JAMDA 16 (2015) 41–48

JAMDA

journal homepage: www.jamda.com

Original Study

Economic Evaluation of a Multifactorial, Interdisciplinary Intervention Versus Usual Care to Reduce Frailty in Frail Older People

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Keywords:
Frailty
randomized controlled trial
cost-effectiveness

A B S T R A C T

Objective: To compare the costs and cost-effectiveness of a multifactorial interdisciplinary intervention versus usual care for older people who are frail.
Design: Cost-effectiveness study embedded within a randomized controlled trial.
Setting: Community-based intervention in Sydney, Australia.
Participants: A total of 241 community-dwelling people 70 years or older who met the Cardiovascular Health Study criteria for frailty.
Intervention: A 12-month multifactorial, interdisciplinary intervention targeting identified frailty characteristics versus usual care.
Measurements: Health and social service use, frailty, and health-related quality of life (EQ-5D) were measured over the 12-month intervention period. The difference between the mean cost per person for 12 months in the intervention and control groups (incremental cost) and the ratio between incremental cost and effectiveness were calculated.
Results: A total of 216 participants (90%) completed the study. The prevalence of frailty was 14.7% lower in the intervention group compared with the control group at 12 months (95% CI 2.4%–27.0%; $P = .02$). There was no significant between-group difference in EQ-5D utility scores. The cost for 1 extra person to transition out of frailty was $A15,955 (at 2011 prices). In the "very frail" subgroup (participants met >3 Cardiovascular Health Study frailty criteria), the intervention was both more effective and less costly than the control. A cost-effectiveness acceptability curve shows that the intervention would be cost-effective with 80% certainty if decision makers were willing to pay $A50,000 per extra person transitioning from frailty. In the very frail subpopulation, this reduced to $25,000.
Conclusion: For frail older people residing in the community, a 12-month multifactorial intervention provided better value for money than usual care, particularly for the very frail, in whom it has a high probability of being cost saving, as well as effective.

Frailty is a measurable biological syndrome that is associated with costly adverse health outcomes, such as falls and disability, as well as elevated levels of hospitalization and institutionalization.[1,2] Between 4% and 17% of older people are frail,[3] and the aging of populations globally will result in an increase in the prevalence, impact, and costs of frailty in the near future. One of the key questions in aging research

Trial registration: ACTRN12608000250336.
The authors declare no conflicts of interest.
This study was funded by an Australian National Health and Medical Research Council Health Services Research grant (reference number NHMRC 402791). The salaries of CS, SL, SK, and IC are funded by Australian National Health and Medical Research Council grants or fellowships. The research was conducted independently from the funding body.

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http://dx.doi.org/10.1016/j.jamda.2014.07.006
1525-8610/

Characteristic	Criteria
Weight loss/ Shrinking	Self-report of ≥ 4.5 kg lost unintentionally in previous 12 months or loss of ≥5% of weight in prior year by direct measurement of weight
Weakness	Lowest 20% in grip strength, measured using a dynamometer (Saehen Dynamometer, model SH5001). Best of three attempts used. Males scoring 30kg or less, female scoring 18kg or less meet the criteria
Exhaustion	Answering "a moderate amount" or "most of the time" to either of the 2 questions from the Centre for Epidemiological Studies-Depression Scale (CES-D) indicated exhaustion: "How often did you feel that everything you did was an effort in the last week?" or "How often did you feel that you could not get going in the last week?".
Slowness	Time to walk four metres, with or without a walking aid, equals six seconds or more.
Low activity	In the past three months, weight bearing physical activity was not performed, more than four hours per day were spent sitting, and went for a short walk once per month or less.

Fig. 1. Definition of frailty components in the Frailty Intervention Trial (FIT).

is how frailty can be treated.[4] Identification of cost-effective interventions to reduce frailty may help health services to more efficiently allocate health care resources to those older people most at risk.

There is a lack of evidence regarding the effectiveness of intervention strategies targeting degree of frailty in older people who are frail. Although several trials have assessed interventions to improve functional outcomes in older people who are probably frail,[5] to our knowledge, only one study has examined the effect of an intervention developed to specifically reverse the syndrome of frailty. In the Frailty Intervention Trial (FIT), we found that a 12-month multifactorial interdisciplinary intervention reduced degree of frailty and decreased disability in older people who met the Cardiovascular Health Study (CHS) frailty criteria.[6,7] To date, there is no evidence on the economic implications of interventions targeting degree of frailty in the frail population. Identifying cost-effective means for reducing frailty has the potential to guide appropriate use of the limited resources available to improve outcomes in older people.

This article, therefore, reports an economic evaluation using data obtained from the FIT trial.[8] From a health care funder perspective, we examined the cost-effectiveness of a multifactorial interdisciplinary intervention, as compared with usual care, in community-dwelling frail older people.

Table 1
Unit Costs for Intervention, Health, and Social Care Resource Use

	Unit Cost	Basis of Estimate
Primary care		
General practitioner appointments	$69	Level C consultation (20–40 minutes)*
Nursing or other health professional appointments	$51.15	30-minute consultation†
Hospital-based care		
Hospital bed days	DRG specific	Australian Refined Diagnosis-Related Group codes‡
Social care		
Residential care (permanent, high-care) (per day)	$93.21	Australian Government Daily Aged Care Funding Instrument subsidy rates per occupied place-day in Australia§
Residential care (permanent, low-care) (per day)	$30.90	
Residential care (respite, high-care) (per day)	$105.78	
Residential care (respite, low-care) (per day)	$37.73	
Home help	$37.74	1 hour duration, assuming 50% personal care and 50% domestic assistance‖
Transport	$12.39	Return trip‖
Meal delivery	$11.10	One meal delivered‖

*Level C General Practitioner consultation (Medicare Benefits Schedule).[13]

†Mean cost in Australia,[16] weighted by 50% of participants in this category receiving community nursing, 25% public hospital service physiotherapy, 25% podiatry.

‡The cost of hospital admissions were obtained from Australian Refined Diagnosis-Related Group cost weights (AR-DRG version 6.0). Hospital admission costs were calculated using the diagnosis and the length of hospital stay of each participant. The average cost per hospital day was calculated for this sample ($1282.92) and was used where the cause of hospital admission was unknown.

§The cost of days in residential aged care facilities were obtained from the Australian Government Department of Health and Ageing Daily Aged Care Funding Instrument subsidy rates,[15] assuming participants received full funding support.

‖Mean cost in Australia.[16]

Methods

Participants and Setting

The FIT was a prospective, assessor-blind, randomized, controlled, single-center trial. The study protocol was registered with the

Table 2
Characteristics of Participants in Intervention and Control Groups at Entry to Study

	Intervention, n = 120	Control, n = 121
Demographic factors		
Age, y	83.4 (5.81; 71–99)	83.2 (5.91; 71–101)
Gender, n males (%)	39 (33)	39 (32)
Lives alone, n (%)	60 (50)	51 (42)
Health		
Frailty criteria present,*n (%)		
3	77 (64)	79 (65)
4	33 (28)	30 (25)
5	10 (8)	12 (10)
Medical conditions,† 0–26	7.44 (2.90; 0–13)	7.37 (2.58; 0–12)
Mini Mental State Examination score,‡ 0–30	26.6 (2.58; 19–30)	25.9 (3.14; 18–30)
Geriatric Depression Scale,‡ 0–15	4.76 (3.18; 0–14)	5.06 (3.19; 0–14)
Health-related quality of life, EuroQol-5D	7.67 (1.47; 5–12)	7.83 (1.50; 5–13)
Functioning		
Walks with walking aid, n (%)	95 (79)	92 (76)
Walking speed, meters/second	0.45 (0.17; 0–1.00)	0.48 (0.16; 0–1.03)
Short Physical Performance Battery, 0–12	5.2 (1.89; 0–11)	5.74 (2.12; 0–12)
Barthel Index, 0–100	93.9 (11.1; 45–100)	92.5 (14.3; 2–100)

Values are mean (SD; range) unless stated otherwise.

*Frailty phenotype (modified from Cardiovascular Health Study criteria).[8]

†Self-reported, doctor-diagnosed medical conditions.

‡Missing data for Geriatric Depression Scale (n = 1), Mini Mental State Examination (n = 1).