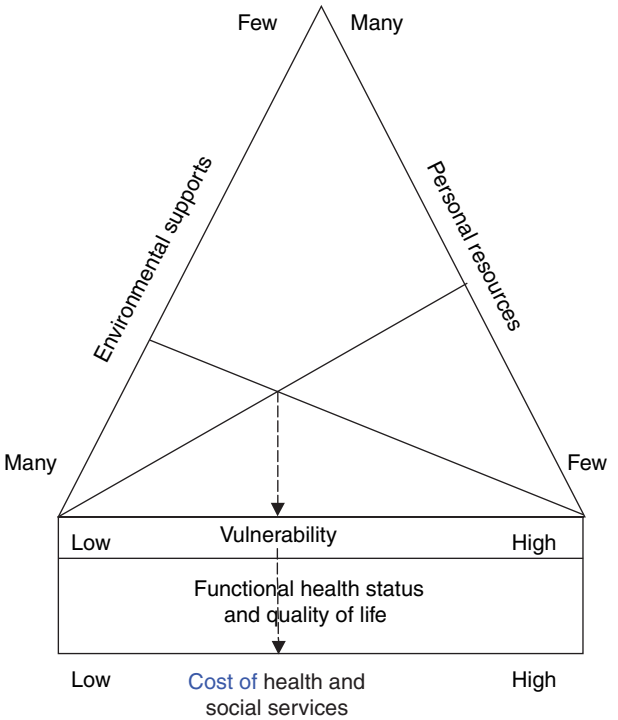

Figure 1 Model of vulnerability (Adapted from Rogers 1997).

social services increase proportionately with the level of vulnerability. Thus, the original model of vulnerability developed by Rogers (1997) was extended to include a health services index.

The study

Aim

The aim of the study was to evaluate the comparative effects and costs of a proactive nursing health promotion intervention in addition to usual home care for older people compared with usual home care services alone.

Design

This was a two-armed, single-blind, randomized controlled trial of proactive nursing health promotion in addition to usual home care vs. usual home care services alone for frail older people. Eligible and consenting participants were randomized to one of two treatment strategies, using a computerized randomization schedule, which randomly assigns subjects to two groups to ensure equal numbers at baseline in both groups. The data were collected in 2001–2002.

Power calculation

The sample size was calculated to detect a clinically important difference of five points in mean change scores between groups in the SF-36 mental health component summary score (Ware & Kosinski 2001). A sample size of 276 (138 older people per arm) was estimated to be sufficient to address this primary outcome including an allowance of an additional 20% to offset drop-outs (two-tailed alpha = 0·05; beta = 0·20).

Participants

Study participants were 75 years of age or older and newly referred to and eligible for personal support services through the Community Care Access Centre (CCAC) in Ontario, Canada. The CCAC provides publicly funded home care using a contractual model of service delivery. In this model, publicly funded employees (case managers) contract out home care services to agencies which provide care to clients. CCACs also provide long-term care facility placement, and information and referral to other community services (Coyte & Young 1999). Individuals were eligible for personal support services if they required assistance with personal care. Personal care may be provided either by a caregiver or a personal support worker contracted by the CCAC. Potential study participants were excluded if they refused to give informed consent, were unable to understand English or if they were deemed eligible for nursing services. At study start-up, 63% of CCAC clients eligible for personal support services in this CCAC were 75 years of age and older.

Interventions

Both study groups received usual home care services. The interventions are described below.

Usual home care services

Home care services in Ontario, Canada consisted of case management, personal care, home support (or homemaking), nursing, occupational therapy, physiotherapy, social work and speech language therapy through community-based agencies (MacAdam 2000). While this full array of services was in place, funding cutbacks during the time of the study resulted in rationing and waiting lists for both professional and non-professional home care services. The CCAC Case Manager determined eligibility and priority level for home care services and the amount and type of home care services required based on set criteria. Because of growing caseloads (ratio of 1:150 case managers to clients at study start-up), there was minimal case planning available for study participants.

Nursing group: proactive nursing health promotion

A detailed description of the intervention can be found elsewhere (Markle-Reid 2002). The model of vulnerability provided the conceptual approach to the study intervention (Rogers 1997). The main goal of the intervention was to bolster the participant's personal resources and environmental supports in order to reduce the level of vulnerability, enhance health and quality of life, and reduce the on-demand use of expensive healthcare resources. A Registered Nurse from a community-nursing agency visited the home or contacted participants by phone over a 6-month period. The nurses had basic education and held a general class registration license through the College of Nurses of Ontario. Strategies for bolstering personal resources included: conducting an initial and ongoing health assessment, identifying and managing risk factors for functional decline (i.e. depression, dementia, polypharmacy and co-occurring illnesses) (Stuck *et al.* 1999), and providing health education regarding healthy lifestyles, and the management of chronic illnesses using a participatory

approach. A participatory approach to enhancing health involved the use of empowerment strategies designed to promote positive attitudes, knowledge and skills to maintain and enhance health (Maville & Huerta 2002), and enhance self-efficacy and participation (McWilliam *et al.* 2000). Strategies for bolstering environmental supports included referral to and coordination of community services, building a trusting, supportive and meaningful relationship with the client and his/her caregiver, and providing caregiver support. Factors influencing health were identified and addressed together with clients, through the development of a health plan, which included specific short-term and 6-month goals.

Data collection

Trained interviewers, blinded to the purpose of the study and the treatment assignment, obtained baseline (prerandomization) and follow-up outcome assessments at 6 months from the participants. Data were collected from February 2001 to June 2002. Table 1 shows the study variables and their measures. Participants completed the questionnaires at structured in-home interviews.

Participant characteristics
Sociodemographic information was obtained at baseline, including age, gender, education, culture, income, living arrangements and medical diagnosis.

Engagement rate (measure of dose of intervention)
For the nursing health promotion intervention, engagement was defined as at least one home visit or telephone contact that lasted for ≥10 minutes.

Functional health status and quality of life
Functional health status and related quality of life were assessed using the Medical Outcome Study Short Form (SF-36) Health Survey (Ware *et al.* 2000). Several studies using the SF-36 have established content, concurrent, construct, criterion and predictive validity of the measure in a variety of client populations, including older people (McHorney *et al.* 1993, 1994). The SF-36 consists of eight scales that assess the following dimensions of health: physical functioning, role limitations related to physical problems, bodily pain, general health perception, energy/vitality, social functioning, and role limitations related to emotional problems and mental health (Ware & Gandek 1998). Each of these eight scales is scored separately on a scale of 0–100, the higher the score, the more favourable the health status. These eight scales contribute to two summary scores, the Physical Health Component Summary and Mental Health Component Summary (Ware & Kosinski 2001) that are reliable and reflect of the eight dimensions (Jenkinson *et al.* 1997).

Mental health (presence of depression)
Mental health (presence of depression) was assessed using the Center for Epidemiological Studies in Depression Scale (CES-D) (Radloff 1977). The CES-D scale is a 20-item self-reported questionnaire that assesses the current frequency of depressive symptoms. Total scores can range from 0 to 60; the higher the score, the more depressed. It was chosen as a measure of depression because of its applicability to the population (Davidson *et al.* 1994, Irwin *et al.* 1999), prior use in studies of adults with mood disorders (Davidson *et al.* 1994, Roberts *et al.* 1997), high degree of reliability (Himmelfarb & Murrell 1983), and validity (Santor *et al.*

Table 1 Variables and their measures

	Variable	Measure
Participant characteristics	Sociodemographic Questionnaire (T_1)	Baseline Questionnaire, CCAC Records
	Cognitive Status (T_1 and T_2)	Short Portable Mental Status Questionnaire (Pfeiffer 1975)
Engagement rate (measure of dose of interventions)	Nursing visits and telephone contacts (T_2)	Nursing Agency Records
Effects	Functional Health Status and Quality of Life (T_1 and T_2)	SF-36 Health Survey (Ware *et al.* 2000)
	Mental health (presence of depression) (T_1 and T_2)	Center for Epidemiological Studies in Depression Scale (CES-D) (Radloff 1977)
	Perceived social support (T_1 and T_2)	Personal Resource Questionnaire 85 (part two) (Weinert & Brandt 1987)
	Coping style (T_1 and T_2)	Coping Questionnaire (Moos *et al.* 1985)
Costs	Use of health and social services (T_1 and T_2)	Health and Social Service Utilization Inventory (Browne *et al.* 2001a)

T_1, baseline; T_2, 6 months following randomization.

1995). In support of its validity, the CES-D has been shown to have good internal consistency for the general population (Corcoran & Fisher 1987) correlates strongly with the Beck Depression Inventory (Santor *et al.* 1995), and distinguishes between depressed vs. non-depressed people (Schein & Koenig 1997).

Perceived social support

Perception of social support (subjective) was assessed using the Personal Resource Questionnaire 85 (part two) (Weinert & Brandt 1987). The PRQ85 – part two is a 25-item scale that measures perceived social support along five dimensions: provision for attachment/intimacy, social integration, opportunity for nurturing behaviour, reassurance of worth as an individual and in role accomplishments, and the availability of informational, emotional and material help. The total scale score was calculated and reported for each participant. The maximum score that can be attained is 175 – the greater the score, the greater the perception of social support. This measure was chosen because of its applicability to the population, prior use in studies involving older adults, and high degree of reliability, construct and content validity (Weinert & Brandt 1987).

Coping style

Coping style was assessed using the coping questionnaire (Moos *et al.* 1985). The coping questionnaire focuses on the cognitive and behavioural coping responses that individuals use when a stressful event has occurred. Respondents are asked to rate their frequency of use of 33 different coping responses. Responses are classified into two major categories: the method of coping (active cognitive coping, active behavioural coping and avoidance coping), and the focus of coping (problem solving, logical analysis, emotional distress, affective regulation and information seeking). In support of its validity, the coping questionnaire has been shown to have good internal consistency, and construct validity based on a general population (Moos *et al.* 1985).

Costs

The Health and Social Service Utilization Inventory was used to tally the frequency of self-reported use of all types of health services by study participants in the previous 2 weeks (Browne *et al.* 2001a). The 2-week frequency was annualized and multiplied by the dollar value of the service and summed as a per person dollar measure of utilization compared between the two groups. This measure has been previously tested and assessed for reliability and validity (Browne *et al.* 2001a).

Ethical considerations

Ethics approval for the study was obtained from the McMaster University Research and Ethics Board and renewed yearly as required. Informed consent was obtained from all study participants. An information letter outlining the purpose of the study, expectations of the participants, and benefits and risks, were given to potential participants prior to obtaining consent. Participants were assured that their decision about participation would not affect the care and services they would receive from the CCAC. They were assured that the data would be reported in aggregate form without the ability to identify specific individuals, and would be kept confidential and used only for the purpose of the study analysis. Participants were also assured of their right to withdraw from the study for any reason, at any time, without penalty of any sort (and without loss of access to relevant services).

Data analysis

Data analysis was done using SPSS 11.0 for Windows. Participants who completed the 6-month follow-up were compared with those who dropped out on baseline characteristics. Participants in each group retained at 6-months were also compared on baseline characteristics. The direction and impact of any differences or biases on results were examined. The level of statistical significance for all tests was alpha $< 0{\cdot}05$. The hypothesis of effectiveness and efficiency was tested in a two-group comparison of all participants who completed the 6-month follow-up using intention-to-treat analysis (Jadad 1998). Chi-square, Kruskal–Wallis tests, independent *t*-tests, and repeated measures analysis of variance were used to compare proportions or mean scores in the two groups. The frequency of using different types of health services in each group were described and quantified as a Canadian dollar value (Can\$1 = US\$0·641, £0·445 and €0·717).

Results

Of the 577 older home care clients eligible to participate in the study, a total of 288 (49·9%) were successfully recruited and randomized (273 refusals; 16 unable to locate). The study flow diagram (Figure 2) summarizes the disposition of participants throughout the study. The baseline characteristics of the 289 non-consenters were not available due to their refusal to provide informed consent to participate in the study. As outlined in Figure 2, the loss of 46 participants by the 6-month follow-up resulted in a 16·7% drop-out rate in

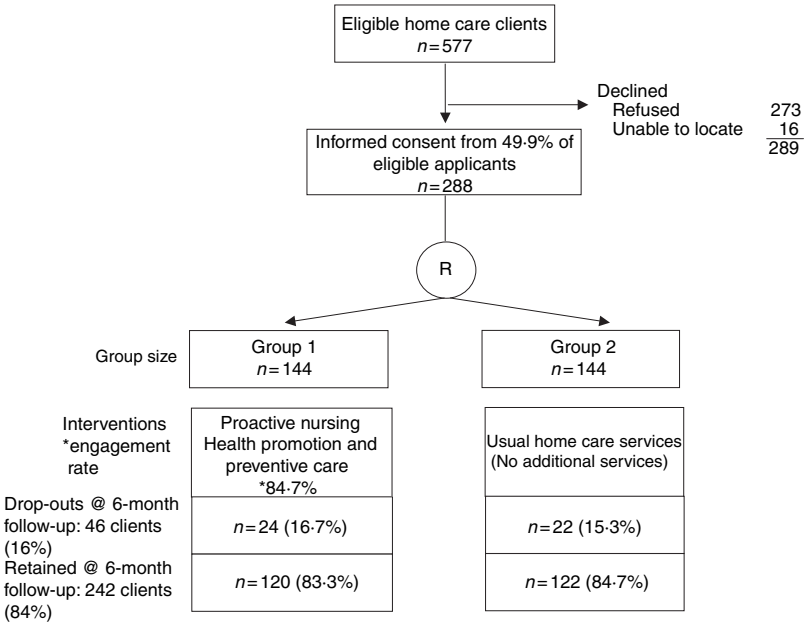

Figure 2 Study flow diagram. *For the nursing health promotion intervention, engagement was defined as at least one home visit or telephone contact for treatment and equal to or >10 minutes.

the nursing group and a 15·3% drop-out rate in the usual care group at the end of the follow-up period. Reasons for loss to follow-up included death (37%), unable to locate or physically unable to participate (37%), and refused to participate (26%).

Chi-square, independent *t*-tests and Kruskal–Wallis tests were used to compare drop-outs with those participants retained at the 6-month follow-up (i.e. completers) on their characteristics at baseline. Completers were similar to drop-outs ($P > 0{\cdot}05$) in their age, cognitive status, marital status, income level, number of medications taken daily, ethnicity, type of health disorders, % living with and receiving help from an informal care provider, % living in a retirement home, % with more than one health disorder, % with depression, % with one or more hospital admissions in the last 6 months, and % reporting physical discomfort that limited activities of daily living. A greater proportion of completers were female (76·9%) compared to drop-outs (63%; $\chi^2 = 3{\cdot}90$; d.f. = 1; $P = 0{\cdot}048$). Completers in comparison with drop-outs reported higher scores in overall physical functioning [mean difference 9·45; 95% confidence intervals (CI) 4·01, 14·89; $t = 3{\cdot}421$, $P = 0{\cdot}001$], mental health functioning (mean difference 9·95; 95% CI 2·33, 17·58; $t = 2{\cdot}615$, $P = 0{\cdot}011$), problem solving (mean difference 1·06; 95% CI 0·04, 2·08; $t = 2{\cdot}050$, $P = 0{\cdot}041$), and a lower per person cost of family physicians or walk-in clinics ($\chi^2 = 6{\cdot}434$; d.f. = 1; $P = 0{\cdot}011$).

Chi-square, independent *t*-tests and Kruskal–Wallis tests were used to compare the two groups of study participants retained in the 6-month follow-up on their characteristics at baseline. Participants in the nursing group, compared with the usual care group, reported, at baseline, lower scores in role functioning related to emotional health (mean difference −10·08; 95% CI 2·53, 17·61; Table 2), and lower scores in mental health functioning (mean difference −10·6; 95% CI 5·13,16·07). It would appear that the respondents in the nursing group, who participated in the 6-month follow-up, were somewhat more disadvantaged than those in usual care with respect to mental health functioning. Additional details on client baseline variables for the two study groups are presented in Table 2.

Engagement rates

A visiting nurse engaged 84·7% of those older participants who were randomly allocated to the nursing intervention at baseline or time 1 ($n = 144$) (Figure 2). Subjects randomized to the nursing group received a median of five home visits and one telephone contact over the 6-month follow-up compared with a median of zero nursing visits in usual care using the Mann–Whitney *U*-test (Mann–Whitney $U = 793{\cdot}0$; $P < 0{\cdot}001$). The average duration of the visits was 1 hour. Notably, 90·8% of the sample randomized to the nursing group received care from the same nurse throughout the entire intervention period.

Table 2 Comparison of selected demographic, clinical and social characteristics between groups at baseline

	Total group		Nursing group		Usual care group		Test statistics	
	n	%	*n*	%	*n*	%	χ^2	*P* value
Age categories (years)								
75–85	168	69·40	90	75·00	78	63·90	3·490	0·062
86 and up	74	30·60	30	25·00	44	36·10		
Sex								
Male	56	23·10	27	22·50	29	23·80	0·055	0·815
Female	186	76·90	93	77·50	93	76·20		
Cognitive status								
0–4 errors (intellectually intact)	218	90·50	108	90·00	110	90·90	0·091	0·955
5–7 errors (moderately impaired)	13	5·40	7	5·80	6	5·00		
8–10 errors (severely impaired)	10	4·10	5	4·20	5	4·10		
Type of accommodation								
House or apartment	199	82·20	102	85·00	97	79·50	1·249	0·264
Senior's house	43	17·80	18	15·00	25	20·50		
Marital status								
Married	76	31·40	38	31·70	38	31·10	0·008	0·931
Other	166	68·60	82	68·30	84	68·90		
Ethnic/cultural group								
Canadian	187	77·30	91	75·80	96	78·70	0·281	0·596
Other	55	22·70	29	24·20	26	21·30		
Number living with and receiving help from an informal care provider								
Yes	125	51·70	65	54·20	60	49·20	0·602	0·438
No	117	48·30	55	45·80	62	50·80		
Level of education								
Grade school	49	20·30	26	21·80	23	18·90	0·760	0·684
High school	111	46·10	56	47·10	55	45·10		
Postsecondary	81	33·60	37	31·10	44	36·10		
Income								
Below $40,000	211	87·20	108	90·00	103	84·40	1·683	0·195
Over $40,000	31	12·80	12	10·00	19	15·60		
Number of health disorders								
One disorder	115	47·52	60	50·00	55	45·08	0·587	0·444
Two disorders	127	52·48	60	50·00	67	54·92		
Presence of depression								
Depressed: CESD ≥21	62	25·60	37	30·80	25	20·50	3·395	0·065
Not depressed: CESD <21	180	74·40	83	69·20	97	79·50		
One or more hospital admissions in the last 6 months								
Yes	154	63·60	76	63·30	78	63·90	0·009	0·923
No	88	36·40	44	36·70	44	36·10		
Number with physical discomfort limiting activities of daily living								
Yes	192	79·30	93	77·50	99	81·10	0·491	0·483
No	50	20·70	27	22·50	23	18·90		
	Mean	SD	Mean	SD	Mean	SD	*t*-test	*P* value
Age	83·82	5·37	83·37	5·47	84·25	5·25	−1·270	0·205
Number of medications	7·29	3·72	6·83	3·1	7·74	4·22	−1·903	0·058
Total Social Support Score	123·99	22·11	121·66	21·74	126·28	22·32	−1·631	0·104
Role-Emotional Score	78·27	30·13	73·19	31·98	83·27	27·41	−2·628	0·009
Mental Health Score	69·48	22·20	64·14	22·55	74·74	20·62	−3·818	<0·001

Functional health status and quality of life

Repeated measures analysis of variance was used to compare the difference in mean change scores ($T_1 - T_2$) in the two groups at 6-months. There was a statistically significantly greater improvement in the mental health component summary score in the nursing group than in the usual care group (mean difference −6·32; 95% CI

−11·04 and −1·59; Table 3). From baseline to the 6-month follow-up, participants in the nursing group experienced an increase in role functioning related to emotional health compared with a decrease in the usual care group (mean difference −10·48; 95% CI −18·87, −2·09). Participants in the nursing group also experienced an increase in mental health functioning compared with a decrease in usual care (mean difference −7·46; 95% CI −12·60, −2·32). There was a clinically important improvement in the score for physical functioning at 6-months in the nursing group compared with the usual care group (mean difference −5·39; 95% CI −11·13, 0·35).

Table 3 Group comparisons of health-related quality of life and function at baseline and 6-month follow-up

	Group						Test statistics		
	Nursing group			Usual care group			Repeat measures ANOVA		Difference in mean change scores ($T_1 - T_2$) (95% confidence interval)*
	n	Mean	SD	*n*	Mean	SD	*F*-test	*P* value	
SF-36 Physical Function Score (0–100)									
Time 1	120	19·57	18·96	122	19·24	19·02	3·427	0·065	−5·39 (−11·13, 0·35)
Time 2	120	31·65	28·13	122	25·92	23·84			
Time 1 − time 2	120	−12·08	25·04	122	−6·69	20·04			
SF-36 Role Physical Score (0–100)									
Time 1	120	27·19	35·27	122	27·15	33·74	1·046	0·307	−6·26 (−18·32, 5·80)
Time 2	120	56·04	41·35	122	49·74	41·34			
Time 1 − time 2	120	−28·85	48·45	122	−22·59	46·79			
SF-36 Bodily Pain Score (0–100)									
Time 1	120	54·03	32·70	122	51·63	34·63	1·084	0·299	4·65 (−4·15, 13·46)
Time 2	120	56·70	34·22	122	58·95	34·45			
Time 1 − time 2	120	−2·67	36·32	122	−7·32	33·15			
SF-36 General Health Perception Score (0–100)									
Time 1	120	56·85	23·77	121	56·46	23·77	0·462	0·497	1·87 (−3·56, 7·31)
Time 2	120	57·19	26·68	121	58·68	24·21			
Time 1 − time 2	120	−0·34	23·26	121	−2·21	19·41			
SF-36 Vitality Score (0–100)									
Time 1	120	28·75	21·73	122	33·76	24·81	1·893	0·170	−4·39 (−10·68, 1·90)
Time 2	120	39·41	26·68	122	40·03	25·22			
Time 1 − time 2	120	−10·66	24·87	122	−6·27	24·79			
SF-36 Social Functioning Score (0–100)									
Time 1	120	50·94	35·44	122	45·59	36·25	0·028	0·867	0·99 (−10·61, 12·59)
Time 2	120	71·88	35·92	122	67·52	37·19			
Time 1 − time 2	120	−20·94	41·95	122	−21·93	49·38			
SF-36 Role Emotional Score (0–100)									
Time 1	120	73·19	31·98	122	83·27	27·41	6·075	0·014	−10·48 (−18·87, −2·09)
Time 2	120	83·26	28·55	122	82·86	30·83			
Time 1 − time 2	120	−10·07	35·47	122	0·41	30·53			
SF-36 Mental Health Score (0–100)									
Time 1	118	64·59	22·28	122	74·74	20·62	8·174	0·005	−7·46 (−12·60, −2·32)
Time 2	118	71·06	23·88	122	73·75	22·83			
Time 1 − time 2	118	−6·47	20·60	122	0·99	19·82			
SF-36 Physical Health Component Summary Score (0–100)									
Time 1	120	37·94	17·83	121	37·45	17·65	0·522	0·471	−1·88 (−7·02, 3·25)
Time 2	120	49·10	24·57	121	46·73	23·39			
Time 1 − time 2	120	−11·16	21·36	121	−9·28	19·05			
SF-36 Mental Health Component Summary Score (0–100)									
Time 1	118	54·32	19·45	122	60·69	18·68	6·930	0·009	−6·32 (−11·04, −1·59)
Time 2	118	65·11	22·44	122	65·18	22·05			
Time 1 − time 2	118	−10·80	18·72	122	−4·48	18·44			

Time 1 (T_1), baseline; time 2 (T_2), 6-month follow-up.
*Negative values for differences in scores favour the nursing group.

Mental health (presence of depression)

Repeated measures analysis of variance was used to compare the difference in mean change scores ($T_1 - T_2$) in the two groups at 6-months. As indicated in Table 2, 25·6% of the participants were assessed with depression at baseline. From baseline to the 6-month follow-up, there was a statistically significantly greater reduction in the depressive symptom scores in the nursing group compared with the usual care group (mean difference 2·72; 95% CI 0·39, 5·07; Table 4). This difference in the prevalence of depressive symptoms translated into a clinically important reduction in the number of clients who were depressed in the nursing group (16·8%) compared with usual care (11·3%) ($\chi^2 = 2{\cdot}83$; d.f. = 3; $P = 0{\cdot}419$), using a cut-off score of ≥21.

Perceived social support and coping style

Repeated measures analysis of variance was used to compare the difference in mean change scores ($T_1 - T_2$) in the two groups at 6-months. There was a statistically significant increase in the perceived social support scores in the nursing group compared with a reduction in the usual care group (mean difference −5·26; 95% CI −9·18, −1·34; Table 4). However, from baseline to the 6-month follow-up, there was no statistically significant or clinically important difference in coping styles between the two groups.

Costs

Using Kruskal–Wallis test, there was no statistically significant difference between the two groups in the mean cost of all types of health and social services, and the total annual per person direct costs of health services at 6-months ($\chi^2 = 0{\cdot}001$; d.f. = 1; $P = 0{\cdot}979$). Noteworthy, is that although there was no statistically significant difference in total costs, there was a statistically significantly lower per person cost of prescription medications in the nursing group compared with usual care ($\chi^2 = 5{\cdot}718$; d.f. = 1; $P = 0{\cdot}017$).

Discussion

Healthcare planners argue that the shift in home care function from health promotion and prevention to acute care substitution functions will improve health outcomes and reduce healthcare costs (Soderstrom *et al.* 1999, Chappell 2001, Penning *et al.* 2002). This study demonstrates that this assumption is incorrect and untenable. On the contrary, nursing health promotion, provided to a general population of frail seniors, 25·6% of whom are depressed and 79·3% of whom are functionally limited, enhanced quality of life (defined and measured to include mental health, depression and perceived social support) while not increasing the overall costs of health care, thus making the intervention highly feasible given its clinical benefits. This study demonstrated that, with modest reorganization of the delivery of existing home services, statistically significant enhancements in quality of life can result. McWilliam *et al.* (1999) reported similar positive findings from a postdischarge health promotion intervention for chronically ill seniors, but the costs were limited to the use of acute hospitalization and home care services. Previous studies have only focussed on the use of institutional care and home care services as measures of cost (Hendriksen *et al.* 1984, Zimmer *et al.* 1985, Stuck *et al.* 1995, Bernabei *et al.* 1998, Stuck *et al.* 2000). Thus, the present study is unique in that it measured the use and costs of the full range of health services.

Table 4 Group comparisons of CES-D depression score and perceived social support at baseline and 6-month follow-up

	Group						Test statistics		
	Nursing group			Usual care group			Repeat measures ANOVA		Difference in mean change scores ($T_1 - T_2$) (95% confidence interval)
	n	Mean	SD	*n*	Mean	SD	*F*-test	*P* value	
CES-D Depression Score (0–60)									
Time 1	113	15·83	10·00	115	12·94	8·49	5·280	0·022	2·72 (0·39, 5·07)
Time 2	113	11·94	10·18	115	11·77	10·73			
Time 1 − Time 2	113	3·89	8·68	115	1·17	9·24			
Perceived Social Support (25–175)									
Time 1	111	121·92	21·49	114	127·55	21·67	6·999	0·009	−5·26 (−9·18, −1·34)
Time 2	111	124·88	21·87	114	125·20	22·29			
Time 1 − Time 2	111	−2·96	15·62	114	2·30	14·20			

Time 1 (T_1): baseline; time 2 (T_2): 6 month follow-up.

At 6 months, compared with baseline, participants in the nursing group reported a greater improvement in physical functioning than the usual care participants. Given the fact that 79·3% of the participants were functionally limited to a moderate to severe degree, this is a clinically important gain for those receiving nursing health promotion. Other studies have reported similar positive effects on functional health status (Stuck *et al.* 1995, Bernabei *et al.* 1998, Stuck *et al.* 2000) and self-rated physical health (Pathy *et al.* 1992), but only two of these studies involved a health promotion intervention that was staffed by a nurse alone (Pathy *et al.* 1992, Stuck *et al.* 2000).

As expected, improvements in physical functioning in the nursing group resulted in a statistically significantly greater reduction in depressive symptom scores, and a statistically significantly greater improvement in overall mental health functioning for participants in the nursing group compared with those in usual care. Given the lower level of mental health functioning in the nursing group at baseline, this is statistically significant gain for those receiving nursing health promotion. Bernabei *et al.* (1998) reported similar positive findings but the intervention was provided by a multidisciplinary geriatric team. Unrecognized, untreated and under treated mood disorders such as depression increase the risk of functional decline and the use of expensive healthcare resources (Stuck *et al.* 1999). The study results provide support for including depression screening and management as a component of a nursing health promotion program for frail older people as a means of decreasing morbidity, enhancing quality of life and promoting the appropriate use of health services.

At 6 months, compared with baseline, participants in the nursing group reported a statistically significantly lower cost of prescription medications. This finding is noteworthy, given the fact that nearly 50% of all medications used by older people are used inappropriately, and almost 25% of hospital admissions of older people are due to medication problems (Halton Region Health Department 2004). In summary, the findings underscore the need to re-invest in Registered Nursing services for health promotion including disease prevention for frail older home care clients with chronic needs.

This trial is unique in that it was designed and evaluated using a theoretical model. Previous studies lack a theoretical foundation. As a result, it is difficult to assess the appropriateness of the intervention to the outcomes being measured, or to formulate hypotheses regarding why or how a particular intervention should be expected to result in a particular outcome (Pawson & Tiley 1997). The study results provide empirical support for the positive synergistic and cumulative effects of bolstering personal resources (physical and mental health functioning) and environmental supports (perceived social support) on health status and related quality of life (Rogers 1997) to considerable economic effect (no additional cost). Future intervention studies need to incorporate a theoretical model, and focus more on the process of delivering care to identify the relative contribution of each component of the intervention, and the synergistic effect of the sum of the parts (Elkan *et al.* 2001).

Our results support and extend the literature regarding best practice guidelines for providing nursing health promotion to older home care clients. Key recommendations include a flexible, client centred and interdisciplinary approach to care delivery, an initial and ongoing health assessment (including depression screening), combined with regular home visits or telephone contacts (Elkan *et al.* 2001, Stuck *et al.* 2002), education regarding healthy lifestyles, and the management of chronic illnesses, referral to and coordination of community services (Rubenstein *et al.* 1991), and empowerment strategies designed to enhance independence and self-efficacy (Robinson & Hill 1998, McWilliam *et al.* 2000). Our findings also underscore the importance of nurse–client relationships and continuity of care for positive outcomes (McWilliam *et al.* 1997, McNaughton 2000).

We also examined the characteristics of participants (age, depression, living arrangement, availability of an informal caregiver, coping style and cognitive status), which may have interacted with the approach to treatment to explain improvement in SF-36 mental component summary score. There were no particular types of clients who benefited more from nursing health promotion vs. usual home care services. This finding is consistent with Browne *et al.* (1999) in a review of 12 studies evaluating a community-based approach to care in Canada, who concluded that regardless of age, chronic illness or circumstance, setting or specific interventions, early proactive and comprehensive care is both more effective and no more expensive in a system of national health insurance.

Study limitations

Although our large sample size, high retention and engagement rate were major strengths, a limitation of the study was the retention of a higher functioning group of older people when compared with dropouts. This may limit the generalizability of the results to lower functioning elders, specifically those with cognitive impairment. Since the study took place in a well-developed urban region in Ontario, the results may not be transferable to recipients of home care services living in rural areas or other environments (Birch & Gafni 2003).

What is already known about this topic

- Extensive health service reforms have given rise to a shift of home care nursing services from health promotion and preventive functions for older people with long-term health needs to short-term postacute care substitution functions.
- These changing trends in the provision of home care combine to create a fragmented system of healthcare delivery, characterized by providing nursing services on an on-demand basis rather than proactively.
- Typically, on-demand care is less effective and more costly because delays or errors in responding to chronically ill older people's changing health needs can contribute to functional decline and dependency that often leads to use of expensive healthcare resources.

What this paper adds

- Health promotion proactively provided by nurses to a general population of frail older home care clients, compared with providing nursing services on-demand, enhanced quality of life, mental health and social support while not increasing the overall costs of health care.
- Health service providers need to re-invest in nursing services for health promotion, including disease prevention, for older home care clients with long-term needs.
- Effective nursing health promotion interventions should use a flexible, client-centred and interdisciplinary approach to care delivery, continuity of care provider, comprehensive assessment combined with regular home visits, health education about management of chronic illnesses, and use of empowerment strategies designed to enhance self-care and independence.

The CCAC Case Managers were aware of which participants were assigned to the nursing group. This was unavoidable and the only feasible means to conduct such a trial in a clinical setting without unduly disrupting service provision. Blinding was not 100% assured. Participants may have inadvertently alerted the interviewers of their assignment to the nursing group. The finding that there was no statistically significant difference between the two groups in total annual per person cost of health and social services may be due to an insufficient sample size and limited power to detect differences in cost. Future trials with an economic evaluation are needed that have sufficient power to detect differences in cost.

Conclusion

In conclusion, nurses have an important role to play in providing health promotion to older home care clients with long-term healthcare needs. Our results suggest that with modest reorganization of the delivery of existing home care services, giving greater priority to nursing health promotion, frail older home care clients can experience improved quality of life at no additional cost to society as a whole. Implementation of efficient care reforms for older people requires a comprehensive rethinking of entire delivery systems (Hollander & Pallan 1995). That is, decisions made in one part of the system (such as reducing access to nursing services for health promotion and preventive functions), need to be evaluated for their impact on the larger whole, considering both health outcomes and costs to society. Lessons learned from this study have opened the space for dialogue between service providers and decision-makers and can be used to inform clinical practice and resource allocation in home care to enhance the quality of life of older people with chronic needs.

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Author contributions

MMR, RW, GB, JR, AG and SH were responsible for the study conception and design and drafting of the manuscript. MMR, GB, JR and SH. performed the data collection and data analysis. MMR, RW and GB obtained funding and provided administrative support. MMR, RW, GB, JR, AG and SH made critical revisions to the paper. RW and GB supervised the study.

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