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Cost-Effectiveness of a Proactive Primary Care Program for Frail Older People: A Cluster-Randomized Controlled Trial

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A B S T R A C T

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Background: A proactive integrated approach has shown to preserve daily functioning among older people in the community. The aim is to determine the cost-effectiveness of a proactive integrated primary care program.

Methods: Economic evaluation embedded in a single-blind, 3-armed, cluster-randomized controlled trial with 12 months' follow-up in 39 general practices in the Netherlands. General practices were randomized to one of 3 trial arms: (1) an electronic frailty screening instrument using routine medical record data followed by standard general practitioner (GP) care; (2) this screening instrument followed by a nurse-led care program; or (3) usual care. Health resource utilization data were collected using electronic medical records and questionnaires. Associated costs were calculated. A cost-effectiveness analysis from a societal perspective was undertaken. The incremental cost per quality-adjusted life-year was calculated comparing proactive screening arm with usual care, and screening plus nurse-led care arm with usual care, as well as the screening arm with screening plus nurse-led care arm.

Results: Out of 7638 potential participants, 3092 (40.5%) older adults participated. Whereas effect differences were minor, the total costs per patient were lower in both intervention groups compared with usual care. The probability of cost-effectiveness at €20,000 per QALY threshold was 87% and 91% for screening plus GP care versus usual care and for screening plus nurse-led care compared to usual care, respectively. For screening plus nurse-led care vs screening plus standard GP care, the probability was 55%.

Conclusion: A proactive screening intervention has a high probability of being cost-effective compared to usual care. The combined intervention showed less value for money.

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Nienke Bleijenberg and Irene Drubbel contributed equally to the study.

The authors declare no conflicts of interest.

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Worldwide, the number of people aged 60 years and older will rise from 600 million in 2000 to approximately 2 billion in 2050.¹ A substantial number of these older people will experience frailty, that is, an increased risk of adverse health outcomes.² Frail older people often have multiple chronic diseases and limitations in their activities of daily living.^{3,4} With their resulting complex care needs, the elderly population places a large burden on health care resources.⁵ In the United States, total health care expenditures for people aged 65 were \$368 billion in 2008, which was almost one-third of the total health care budget.⁶ For people with 5 or more chronic diseases, health care spending is often 14 times higher than for people without any chronic disease.⁷

In the Netherlands, €33 billion (37%) of the total 2011 health care budget of €89 billion was spent on care for people aged 65 years and older.⁸ Because health care costs for older people place a major burden on society, the efficient delivery of care is important to ensure that as many positive health effects as possible are realized for the money invested.

Most care needs of older people are addressed in primary care. As gatekeepers to the health care system, general practitioners (GPs) resolve more than 90% of the health problems in the overall population.⁹ Based on the integrated, patient-centered approach and the long-lasting relationship with their patients, GPs have a key role in the provision and coordination of care for frail older patients.¹⁰ However, at present, the care for older people in general practice is reactive and fragmented, and the care needs of frail older people are not adequately met.^{11,12} A paradigm shift is needed from reactive care, in which GPs respond to emerging health problems of the high-needs, high-cost individual a more proactive, population-based care provision.^{13,14}

The current evidence for the cost-effectiveness of proactive primary care for older people is scarce and difficult to compare across studies.^{15,16} We designed and implemented a strategy for proactive primary health care for older people consisting of the systematic identification of frail older people, and a subsequent nurse-led, proactive, and personalized care program.¹⁷ The strategy demonstrated a small but significant effect in delaying functional decline in the elderly population at 1-year follow-up.¹⁸ The aim of the present study was to evaluate the cost-effectiveness of the Utrecht Proactive Frailty Intervention Trial (U-PROFIT) strategy and its separate intervention components.

Method

The U-PROFIT Trial

Design clinical trial

The economic evaluation was performed using data collected alongside the U-PROFIT trial, which has been described elsewhere in detail.¹⁹ In brief, we conducted a single-blind, 3-armed, cluster-randomized controlled trial in 39 general practices in the Utrecht region of the Netherlands. These general practices provide primary health care to approximately 44,000 patients aged 60 years and older. In this trial, we evaluated the effectiveness of the frailty screening instrument followed by standard GP care, and that of the screening followed by a nurse-led proactive care program on the level of daily functioning among frail, community-dwelling older people compared with the usual primary care. The U-PROFIT trial was approved by the Institutional Review Board of the University Medical Center Utrecht (protocol ID 10-149/O).

Interventions

Arm 1. The frailty screening intervention consists of a software application that identifies patients at risk for frailty by screening routine electronic medical record (EMR) data from general practices. Patients aged 60 years and older were considered potentially frail and included in a quarterly report when they met at least 1 of the following criteria: a frailty index ≥ 0.20 ,^{20,21} polypharmacy of ≥ 5 medications in chronic use, or a consultation gap (at least 3 years without general practice consultation except for the annual influenza vaccination).²² In the screening plus standard GP care arm, GPs were asked to use the reports proactively, following current professional guidelines. For example, GPs were able to call patients if they felt it was necessary because of the consultation gap or comorbidities. In these practices, there was no trained registered nurse to deliver the additional steps of the proactive care program.

Arm 2. In the second arm, the frailty screening was followed by the nurse-led care intervention. Twenty-one registered practice nurses were trained to deliver this proactive intervention. After the frailty

screening based on EMR data, patients at risk received a self-report questionnaire to measure the level of frailty using the Groningen Frailty Indicator.²³ Next, patients who were identified as frail on the Groningen Frailty Indicator received a home-based Comprehensive Geriatric Assessment, followed by evidence-based care planning, care coordination and follow-up.¹⁷ Care coordination and the intensity of follow-up was based on patients care needs. Evidence-based care plans were developed for 11 geriatric syndromes such as falls, urinary incontinence, mobility, and nutrition.

Arm 3. The frailty screening was also performed in the control group practices, but the report was not visible for the GPs. GPs in the control group were asked to continue their usual care, based on Dutch general practice guidelines. Most practices provided reactive care to emerging health problems. Patients need a referral from the GP to get access to secondary care or to see a medical specialist. In some control group practices, nurses provided reactive and ad hoc care to older people.

Participants

Within the participating general practices, we approached 7638 eligible patients, that is, patients aged 60 years and older who met at least 1 of the frailty selection criteria based on the EMR record data as described above. In total, 3092 patients (40.5%) provided written informed consent. Individuals who were terminally ill, defined as estimated life expectancy of 3 months or less, and those in assisted-living facilities or nursing homes were excluded. Flowchart of the participants is provided in [Appendix A](#). Nonresponders were phoned and, if needed, home visits were conducted for those who experienced difficulty reading or filling in the questionnaire.

Design Cost-Effectiveness Study

For the current study, we performed an incremental cost-effectiveness analysis from a societal perspective. We compared the 2 interventions for proactive care for frail older people as evaluated in the U-PROFIT trial, that is, frailty screening followed by standard GP care and frailty screening followed by nurse-led care, with usual care as the control condition and among each other. We evaluated the costs and effects at 12 months, which is the full follow-up period of the U-PROFIT trial. Because of this time frame, discounting of costs and effects was not necessary.

Data Collection and Resource Valuation

Costs

Intervention costs. The costs of the frailty screening followed by standard GP care and the frailty screening followed by nurse-led care intervention were calculated using a bottom-up approach ([Appendix B](#)). In brief, we collected information on the time required for the interventions by the GPs and registered nurses and the related costs based on their hourly wage costs. Information on costs of electronic frailty screening start-up and maintenance, the nurse-led care educational program for the registered nurses in primary care, and an evidence-based toolkit developed and used by the nurses was collected alongside the development and implementation of both interventions. Next, we calculated the number of potentially frail older people per general practice based on the frailty screening, assuming a standard Dutch practice size of 2350 patients.²⁴ In a standard general practice, on average, 552 patients (23.5%) are 60 years and older.²⁵ Within this older population, 110 patients (20%) would be selected as potentially frail in frailty screening based on routine primary care data.¹⁹ With these data, we converted the calculated intervention costs to “costs per potentially frail older patient per year.”

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