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# Effects of Case Management for Frail Older People or Those With Chronic Illness

## A Systematic Review

Barth Oeseburg ▼ Klaske Wynia ▼ Berry Middel ▼ Sijmen A. Reijneveld

- ▶ **Background:** Financial constraints and quality requirements demand that interventions selected are most effective. A previous systematic review of the effectiveness of the patient advocacy case management model was not found.
- ▶ **Objective:** The objective of this study was to evaluate the effects of patient advocacy case management on service use and healthcare costs for impaired older people or adults with a chronic somatic disease living in the community.
- ▶ **Methods:** A literature search was conducted in Medline, CINAHL, and Cochrane databases. Included were English-language randomized controlled trials evaluating service use and costs of the patient advocacy case management model for people with a chronic somatic disease or for impaired older people living in the community.
- ▶ **Results:** Eight relevant studies were identified and included after evaluation of methodological quality. All studies concerned frail or impaired older people, and one study also included people with a somatic chronic disease. In none of the studies was evidence found for clinically relevant increase of service use and costs, whereas in two studies, it was reported that patient advocacy case management led to decreased service use and to savings in costs.
- ▶ **Discussion:** Patient advocacy case management does not increase service use and costs and was effective in decreasing service use and costs in two studies. These conclusions are an indication for quality improvement through the combination of its organizational benefits. Therefore, there should be more priority given to further implementation of patient advocacy case management for those with chronic illness and impaired older people. Nursing can play an important role in this development.
- ▶ **Key Words:** case management • systematic review

Case management has been suggested as an innovative strategy to facilitate the improvement of a patient's quality of life, reduce hospital length of stay, optimize self-care, and improve satisfaction of the patient and the professionals involved (Lee, Mackenzie, Dudley-Brown, & Chin, 1998; Long, 2002). In general, case management is focused on high-risk and high-cost populations that

represent the largest part of costs for healthcare in developed countries (Casarin et al., 2002; Meier et al., 2004).

In case management, an individual or a small team is responsible for navigating the patient through a complex process in the most efficient, effective, and acceptable way (Zwarenstein, Stephenson, & Johnston, 2005). On the basis of suggestions about the underlying dynamics, the many variants of case management have been categorized into two types: the interrogative case management model and the patient advocacy model (Long, 2001; Long & Marshall, 2000).

The predominant focus of the interrogative case management model is on the appropriateness of services during the initial clinical decision-making process, that is, prior to authorization. The costs of care in particular are recognized as representing a legitimate focus of this process. This model, also referred to as the *medical case management model* (Hurley & Fennell, 1990) and the *gatekeeper model* (Capitman, 1988), employs a physician gatekeeper with expectations of cost containment by arranging substitution of services.

The predominant focus of the patient advocacy case management model is on a more comprehensive coordination of services across the continuum of care, viewed from the patient perspective (Long & Marshall, 2000). In this model, also referred to as the *socioeconomic model*, the treatment regimen is determined not only by the medical needs but also by the financial, psychological, and social

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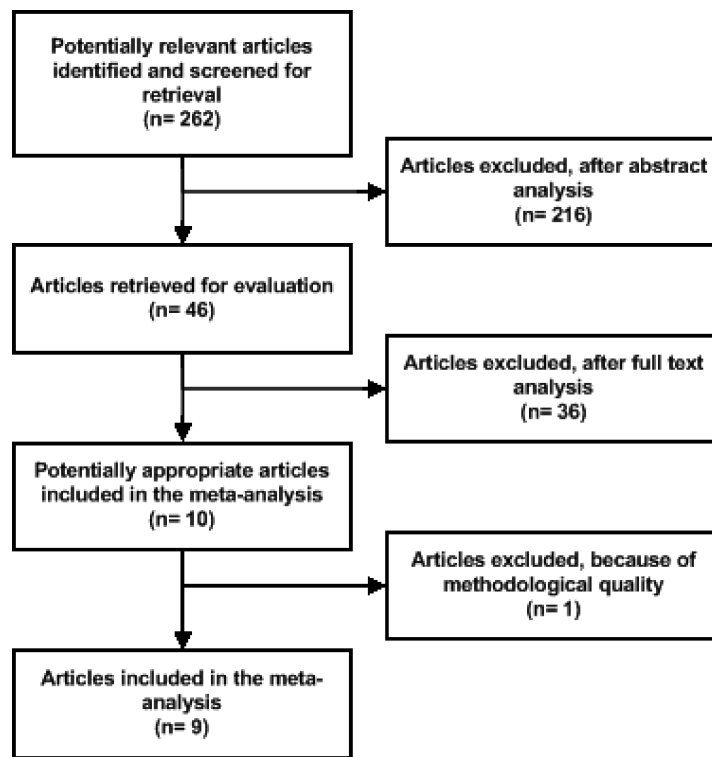


FIGURE 1. Flow diagram of article selection process.

circumstances of the patient. The case management approach in the patient advocacy model is especially relevant for those with chronic illness and older people with complex health problems and is in line with the contemporary general focus on patient-centered healthcare (Pruitt & Epping-Jordan, 2005).

There are several reasons to analyze further the effects that the patient advocacy model has on service use and costs. First, financial constraints require that effective interventions are selected to at least maintain quality of care. According to Donabedian (1988), quality of care is a combination of costs and benefits: when costs remain constant and benefits increase, quality is improved. In other words, assuming that the patient advocacy model improves patients' benefits by means of comprehensive coordination of services, it is important to find evidence that costs at least remain constant to improve the quality of care. A second reason for this analysis is the growing number of those with chronic illness and older people. These groups in particular seem to benefit from the patient advocacy model in which the case manager assesses the changing needs of the clients, eliminates fragmented care, and arranges for services to be provided (Long, 2001). Although it is expected that less costly appropriate substitute services will be used whenever possible (Long, 2001), it is important to know the effects the patient advocacy model has on service use and healthcare costs. A third reason for the analysis is that nurses are employed as case managers in many of the patient advocacy case management interventions. It is of importance for the future of nursing, therefore, to gather evidence on the contributions

that patient advocacy case management makes to quality of care.

Although there is a vast body of literature that speaks of the influence of case management on patient outcomes and service utilization, no systematic review was found concerning evidence for the effectiveness of the patient advocacy case management model. Therefore, the aim of this study was to review randomized controlled trials (RCTs) systematically to determine the effects of a patient advocacy case management model on service use and costs in people with a somatic chronic disease or in frail older people living in the community.

## Methods

### Study Identification

A comprehensive search was developed by a librarian and two of the investigators to identify studies matching search terms related to the MeSH headings: *case management*, *outcomes*, *costs*, *RCT*, *chronic disease*, and *older*. The following electronic databases were searched for English-language articles published in the period March 1995 to March 2007: Medline, CINAHL, and Cochrane. Additional studies were obtained via periodic search updates and from the reference lists of included studies.

### Study Selection

Information from abstracts and titles of the studies found in the search was used to include or exclude studies. To be considered for inclusion, studies had to evaluate case management interventions for people with a somatic chronic

TABLE 1. Characteristics of Studies Included in the Analyses

Study and country	Population	Experimental group	Control group	Intervention
Newcomer et al. (1999), United States	Alzheimer's or vascular dementia	<i>n</i> = 4,151 Women = 62% Age (in years) 20–64 = 2% 65–69 = 10% 70–79 = 42% 80–84 = 24% 85+ = 23%	<i>n</i> = 3,944 Women = 60% Age (in years) 20–64 = 2% 65–69 = 9% 70–79 = 42% 80–84 = 25% 85+ = 22%	<i>Goal:</i> to assess whether or not community care management affected healthcare use and expenditures. <i>Intervention:</i> to plan and coordinate community services and to train caregivers about disease progression and support of functional status tasks. Two models (A and B). Models differed on caseload and per-month service expenditure ceilings for each client. <i>Main contact method:</i> intake assessment and annual telephone reassessments. <i>Case manager:</i> nurse or social worker. <i>Caseload:</i> Model A: case manager:client ratio of 1:100, Model B: case manager:client ratio of 1:30.
Newcomer et al. (2004), United States	High-risk geriatric patients	<i>n</i> = 1,648 Women = 60% Age (in years) 65–69 = 2% 70–79 = 28% 80–84 = 37% 85+ = 33%	<i>n</i> = 1,599 Women = 60% Age (in years) 65–69 = 3% 70–79 = 28% 80–84 = 38% 85+ = 31%	<i>Goal:</i> to complement the primary care of high-risk geriatric patients. <i>Intervention:</i> annual screening with questionnaire to identify at-risk conditions and situations, baseline interviews, care planning, appointment adherence monitoring, disease education, and condition self-management support. <i>Main contact method:</i> home visits and telephone. Communication with primary care physician mainly by mail and e-mail. <i>Case manager:</i> six nurses. <i>Caseload:</i> ±250 persons per case manager, approximately 60 of whom were actively managed at one time. Average contact hours = 7.7 ( <i>SD</i> = 3.7).
Long and Marshall (2000) and Long (2002), United States	Older people with functional impairment  Substudy (Long & Marshall, 2000)	<i>n</i> = 140 Women = 59% Mean age = 82 years  <i>n</i> = 34 Women = 59% Age = 75+ years, mean age = 82 years	<i>n</i> = 177 Women = 51% Mean age = 84 years  <i>n</i> = 43 Women = 51% Age = 75+ years, mean age = 84 years	<i>Goal:</i> to eliminate fragmented care, inappropriate care, unnecessary costs, and client confusion. Less costly outpatient visits should be substituted for hospital and emergency department visits. <i>Intervention:</i> The team developed the initial plan; the case manager was responsible for making visits (at least once in 6 months), reporting to the team, and helping to revise the care plan as necessary. Case managers made appointments, accompanied patients, and assisted with nonmedical services. <i>Main contact method:</i> home visits. <i>Case manager:</i> one nurse and one social worker with geriatric case manager experience. <i>Case load:</i> 70 persons.
Schore et al. (1999), United States	Project I: catastrophic and chronic illness  Project P: employees with catastrophic illness  Project H: older people with complicated medical problems	I: <i>n</i> = 556 Women = 58% Mean age = 77 years  P: <i>n</i> = 376 Women = 54% Mean age = 77 years  H: <i>n</i> = 209 Women = 61% Mean age = 77 years	I: <i>n</i> = 556 Women = 56% Mean age = 77 years  P: <i>n</i> = 363 Women = 55% Mean age = 76 years  H: <i>n</i> = 211 Women = 61% Mean age = 78 years	<i>Goal:</i> to improve client health and thereby reduce total medical expenses. <i>Intervention:</i> monitoring treatment regimens and symptoms and arranging support services and caregiver support. Project P included education. <i>Main contact method:</i> telephone. Project H included in-person contact. <i>Case manager:</i> Project I: seven FTE nurses, one supervisor, and one social worker; Project P: four FTE nurses and one supervisor; Project H: three FTE (two nurses and one social worker) and one supervisor. <i>Caseload:</i> ±80 persons.

(continues)

TABLE 1. (continued)

Study and country	Population	Experimental group	Control group	Intervention
Eloniemi-Sulkava et al. (2001), Finland	Older people with dementia	<i>n</i> = 53 Women = 49% Mean age = 79 years, range = 65–97 years	<i>n</i> = 47 Women = 57% Mean age = 80 years, range = 67–91 years	<i>Goal:</i> to prolong time in community care. <i>Intervention:</i> advocacy for patients and caregivers, comprehensive support, continuous and systematic counseling, annual training courses for patients and caregivers, follow-up calls, in-home visits, assistance with arrangements for social and healthcare services, and 24 hours-per-day availability by mobile telephone. <i>Main contact method:</i> home visits. <i>Case manager:</i> nurse with public health background. <i>Caseload:</i> 53 persons. <i>Contacts:</i> from once a month to five times a day.
Gagnon et al. (1999), Canada	Frail older people at risk of repeated hospital admissions	<i>n</i> = 212 Women = 57% Mean age = 81 years, <i>SD</i> = 6 years	<i>n</i> = 215 Women = 59% Mean age = 82 years, <i>SD</i> = 7 years	<i>Goal:</i> to integrate hospital and community services and the prevention and promotion of autonomy. <i>Intervention:</i> supporting people and caregivers, coordination of care, and the promotion of autonomy. Case managers were members of a multidisciplinary team in a community center. <i>Main contact method:</i> a monthly telephone call and a home visit every 6 weeks. <i>Case manager:</i> four FTE nurses with geriatric nursing experience. <i>Caseload:</i> 46 persons. <i>Average time spent:</i> 7.3 telephone calls (range = 6.2–9.0 telephone calls) and 9.8 home visits per week (range = 6.2–11.4 home visits per week).
Fordyce et al. (1997), United States	Frail older people or older people in danger of becoming frail	<i>n</i> = 326 Women = 48% Age (in years) 65–69 = 33% 70–74 = 16% 75–79 = 30% 80+ = 20%	<i>n</i> = 764 Women = 56% Age (in years) 65–69 = 37% 70–74 = 15% 75–79 = 28% 80+ = 17%	<i>Goal:</i> to improve health and function and decrease hospital admissions. <i>Intervention:</i> annual assessment of health, functional, and social status of each participant at an office visit; development of a medical functional profile by the STAR team: geriatrician, health educator, and geriatric psychiatrist; dispatch of a detailed summary to each patient and healthcare provider. Case management for the frail older people: follow-up by telephone and chart review and referrals to primary physicians. <i>Main contact method:</i> telephone. <i>Case manager:</i> nurse practitioner. <i>Caseload:</i> not reported.
Bernabei et al. (1998), Italy	Frail older people receiving community care services	<i>n</i> = 99 Women = 70% Mean age = 81 years, <i>SD</i> = 7 years	<i>n</i> = 100 Women = 71% Mean age = 81 years, <i>SD</i> = 7 years	<i>Goal:</i> to integrate medical and social services in a continuum of care. <i>Intervention:</i> initial assessment with validated assessment form and questionnaires repeated every 2 months and reported to the geriatric evaluation unit (geriatrician, social worker, and nurses), which determined eligible services and designed and implemented individual care plans in agreement with the GP. The team discussed problems emerging from home visits during weekly meetings. <i>Main contact method:</i> home visits and constant availability for patients and GPs. <i>Case manager:</i> two trainees of the case manager course. <i>Caseload:</i> 50 persons.

Note. FTE = full-time equivalent; STAR = Senior Team Assessment and Referral Program; GP = general practitioner.

TABLE 2. Case Management Outcomes on Service Use

Study	Quality score	Follow-up (months)	Patients followed up (%)	Experimental group proportions, <i>n</i> (%) or <i>M</i> ( <i>SD</i> )	Control group proportions, <i>n</i> (%) or <i>M</i> ( <i>SD</i> )	95% CI	<i>p</i>	Effect size
Hospital admission								
Newcomer et al. (2004)	Weak	12	99	333 / 1,523 (21.9)	357 / 1,532 (23.3)	-0.04 to 0.02		
Bernabei et al. (1998)	High	12	100	36 / 99 (36.4)	51 / 100 (51.0)	-0.29 to -0.01		-.30
Schore et al. (1999), Project I	Weak	12	98	304 / 506 (54.7)	292 / 556 (52.5)	-0.04 to 0.08		
Schore et al. (1999), Project P	Weak	12	73	225 / 376 (60.0)	223 / 363 (61.4)	-0.09 to 0.06		
Schore et al. (1999), Project H	Weak	12	76	117 / 209 (56.1)	97 / 201 (46.1)	0.00 to 0.20		.15
Long (2002)	Good	24	73	<i>M</i> = 1.86 ( <i>SD</i> = <i>n/a</i> )	<i>M</i> = 1.66 ( <i>SD</i> = <i>n/a</i> )			.74
Schore et al., 1999; Project I	Weak	12	98	<i>M</i> = 1.15 ( <i>SD</i> = <i>n/a</i> )	<i>M</i> = 1.12 ( <i>SD</i> = <i>n/a</i> )			.71
Schore et al. (1999), Project P	Weak	12	73	<i>M</i> = 1.35 ( <i>SD</i> = <i>n/a</i> )	<i>M</i> = 1.32 ( <i>SD</i> = <i>n/a</i> )			.83
Schore et al. (1999), Project H	Weak	12	76	<i>M</i> = 1.21 ( <i>SD</i> = <i>n/a</i> )	<i>M</i> = 0.90 ( <i>SD</i> = <i>n/a</i> )			.06
Gagnon et al. (1999)	High	10	100	<i>M</i> = 0.5 ( <i>SD</i> = 0.8)	<i>M</i> = 0.4 ( <i>SD</i> = 0.7)	-0.04 to 0.24		.17
Fordyce et al. (1997)	Good	36	100	<i>M</i> = 0.26 ( <i>SD</i> = 0.8)	<i>M</i> = 0.31 ( <i>SD</i> = 0.7)	-0.15 to 0.05		.33
Hospital length of stay								
Bernabei et al. (1998)	High	12	100	894 / 36,135 <sup>a</sup> (2.5)	1,376 / 36,500 (3.8)	-0.02 to -0.01		-.07
Newcomer et al. (2004)	Weak	12	99	<i>M</i> = 1.3 ( <i>SD</i> = 4.0)	<i>M</i> = 1.5 ( <i>SD</i> = 6.8)	-0.60 to 0.20		.32
Long (2002)	Good	24	73	<i>M</i> = 13.85 ( <i>SD</i> = <i>n/a</i> )	<i>M</i> = 12.93 ( <i>SD</i> = <i>n/a</i> )			.94
Gagnon et al. (1999)	High	10	30	<i>M</i> = 13.0 ( <i>SD</i> = 20.7)	<i>M</i> = 11.9 ( <i>SD</i> = 13.1)	-2.19 to 4.39		.51
Fordyce et al. (1997)	Good	36	100	<i>M</i> = 1.21 ( <i>SD</i> = 6.1)	<i>M</i> = 1.55 ( <i>SD</i> = 5.8)	-1.12 to 0.44		.39
Emergency department visits								
Newcomer et al. (2004)	Weak	12	99	394 / 1,523 (25.9)	398 / 1,532 (26.0)	-0.03 to 0.03		
Bernabei et al. (1998)	High	12	100	6 / 99 (6.1)	17 / 100 (17.0)	-0.21 to -0.01		-.35
Long (2002)	Good	24	73	<i>M</i> = 5.05 ( <i>SD</i> = <i>n/a</i> )	<i>M</i> = 5.31 ( <i>SD</i> = <i>n/a</i> )			.77
Schore et al. (1999), Project I	Weak	12	98	<i>M</i> = 1.36 ( <i>SD</i> = <i>n/a</i> )	<i>M</i> = 1.37 ( <i>SD</i> = <i>n/a</i> )			.90
Schore et al. (1999), Project P	Weak	12	73	<i>M</i> = 1.43 ( <i>SD</i> = <i>n/a</i> )	<i>M</i> = 1.45 ( <i>SD</i> = <i>n/a</i> )			.88
Schore et al. (1999), Project H	Weak	12	76	<i>M</i> = 1.84 ( <i>SD</i> = <i>n/a</i> )	<i>M</i> = 0.99 ( <i>SD</i> = <i>n/a</i> )			.01 n/a
Gagnon et al. (1999)	High	10	100	<i>M</i> = 1.2 ( <i>SD</i> = 2.0)	<i>M</i> = 0.9 ( <i>SD</i> = 1.2)	0.01 to 0.61		.06
Nursing home admission								
Newcomer et al. (2004)	Weak	12	99	183 / 1,537 (11.9)	194 / 1,542 (12.6)	-0.03 to 0.02		
Eloniemi-Sulkava et al. (2001)	Good	12	100	4 / 53 (7.6)	9 / 47 (19.2)	-0.27 to 0.04		.09
		24	100	17 / 53 (32.1)	14 / 47 (29.8)	-0.17 to 0.21		.80
Bernabei et al. (1998)	High	12	100	10 / 99 (10.1)	15 / 100 (15.0)	-0.15 to 0.05		

Note. *n/a* = data not attainable.

<sup>a</sup>Total days = number of respondents × 365 days.

TABLE 3. Mean Costs per Person

Study	Quality score	Follow-up period	Experimental group	Control group	95% CI	p	Effect size
			costs (\$), M (SD)	costs (\$), M (SD)			
Newcomer et al. (1999)	Good	Year 1	7,169 (11.751)	7,898 (11.316)	−13,589.57 to −990.43	.03	−.06
		Year 2	7,378 (11.812)	8,032 (13.105)	−1,462.82 to 154.82	.11	
		Year 3	8,526 (14.127)	9,305 (14.813)	−19,767.45 to 4,187.45	.20	
		Month 36	7,555 (8.486)	8,260 (8.576)	−11,703.20 to −2,396.80	.00	−.08
Bernabei et al. (1998)	High	Month 12	5,041 (n/a) <sup>a</sup>	7,762 (n/a) <sup>a</sup>	n/a	n/a	n/a
Long (2002) and Long and Marshall (2000)	Good	Month 24	18,210 (n/a)	13,973 (n/a)	n/a	.05	n/a

Note. n/a = data not attainable.

<sup>a</sup>—£1 = \$1.6.

disease or older people who are frail or with impairment living in the community. Eligible studies reported RCT on the patient advocacy case management model and evaluated service use and costs. Excluded were studies on mental healthcare or acute care and studies applying other case management models such as hospital-based case management, interrogative case management, disease management programs, or programs for discharge follow-up. Also excluded were studies focused on children, adolescents, caregivers, substance abuse, or professional reintegration.

Two authors working independently screened each citation retrieved in the searches. Articles were included when both investigators unequivocally considered the publication as appropriate for analysis. Differences were resolved through discussion or with reference to a third investigator if necessary.

#### Data Extraction

The full articles of the included studies were independently analyzed by two investigators for the characteristics of the studies (country of origin, cases included, characteristics of experimental and control group, and intervention details) and the outcomes of service use and costs, using a structured data form based on the Consolidated Standards of Reporting Trials statement (Moher, Schulz, & Altman, 2001).

**Assessment of Methodological Quality** Two investigators independently assessed the methodological quality of the selected articles and recorded their findings with an evaluation tool and scoring system composed of a set of 10 items for quality assessment. Criteria in the evaluation tool were extracted from the Cochrane Library and from publications on quality assessment of studies (Dawes et al., 1999; Hadorn, Baker, Hodges, & Hicks, 1996; Higgins & Green, 2005; Verhagen et al., 1998). Differences were resolved through discussion with reference to a third investigator if necessary. The appraisal of the methodological quality of the individual studies was based on a weighted score for those items that concerned the similarity of groups at baseline (concerning the most important indica-

tors), randomization, and adequate statistical methods (3 points); the use of power analysis, comparisons between dropouts and sample, and (statistical) control of confounders (2 points); and assessment by a medical ethics committee, concealment of allocation, unbiased outcome measure, and eligibility criteria (1 point). The overall quality score for each study was calculated by summing up the weighted "yes" scores. The total score could range from 0 to 19 points. To classify these total scores, the quality scale scores were arranged into the following ordinal categories based on suggestions made by Verhagen et al. (2000): invalid quality (scores 0–4), weak quality (scores 5–9), good quality (scores 10–14), and high quality (scores 15–19). Studies with an invalid methodological quality were excluded from further analysis.

**Analysis and Synthesis** Findings of the selected studies were grouped by outcome variables for service use and costs. Confidence intervals (95% CI) for the differences between experimental and control groups were calculated using the *t*-test method for independent mean scores and the method according to Newcombe (1998) for differences among independent proportions. When the necessary data for calculating confidence intervals were unavailable, the results for statistically significant differences between experimental and control groups were explored. Effect sizes (ESs) were calculated for statistically significant differences between experimental and control groups: Cohen's *b* for data reporting proportions and Cohen's *d* for data reporting the mean. According to Cohen's (1988) thresholds, an ES of <.20 indicates a trivial effect; an ES of ≥.20 to <.50, a small effect; an ES of ≥.50 to >.80, a moderate effect; and an ES ≥.80, a large effect. An ES ≥.20 reflects a clinically relevant difference (Middel, Stewart, Bouma, van Sonderen, & van den Heuvel, 2001).

## Results

### Search for Trials

The database search resulted in 262 potentially relevant articles on RCTs in case management. After screening titles

and abstracts, 46 articles were included for full-text analysis. Ten articles from nine studies were included for methodological evaluation (Figure 1).

### Methodological Quality

Finally, nine articles from eight studies (Bernabei et al., 1998; Eloniemi-Sulkava et al., 2001; Fordyce, Bardole, Romer, Soghikian, & Fireman, 1997; Gagnon, Schein, McVey, & Bergman, 1999; Long, 2002; Long & Marshall, 2000; Newcomer, Maravilla, Faculjak, & Graves, 2004; Newcomer, Miller, Clay, & Fox, 1999; Schore, Brown, & Cheh, 1999) were included in the analysis and synthesis procedure (Figure 1). Two out of nine studies (22%; Bernabei et al., 1998; Gagnon et al., 1999) were classified as high-quality studies, four studies (44%; Eloniemi-Sulkava et al., 2001; Fordyce et al., 1997; Long, 2002; Long & Marshall, 2000; Newcomer et al., 1999) showed good methodological quality, and two studies (22%; Newcomer et al., 2004; Schore et al., 1999) were classified as weak studies (Table 2). One study (11%; Boyd, Fisher, Davidson, & Neilsen, 1996) was excluded from final selection because of an overall invalid quality. Randomization and baseline comparison of experimental and control groups were performed adequately in all studies. Control of confounders and statistical tests were adequate in most studies, although the performance of a power analysis and the analysis of dropouts were reported only in one and two studies, respectively.

### Description of the Studies

Characteristics of the included studies are described in Table 1. All studies involved frail or impaired older people, and two of the three projects in the study by Schore et al. (1999) included people with a catastrophic or chronic illness. Five studies were performed in the United States (Fordyce et al., 1997; Long, 2002; Long & Marshall, 2000; Newcomer et al., 1999, 2004; Schore et al., 1999), one in Canada (Gagnon et al., 1999), and two in Europe (Bernabei et al., 1998; Eloniemi-Sulkava et al., 2001). Sample sizes in the control or experimental groups ranged from around a hundred or fewer respondents (Bernabei et al., 1998; Eloniemi-Sulkava et al., 2001; Long, 2002) to more than 4,000 respondents. The intervention period varied from 10 months (Gagnon et al., 1999), to 24 months (Long, 2002; Long & Marshall, 2000) and 36 months (Gagnon et al., 1999) and was in most studies 12 months (Bernabei et al., 1998; Newcomer et al., 2004; Schore et al., 1999).

In four studies (Bernabei et al., 1998; Fordyce et al., 1997; Gagnon et al., 1999; Long, 2002; Long & Marshall, 2000), the case manager acted as a member of a multidisciplinary team, and in four studies (Eloniemi-Sulkava et al., 2001; Newcomer et al., 2004, 1999; Schore et al., 1999), the case manager acted independently. The main contact method was home visits (Bernabei et al., 1998; Eloniemi-Sulkava et al., 2001; Long, 2002; Long & Marshall, 2000), telephone calls (Fordyce et al., 1997; Schore et al., 1999), or a combination of home visits and telephone calls (Gagnon et al., 1999; Newcomer et al., 2004). Case management was performed by a nurse (Eloniemi-Sulkava et al., 2001; Gagnon et al., 1999; Newcomer et al., 2004), a nurse or a social worker

(Newcomer et al., 1999; Long, 2002; Long & Marshall, 2000), a nurse practitioner (Fordyce et al., 1997), or the professional background was unclear (Bernabei et al., 1998). Caseload per case manager varied from 30 to 100 people ( $M = 61$ ). In one study (Fordyce et al., 1997), the caseload was not reported.

### Effectiveness of Patient Advocacy Case Management

Results are reported using best-evidence analysis of the separate studies of service use (Table 2) and costs (Table 3). The reasons that inhibited statistical pooling of data were missing standard deviations (Table 2) and heterogeneous statistical methods used to test differences among RCT groups. Attempts to obtain the sufficient data from the authors necessary for statistical analysis were unsuccessful. Also unsuccessful was transforming the data into comparative statistical indicators, despite the assistance of experienced researchers in this field.

**Hospital Admission** Hospital admission was reported in six studies (Bernabei et al., 1998; Fordyce et al., 1997; Gagnon et al., 1999; Long, 2002; Newcomer et al., 2004; Schore et al., 1999). Bernabei et al. (1998) performed a study of good methodological quality and reported a small but clinically relevant decrease in hospital admissions in favor of the intervention group, whereas one of the three projects (project H) in the study by Schore et al. (1999), a study with weak methodological quality, showed a trivial increase in hospital admissions in the experimental group.

**Hospital Length of Stay** Effectiveness of case management regarding hospital length of stay was reported in five studies (Bernabei et al., 1998; Fordyce et al., 1997; Gagnon et al., 1999; Long, 2002; Newcomer et al., 2004). Bernabei et al. (1998) reported a trivial reduction in number of days per year spent in a hospital in the intervention group.

**Emergency Department Visits** Emergency department visits were evaluated in five studies (Bernabei et al., 1998; Gagnon et al., 1999; Long, 2002; Newcomer et al., 2004; Schore et al., 1999). Bernabei et al. (1998) reported a small but clinically relevant reduction in visits, whereas Schore et al. (1999) reported an increase in the number of emergency department visits in one of the three experimental groups.

**Nursing Home Admission** Three studies (Bernabei et al., 1998; Eloniemi-Sulkava et al., 2001; Newcomer et al., 2004) reported results on nursing home admissions. None of the studies showed a change in the number of nursing home admissions.

**Costs** Healthcare costs were calculated in three studies (Bernabei et al., 1998; Long, 2002; Newcomer et al., 1999; Table 3). Newcomer et al. (1999) performed an extensive study with a good methodological quality and found statistically significant but trivial savings in the first year of the case management intervention and over the total intervention period of 3 years. Bernabei et al. (1998) found extensive savings mainly from a substantial decrease in nursing home (-48%) and hospital expenses (-34%) but also for community health services costs (-19%); however, data were insufficient to calculate a  $p$  value or ES. Long (2002) and Long and Marshall (2000) performed a



study with a good methodological quality and found that the average total costs per person were higher for the case-managed group, but this difference was not statistically significant.

## Discussion

None of the studies found evidence for clinically relevant increases in service use or costs, whereas two studies (Bernabei et al., 1998; Newcomer et al., 1999) reported that patient advocacy case management led to decreased service use and savings in healthcare costs. Therefore, the most important conclusion of this study can be that patient advocacy case management does not increase service use and costs. Moreover, indications were found that patient advocacy case management for those with chronic illness or older people can lead to a decrease in service use and healthcare costs. In accordance with Donabedian (1988), these conclusions are an indication for quality improvement by patient advocacy case management through the combination of its benefits (more comprehensive coordination of services over the continuum of care from the patient perspective), with service use and costs remaining at least constant.

The largest positive effects were shown by Bernabei et al. (1998) with a program of integrated social and medical care among frail older people living in Northern Italy. This study with a high methodological quality was effective in the reduction of hospital admissions, hospital length of stay, and emergency room visits. Furthermore, this study showed savings in community health service costs, nursing home, and hospital expenses. Reasons for the success of this study are most likely the following. First, the intensively trained case managers provided case management skills and geriatric assessment technology, which determined the ability to design care plans and coordinate all available agencies. Second, the community geriatric evaluation unit (geriatrician, social worker, and nurses) represented gatekeepers and provided their skills. Finally, close collaboration among case managers, the community geriatric evaluation unit, and the general practitioner were invaluable.

Other factors related to the strength of the intervention may explain the variations in outcome. Examples of this are Fordyce et al. (1997), Bernabei et al. (1998), Schore et al. (1999), and Eloniemi-Sulkava et al. (2001), who noted two factors as being important determinants in the intervention that led to positive effects using patient advocacy case management: (a) good communication and close cooperation between the case manager and physicians and other health professionals and (b) the acceptance of the case manager as the coordinator for care delivery.

Long and Marshall (1999) suggested a "floor effect" on service use and cost savings. When both the case management group and the usual care group of clients are enrolled members of a managed care organization, in which service utilization and cost controls are generally part of the everyday dynamic, it is difficult to achieve further reductions. Newcomer et al. (2004) suggested a "ceiling effect" on the benefits of adding a case manager to patients who already had a high level of physician involvement. Newcomer et al. and Gagnon et al. (1999) included a high-risk older people

case mix and found that still more attention to patient inclusion was needed to reduce per-client costs and suggested the inclusion of clients with high rates of physician visits, emergency department visits, problems of treatment compliance, instrumental activities of daily-living limitations, terminal conditions, or those approaching end-of-life care. Long (2002) compared the outcomes for case managers with a different professional background—nurse or social worker—and found no differences, suggesting that the professional background was of less importance.

Cost effectiveness was studied best by Newcomer et al. (1999), who performed an extensive study of good methodological quality. Case management was delivered by a nurse or a social worker, with a case load of 30 (Model A) or 100 persons (Model B), who planned and coordinated community services and trained the caregivers about disease progression and support of functional status tasks. In contrast to the other studies, the intervention period was 3 years. During this period, Newcomer et al. found overall savings after the first year of intervention and over the full intervention period of 3 years. According to the authors, these findings suggested that treatment effects might be more discernible when expenditures are averaged over multiple years rather than using only the events of a single year for a steady-state program such as case management. Worth noting in this context is the "investment effect" that Toseland et al. (1997) suggested in a trial with a 24-month intervention period evaluating the cost effectiveness of a geriatric evaluation and management program for the frail older people. In the first months of the study, the healthcare costs in the experimental group were more than those incurred for patients in the usual care group. In the final months of the study, costs for the usual care group exceeded those for the experimental group. The greater average cost per person in the case-managed group has been explained as "dynamics inherent in the case management model" (Long, 2002, p. 64), "in which the case manager acts in the best interest of the clients and therefore encourages and facilitates use of the healthcare system" (Long, 2002; Long & Marshall, 2000).

## Strength and Limitations

The extensive literature search resulted in eight RCTs on service use and costs that examined the effects of patient advocacy case management for either frail or impaired older or adult people with a chronic somatic disease living in the community.

One important limitation when synthesizing the results was the impracticability of statistical pooling of the data across studies. The main problems that caused this limitation were the missing data (e.g., standard deviations for mean values) in some studies and the heterogeneity of the statistical methods applied to test the differences among RCT groups. Despite attempts to complete these missing data and to transform the data into more comparable statistical indicators, statistical pooling of the data was not possible. Therefore, to make a meaningful comparison of the effectiveness of case management among the studies, confidence intervals were calculated for studies reporting proportions or mean scores and ESs for statistically significant results.

Other limitations are related to the limitations of the studies included. Most obvious was the lack of studies on people with a chronic disease who are living in the community and receiving patient advocacy case management. Furthermore, in the included studies, little attention was paid to other potential benefits of patient advocacy case management, besides service use and costs, such as physical health or quality of life aspects. These potential limitations tend to result in a narrowed view of the effects of patient advocacy case management.

### Implications

There should be more priority given to further implementation of patient advocacy case management for those with chronic illness and older people with impairment because indications were found that this intervention improves the quality of care. Nurses can play an important role in this development once the nursing discipline (scientists and professional nurses) succeeds in implementing a strong intervention that differs clearly from the usual care; using suggestions from the authors of the various studies included in our analysis may serve as a beginning. These suggestions imply that (a) patient advocacy case management should be delivered by experienced case managers; (b) communication and cooperation between case manager, physicians, and primary care staff should be of high quality; (c) case management should serve an appropriate and adequate population of patients; and (d) the intervention period should be long enough to make the treatment effects discernible (Toseland et al., 1997).

Moreover, the effectiveness of patient advocacy case management needs further research. Studies are needed that have a similarity of participants in intervention and control groups at baseline, randomization, adequate statistical methods and use of power analysis, comparison of dropouts and sample, and statistical control of confounders. Finally, studies on the effectiveness of patient advocacy case management on service use and costs should also evaluate the effects on the quality of life of the patient and the caregiver, as well as on satisfaction with care. ▀

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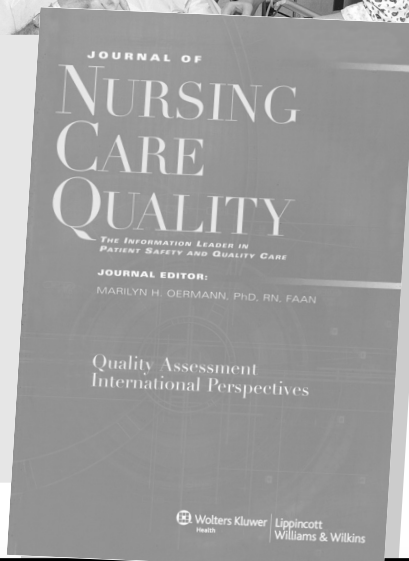
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