Supporting older adults to STAY ACTIVE AT HOME

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Process, effect and economic evaluation of a reablement training program for homecare staff

Teuni Henrica Rooijackers

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Voor opa & oma Rooijackers
en opa & oma Van der Zanden

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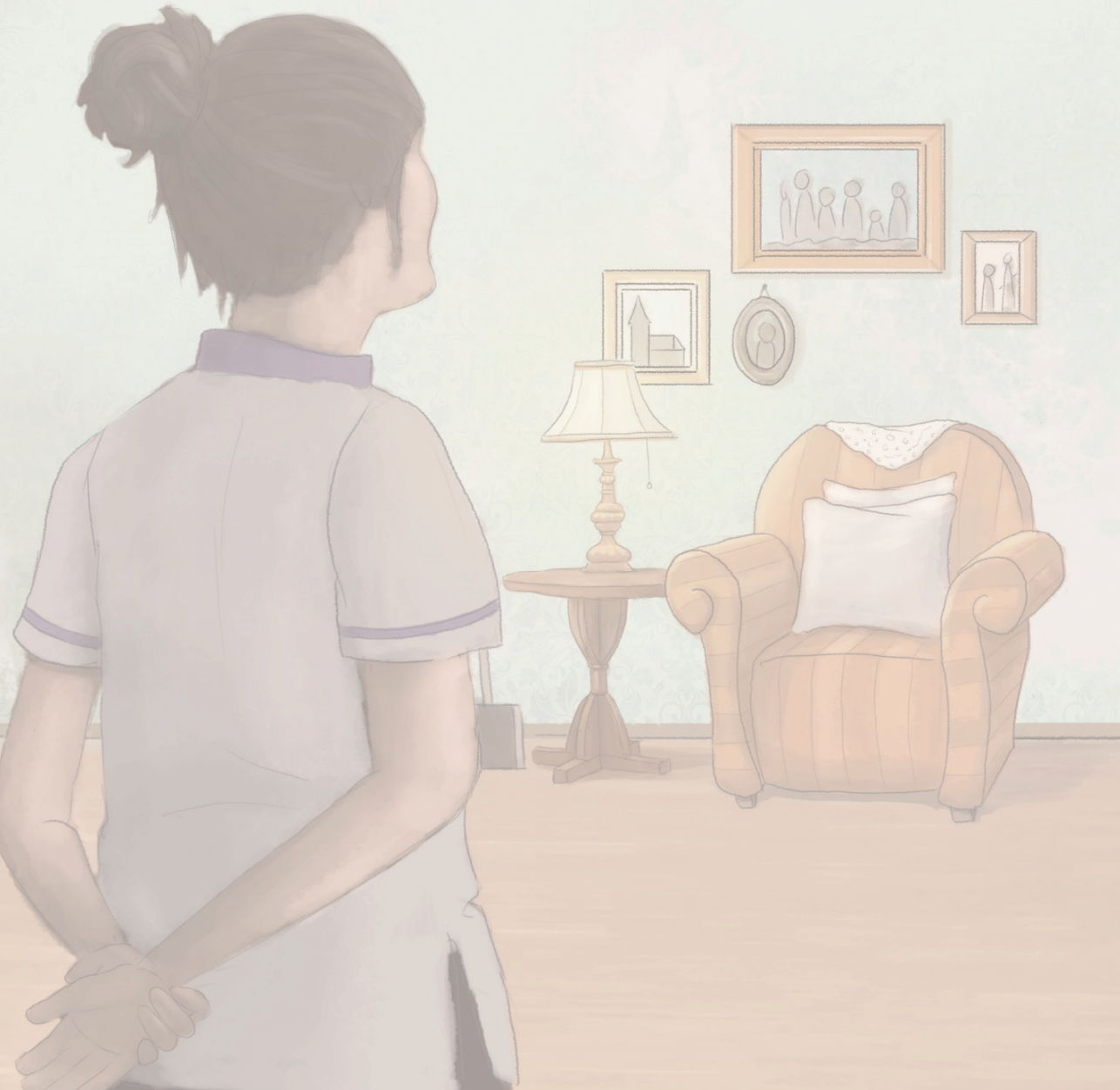
CHAPTER 1



General introduction

Teuni H. Rooijackers

To address the challenges of an aging population, the concept of 'aging-in-place' is often pursued today. In this context, Dutch homecare is increasingly committed to promoting the independence of community-dwelling older adults. For homecare staff, who have traditionally been used to providing care and support by 'doing for' older adults rather than 'doing with' them, this requires a change in their philosophy of service delivery.

This thesis is about 'Stay Active at Home' (in Dutch: 'Blijf Actief Thuis'), a Dutch reablement training program for homecare staff. 'Stay Active at Home' aims to change the behavior of homecare staff towards increasing older adults' participation in daily and physical activities and reducing their sedentary behavior, in order to support older adults to continue living at home as independently as possible.

This chapter provides background information on aging in the Netherlands, the importance of staying active and independent in later life, and the role that homecare staff can play in this regard. It also introduces reablement as an approach to changing staff behavior, and the 'Stay Active at Home' reablement training program for homecare staff. The chapter concludes with the overall aim, objectives, and outline of this thesis.

Aging in the Netherlands

Population aging is one of the greatest challenges of the 21st century. It is driven in particular by declining fertility rates and increased life expectancy.[1, 2] In the Netherlands, the proportion of people aged 65 years and older (hereafter referred to as 'older adults') increased from 13.6% to 19.5% between 2000 and 2020 and is expected to rise to 25.2% by 2050.[3] At the same time, life expectancy at birth increased from 78.1 to 81.7 years and is expected to rise to 86.8 years in 2050.[4, 5] Thus, not only does the group of older adults constitute an increasingly large share of Dutch society, but the average age is also increasing. Fortunately, healthy life expectancy at birth, i.e., the average number of years a person is expected to live in 'full health', has also increased over time.[6] Yet this increase is slower than the increase in life expectancy, meaning that the Dutch population on average lives more years with disability or disease burden.[7]

This aging of the population, which is often accompanied by age-related disabilities and chronic diseases, has profound implications for older adults, their social networks, and the sustainability of healthcare systems.[7-9] It leads to increasing demand for healthcare, particularly long-term care, rising healthcare costs, and labor shortages. To address these challenges, many countries, including the Netherlands, are now pursuing the concept of 'aging in place'. 'Aging in place' is defined as '*remaining living in the*

community, with some level of independence, rather than in residential care'.[10-12] The vast majority of older adults prefer this, even those with frail health and challenging social situations,[13, 14] provided they receive appropriate levels of care or support to meet their (changing) needs.[15] Moreover, 'aging in place' is believed to lead to better outcomes at lower costs than institutionalization,[16-18] making it also the preferred choice of policy makers and healthcare providers.[11] Today, about 96% of Dutch older adults live at home, of which 80% live independently and 16% receive homecare or support.[19-21]

Staying active and independent in later life

To continue living at home in the long term, it is particularly important for older adults to stay active in later life. This can lead to a wide range of beneficial effects, including limiting the development and progression of disabling conditions and chronic diseases,[22] and maintaining or improving function and independence.[23-26] In contrast, sedentary behavior is associated with functional limitations, frailty, disability, and loss of independence.[23, 27, 28] The Health Council of the Netherlands therefore recommends that older adults: engage in moderately intensive activities for at least 150 minutes per week, spread over several days; perform activities that strengthen muscles and bones at least twice a week, combined with balance exercises; and avoid prolonged sitting.[29] Yet many older adults have primarily sedentary lifestyles. Objective measurements of sedentary behavior show that Dutch older adults spend an average of 65–80% of their waking day sedentary.[30, 31] These findings are consistent with those of a systematic review of 22 studies from ten European countries, involving nearly 350,000 older adults.[32] Even higher sedentary times are reported among older adults receiving long-term care.[33] This makes older adults the most sedentary age group in society.[34, 35]

Today, there are numerous interventions aimed at improving physical activity and reducing sedentary behavior in older adults, primarily specific exercise interventions. Yet many of these interventions have had limited success, especially in the long term and when implemented in real-world settings.[36-38] In part, this is due to barriers experienced by older adults, including health problems, fear of injury or falling, insufficient understanding of the benefits of physical activity, or environmental constraints.[39, 40] Moreover, exercise interventions typically do not include a behavior change concept for fostering long-term adherence.[36] Therefore, alternative approaches based on the preferences of older adults (i.e., integrating activity into daily routines rather than participating in stand-alone exercise interventions[41]) and applying behavior change concepts have been repeatedly advocated to promote long-lasting

change.[42, 43] Homecare staff, who routinely visit a large proportion of Dutch older adults and provide assistance with a wide range of activities, could play a central role in this.

Dutch homecare

Dutch homecare includes personal care (i.e., assistance with activities of daily living (ADL) such as washing and dressing), nursing care (i.e., medical assistance such as tending to wounds or administering injections), and domestic support (i.e., assistance with instrumental activities of daily living (IADL) such as doing laundry and vacuuming).[44, 45] Personal and nursing care are regulated by the Health Insurance Act, funded by health insurers, and provided by homecare organizations through district nursing teams.[45, 46] District nursing teams consist of approximately 10–15 staff members: bachelor-educated registered nurses, vocationally trained registered nurses, (certified) nurse assistants and nurse aides. The district nurse, who usually has a bachelor's degree, leads the nursing team, coordinates and supervises care delivery, and is responsible for, among other things, conducting formal needs assessments and developing care plans.[47] Domestic support is regulated by the Social Support Act and is funded from general tax revenues, although older adults pay a small income-dependent contribution. The assessment of domestic support needs is the responsibility of municipalities and support is provided by domestic staff.[45, 46] They are often affiliated with homecare organizations, although they work separately from district nursing teams and mainly individually. In this thesis, the term 'homecare staff' was used when referring to staff involved in personal care, nursing care, and domestic support.

Homecare staff have traditionally been trained according to a disease- or illness-based medical care model.[48] This means that, with the best of intentions, staff are accustomed to providing care and support by task-completion, even when older adults could at least partially perform these tasks or activities themselves.[49-51] This can lead to a downward spiral, with more sedentary behavior,[34] greater loss of function and independence,[52] and paradoxically, higher care consumption.[50, 53] Fortunately, in recent years there has been a shift from the medical care model to a more social model or 'person-centered' model of care. This model focuses on empowering older adults to take control of their own health and actively participate in their own care and support, and promotes self-direction and self-strength (in Dutch: 'eigen regie' and 'eigen kracht').[54, 55] This model is currently advocated by the World Health Organization,[56, 57] and by recent Dutch policy initiatives, including 'The Right Care in the Right Place' and 'Pact on Care for Older Adults'.[58, 59] It is also prominent in the Dutch quality framework for district nursing.[60]

For homecare staff, this shift means new ways of working and delivering care and support. Instead of focusing on what older adults can no longer do and on taking over tasks and activities, this requires staff to focus on what older adults are still capable of and willing to do and how this can best be supported.[61] Although this shift has received increasing attention recently, it requires a complex change in culture and behavior in homecare. An innovative approach that could guide staff in changing their behavior in line with these ideals is reablement,[61, 62] also called restorative care and similar to the approach of function-focused care that originated in institutionalized care.[50, 53]

Reablement

Reablement has been developed and applied in homecare across Australia, New Zealand and the United Kingdom over the past 10–15 years, and is being applied more recently in other countries, notably Canada, Denmark, and Norway.[63] Reablement is an innovative approach to improving homecare for individuals who need care and support or are at risk of functional decline.[64] It is often offered to older adults at the beginning of their homecare journey.[65, 66] Although there is ambiguity about the boundaries between reablement and related approaches to health and social care,[67, 68] reablement represents a reorientation of homecare from treating disease and creating dependency to focusing on capabilities and opportunities and maximizing independence.[63] In other words, a shift from a reactive to a more preventive and proactive model of homecare.

The goal of reablement is to help older adults retain, regain or gain skills so that they can manage their daily lives as independently as possible.[61] This is accomplished by providing person-centered, holistic and goal-oriented services, often of limited duration (usually 6 to 12 weeks) and interdisciplinary in nature (e.g., registered nurses, occupational therapists, and physical therapists), promoting active participation in activities of interest to the individual.[61, 64] Despite growing interest in reablement, there is variation between and within countries regarding its conceptual understanding.[69, 70] In this context, a Delphi study among reablement experts was recently conducted to reach agreement on the aims, target groups, characteristics, and components of reablement,[66] leading to the following internationally accepted definition:

'Reablement is a person-centered, holistic approach that aims to enhance an individual's physical and/or other functioning, increase or maintain their independence in meaningful activities of daily living at their place of residence, and reduce their need for long-term services. Reablement consists of multiple visits and is delivered by a trained and

coordinated interdisciplinary team. The approach includes an initial comprehensive assessment, followed by regular reassessments and the development of goal-oriented support plans. Reablement supports an individual to achieve their goals, if applicable, through participation in daily activities, home modifications and assistive devices as well as involvement of their social network. Reablement is an inclusive approach irrespective of age, capacity, diagnosis or setting.'

Reablement appears to address political priorities by introducing innovative and sustainable initiatives to promote activity, functioning and independence.[71] However, the evidence base on reablement is still limited.[61] Although some systematic and scoping reviews report promising findings,[62, 65, 72, 73] particularly for daily functioning, health-related quality of life, and healthcare utilization, others indicate that there is considerable uncertainty about its effects, costs and cost-effectiveness.[63, 74-76] To date, however, many intervention studies are of insufficient methodological quality to draw robust conclusions, and the need for high-quality trials has been acknowledged.[63]

Stay Active at Home: A staff reablement training program

Aim and principle

In the Netherlands, reablement is still in its infancy. In order to integrate reablement into Dutch homecare for older adults, the reablement training program 'Stay Active at Home' was developed a few years ago.[77] 'Stay Active at Home' aims to change the behavior of homecare staff from 'doing for' older adults to 'doing with' them. The underlying principle is that by equipping staff with knowledge, attitude, and skills on reablement and by providing social and organizational support, staff will be guided to implement reablement in the daily practice of Dutch homecare. This intended behavioral change of staff is expected to increase the participation of older adults in daily and physical activities and reduce their sedentary behavior. In the longer term, this could lead to beneficial effects on daily, physical and psychological functioning, falls, quality of life, and healthcare utilization and associated costs.

Format and content

'Stay Active at Home' is embedded in the regular working routines of homecare staff. The training program consists of a kick-off meeting for all homecare staff, followed by discipline-specific regular team meetings over a 6-month period. First, 'Stay Active at Home' provides knowledge about the consequences of task completion and sedentary behavior and the benefits of engaging older adults in daily and physical activities.

Second, it addresses various skills to facilitate the implementation of reablement in daily practice, such as motivating older adults through motivational techniques. Third, it contains sources of the self-efficacy theory, because according to this theory, high self-efficacy and outcome expectations primarily determine behavior change.[78, 79] Fourth, it provides social and organizational support by encouraging staff to exchange practice experiences and inviting team managers to participate in the program meetings. In addition, practical assignments, weekly newsletters, and a booster session nine months after the start ensure that the new way of working continues to receive attention.

Development, piloting, evaluation and implementation

In preparing 'Stay Active at Home' for use in Dutch homecare, the first two phases of the Medical Research Council (MRC) framework for developing and evaluating complex interventions have been completed to date:[80]

Phase 1: Development (2013–first half of 2016):

'Stay Active at Home' was systematically developed based on international research on reablement,[50, 81-84] in co-creation with international researchers in the field of reablement and function-focused care and a group of relevant Dutch stakeholders (i.e., older adults, homecare staff, allied health professionals, training officers, managers and board of directors, and policy makers).[77, 85, 86] As part of the development, several working visits were made to Australia, New Zealand and the United States and international expert meetings were organized to gain insights into various reablement approaches and their application in practice. Based on these insights, a program model for 'Stay Active at Home' was developed and discussed with international researchers and relevant Dutch stakeholders for application in Dutch homecare.

Phase 2: Feasibility and piloting (second half of 2016–first half of 2017)

'Stay Active at Home' was tested in a pilot study (in one district nursing team) and an early trial (in two district nursing teams, one of which received 'Stay Active at Home' and the other delivered care as usual).[77, 87] Based on the findings of these studies, minor adjustments were made to the format and content of 'Stay Active at Home', such as adding identifiable role models (program champions from the pilot studies) to share their experiences about implementing the training program in daily practice.

Phase 3 and 4: Evaluation and implementation

Prior to possible national implementation of 'Stay Active at Home' in Dutch homecare for older adults (phase 4), the training program should first be evaluated on a larger

scale to assess its effectiveness and cost-effectiveness and to gain insight into change processes (phase 3).

Aim and objectives of this thesis

The aim of this thesis is to evaluate 'Stay Active at Home', a reablement training program for homecare staff, in a large-scale cluster randomized controlled trial (c-RCT). The objectives are:

- to evaluate the implementation, potential mechanisms of impact, and context of 'Stay Active at Home' (*process evaluation*);
- to evaluate the effectiveness of 'Stay Active at Home' compared to usual care with respect to client outcomes (*effect evaluation at client level*);
- to evaluate the effectiveness of 'Stay Active at Home' compared to usual care with respect to staff outcomes (*effect evaluation at staff level*);
- to evaluate the cost-effectiveness and cost-utility of 'Stay Active at Home' compared to usual care (*economic evaluation*).

Outline of this thesis

Chapter 2 presents the study protocol of the c-RCT to evaluate 'Stay Active at Home', with information on participant recruitment and allocation, the intervention, data collection, and analyses. Chapter 3 describes the results of the process evaluation conducted alongside the c-RCT. We explore the implementation (i.e., reach, dose, fidelity, adaptations, and acceptability), potential mechanisms of impact (i.e., staff knowledge, attitude, skills, and support), and contextual factors (i.e., facilitators and barriers) of 'Stay Active at Home'. Chapter 4 presents the results of the client-level effect evaluation, comparing the intervention group with the control group (outcomes: sedentary behavior, daily, physical and psychological functioning, and falls). Chapter 5 presents the results of the effect evaluation at the staff level (outcomes: self-efficacy and outcome expectations regarding client activation). Chapter 6 describes the results of the economic evaluation embedded in the c-RCT. More specifically, the cost-effectiveness and cost-utility of 'Stay Active at Home' compared to usual care are examined from a societal perspective over a 12-month time horizon. Chapter 7 summarizes the main findings of this thesis, and discusses methodological and theoretical considerations, as well as implications for practice and future research.

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CHAPTER 2

Effects, costs and feasibility of the 'Stay Active at Home' reablement training program for homecare professionals: Study protocol of a cluster randomized controlled trial

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Abstract

Background: According to the principles of reablement, homecare services are meant to be person-centered, holistic, and goal-oriented, taking into account the capabilities and opportunities of older adults. However, homecare services have traditionally focused on doing things *for* older adults rather than *with* them. To implement reablement in homecare practice, the 'Stay Active at Home' program was developed. It is assumed that the program leads to a reduction in sedentary behavior in older adults and consequently more cost-effective outcomes in terms of their health and wellbeing. However, this has yet to be proven.

Methods/ design: A two-group cluster randomized controlled trial with twelve months follow-up will be conducted. Ten homecare nursing teams will be selected, pre-stratified by working area, and randomized into the intervention group ('Stay Active at Home') or control group (no training). All nursing staff of the participating nursing teams are eligible to participate in the study. Older adults and, if applicable, their domestic staff will also be allocated to the intervention or control group, based on the allocation of the nursing teams. Older adults are eligible to participate, if they: 1) receive homecare services by one of the selected teams; and 2) are 65 years or older. Older adults will be excluded if they: 1) are terminally ill or bedbound; 2) have serious cognitive or psychological problems; or 3) are unable to communicate in Dutch. Domestic staff are eligible to participate if they provide services to clients who fulfil the eligibility criteria for older adults. The study consists of an effect evaluation (primary outcome: sedentary behavior in older adults), an economic evaluation and a process evaluation. Data for the effect and economic evaluation will be collected at baseline and six and/or twelve months after baseline using performance-based and self-reported measures. In addition, data will be extracted from client records. For the process evaluation, a mixed-methods design will be applied, collecting data of older adults and staff throughout the study period.

Discussion: This study will result in evidence about the effectiveness, cost-effectiveness, and feasibility of the 'Stay Active at Home' program.

Trial registration: ClinicalTrials.gov: #NCT03293303, registered on 26 September 2017.

Background

Western countries with aging populations, such as the Netherlands, have to deal with an increasing demand for healthcare, while financial resources and manpower are shrinking.[1] One strategy to face this challenge is to enable 'aging in place', which is a common policy in these countries. Consequently, the proportion of older adults in Dutch long-term care facilities is decreasing and homecare is becoming more important.[2] This is in line with the preference of most older adults, who want to stay at home for as long as possible, even if they suffer from fragile health or are faced with challenging social situations.[3] However, to enable 'aging in place' it is important that older adults maintain their self-care capabilities.

Previous research has shown that physical activity can positively affect daily functioning of older adults.[4-7] Nevertheless, many community-dwelling older adults have a highly sedentary lifestyle.[8] In general, older adults spend approximately 80% of their awake time in sedentary activities, which represents 8 to 12 hours per day.[9, 10] Most research on stimulating physical activity of older adults focuses directly on the behavior of older adults, for instance by offering an exercise intervention, in group or individual format.[7] However, persuading older adults to become and continue to be physically active is a challenging task. Reasons for this may be a lack of motivation, fear (of falling), depression or a poor understanding of the long-term benefits of physical activity in older adults.[11] An alternative for these (classical) exercise programs is to integrate physical activity in daily care, for example, in homecare.

In the Netherlands, about 20% of older adults receive homecare services.[12] Nursing and domestic staff support them with personal care (e.g., washing and dressing) or domestic tasks (e.g., cleaning or doing the laundry), respectively. Unfortunately, they mainly provide care and support by taking over tasks instead of stimulating older adults to be active in physical and daily activities, as they are used to doing things *for* older adults rather than *with* them. This can result in a downward spiral, as they deprive older adults of their opportunities to engage in a routine range of movements necessary for maintaining underlying capabilities, resulting in further deconditioning and functional decline.[13-15] These negative consequences may be prevented by implementing reablement in homecare.

During the last decade, reablement has been introduced in several countries (i.e., US, UK, New Zealand, Australia, Norway, and Sweden), but there is no internationally accepted definition of reablement, and consequently there are differences between and

even within countries in how reablement is implemented.[16, 17] Nevertheless, reablement initiatives have in common that day-to-day services are meant to be person-centered, holistic, and goal-oriented, taking into account the capabilities and opportunities of older adults instead of focusing on disease and dependency.[18] So far, evidence on the effectiveness and cost-effectiveness of reablement is scarce and inconsistent.[16, 17, 19-21] A few studies have shown favorable outcomes for physical activity,[22] daily functioning,[23-26] health-related quality of life,[27, 28] or healthcare utilization and costs.[23, 27-31] Furthermore, little is known about how reablement is implemented in practice and which client groups are most likely to benefit from reablement.[16] Consequently, more research in the field of reablement is needed.

In the Netherlands, recently, the 'Stay Active at Home' program was developed based on international evidence and in close collaboration with Dutch and foreign stakeholders.[18] It is a training program for homecare staff that aims to provide them with knowledge, attitude (i.e., self-efficacy and outcome expectations), skills and social and organizational support to implement reablement in practice. The feasibility of the program and the research design have been evaluated in an exploratory trial (clinicaltrials.gov: #NCT02904889),[32] which is part of the Basic Care Revisited project.[33] Semi-structured interviews conducted with homecare staff showed that staff experienced the 'Stay Active at Home' program as an empowering way to apply reablement in homecare.[32]

The effectiveness, cost-effectiveness and feasibility of the 'Stay Active at Home' program are not yet known. Therefore, a two-group cluster randomized controlled trial will be conducted to evaluate whether its implementation leads to a reduction in sedentary behavior in older adults and thereby an increase in their level of physical activity. Furthermore, we will investigate whether the program leads to more cost-effective outcomes in terms of older adults' health and wellbeing. In addition, an extensive process evaluation will be conducted alongside the trial to provide information about 1) the implementation of the 'Stay Active at Home' program; 2) its mechanisms of impact; and 3) contextual factors that may affect implementation and outcomes. This paper describes the study protocol of the cluster randomized controlled trial taking into account the SPIRIT 2013 Statement.[34, 35]

Methods/ design

Objectives

This study evaluates the 'Stay Active at Home' program. More specifically the aims are:

- to evaluate the program's effectiveness regarding sedentary behavior of older adults (primary outcome). Furthermore, several secondary outcomes will be evaluated: physical activity, daily, physical and psychological functioning, and falls *(effect evaluation)*;
- to evaluate the program's cost-effectiveness from a societal perspective *(economic evaluation)*;
- to evaluate the program's feasibility with regard to implementation, mechanisms of impact, and contextual factors that may affect its implementation and outcomes *(process evaluation)*.

Design

A two-group cluster randomized controlled trial will be conducted in the south of the Netherlands. Homecare staff (i.e., nursing and domestic staff) in the intervention group will receive the 'Stay Active at Home' program. Staff in the control group will receive no additional training. Data for the effect and economic evaluation will be collected at the client level by performance-based and self-reported measures. In addition, data from client records will be extracted. Data are assessed at baseline and six and/or twelve months after baseline. A mixed-methods design will be applied for the process evaluation at the client and staff level. Data will be collected throughout the whole study period. For practical reasons, the recruitment, program implementation and data collection will be conducted in four phases. The recruitment of participants will be conducted between September 2017 and January 2018 (two teams, intervention group), November 2017 and January 2018 (two teams, control group), January and April 2018 (three teams, intervention group) and March and June 2018 (three teams, control group). The trial is registered at clinicaltrials.gov: #NCT03293303.

Setting

This study will be conducted at MeanderGroep Zuid-Limburg (meandergroep.com), a large healthcare provider that offers, among other things, different types of homecare services in the region of South-Limburg: domestic support (e.g., cleaning and other household chores), personal care (e.g., assistance with bathing or dressing) and nursing care (e.g., wound care and injections). MeanderGroep has divided its region into seven

working areas, which are subdivided into small-scale self-directed nursing teams, with on average eleven nursing teams per working area (range 3–28). Each team is guided by a district nurse (usually a baccalaureate-educated registered nurse). The other team members are vocationally-trained registered nurses, (certified) nurse assistants and nurse aides. Domestic support is provided by domestic workers, who work individually under supervision of a manager. They are linked to a working area, but not to a specific nursing team.

Randomization

For this study, ten nursing teams from five working areas (two teams per area) will be selected by the nursing team managers of MeanderGroep. To avoid contamination bias, managers will be asked to select two teams within each area that are not collaborating with each other. Furthermore, dementia teams will not be considered, as most of their clients potentially will not fulfil the inclusion criteria for older adults. The nursing teams will be pre-stratified by working area and randomized into either the intervention group or the control group within each working area. The clients and, if applicable, their domestic staff will be allocated to the intervention or control group based on the allocation of the nursing teams. The randomization will be conducted by means of a computer-generated randomization list. The researcher who will conduct the randomization, will be blinded, not be involved in this study, and not be familiar with the nursing teams. A flow diagram of the study design is shown in Figure 1.

Participants and recruitment

Two types of participants will be recruited for this study: older adults and homecare staff (i.e., nursing and domestic staff).

Older adults

Several inclusion and exclusion criteria will be determined for older adults. Older adults are eligible to participate in this study if they: 1) receive homecare services by the selected teams; and 2) are 65 years or older. Older adults will be excluded if they: 1) are terminally ill or bedbound; 2) have serious cognitive or psychological problems; or 3) are unable to communicate in Dutch. The participating district nurses, who are leading the nursing teams and are familiar with all clients, will assess clients for eligibility based on their clinical judgement. This will result in a list of eligible older adults per team. Subsequently, the recruitment of older adults will start, which consists of three steps. First, older adults will receive a short information letter and flyer about the study on behalf of MeanderGroep. Second, older adults will receive a short telephone call to

assess whether they are potentially interested in participating in this study. Third, a home visit will be conducted by the research team (author THR or research assistant) to provide additional information. When older adults agree to participate, the baseline data will be collected. Participation of older adults is voluntary; they will be informed about the study and asked for written informed consent. Older adults may withdraw from the study for any reason at any moment.

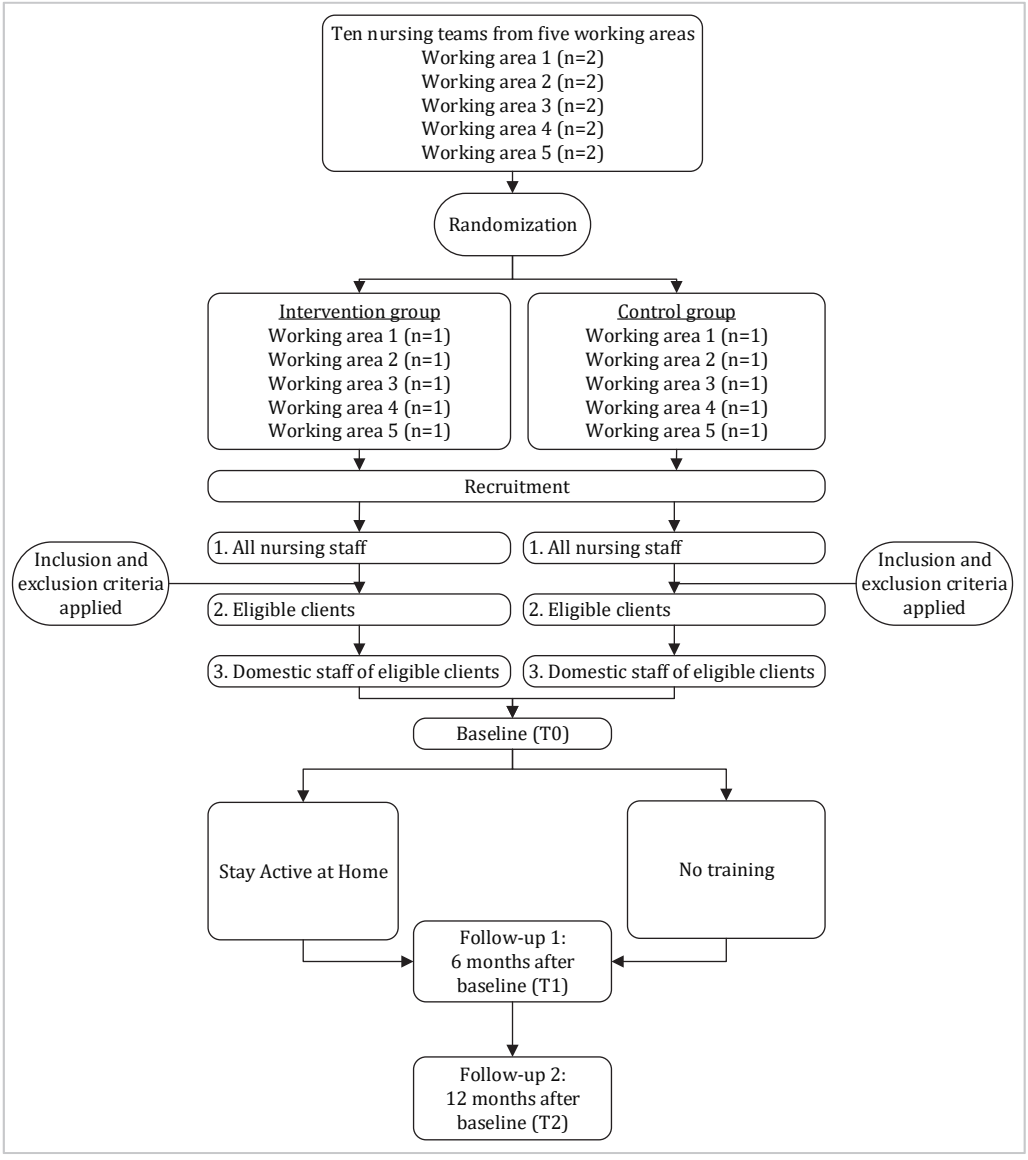

Figure 1. Flow chart of the study.

Homecare staff

All nursing staff of the participating nursing teams are eligible to participate in the study. There will be no specific inclusion and exclusion criteria for them. Domestic staff are eligible to participate if they provide services to clients who fulfil the eligibility criteria for older adults. Domestic staff will be traced via their team managers, who receive the list of eligible older adults from the research team (author THR). Based on this list, the manager will inform the research team if clients also receive domestic support of MeanderGroep and by whom. Subsequently, these domestic workers will be invited to participate in the study.

Intervention

Homecare staff in the intervention group will follow the 'Stay Active at Home' program. The program lasts for nine months and consists of face-to-face meetings, practical assignments in-between the meetings, and twenty weekly newsletters. The face-to-face meetings can be divided into a kick-off meeting (120 minutes), a series of (bi-)monthly team meetings (60 minutes each) spread over a period of six months, and a booster session (120 minutes) 3 months later (Figure 2). The kick-off meeting and booster session are the same for nursing and domestic staff. Staff from both disciplines, who are working in the same working area, are invited to the sessions to get to know each other. The team meetings are offered to nursing and domestic staff separately, as these meetings are more focused on discipline-specific tasks. Domestic staff have fewer team meetings than nursing staff (three and five meetings, respectively), as they have a lower annual time-budget for training activities. During the program, staff receive background information about the benefits of reablement. Furthermore, they learn skills to apply reablement in practice: (1) assessing capabilities of older adults; (2) implementing goal-setting and action-planning; (3) increasing engagement of older adults in physical and daily activities; (4) motivating older adults by taking into account their phase of behavior change[16, 17, 36, 37] and making use of Bandura's self-efficacy theory[38, 39]; and (5) involving the social network of older adults. Staff can practice these skills in a safe environment during the face-to-face meetings. Afterwards they are expected to apply these skills in practice as part of the practical assignments. Their experiences are discussed during the next meeting. Further details about the development and content of the program are published elsewhere.[18] In addition, a brief movie about the 'Stay Active at Home' program (in Dutch and English) can be found at awo.mumc.maastrichtuniversity.nl/research-programme/15521.

Staff in the control group will receive no additional training.

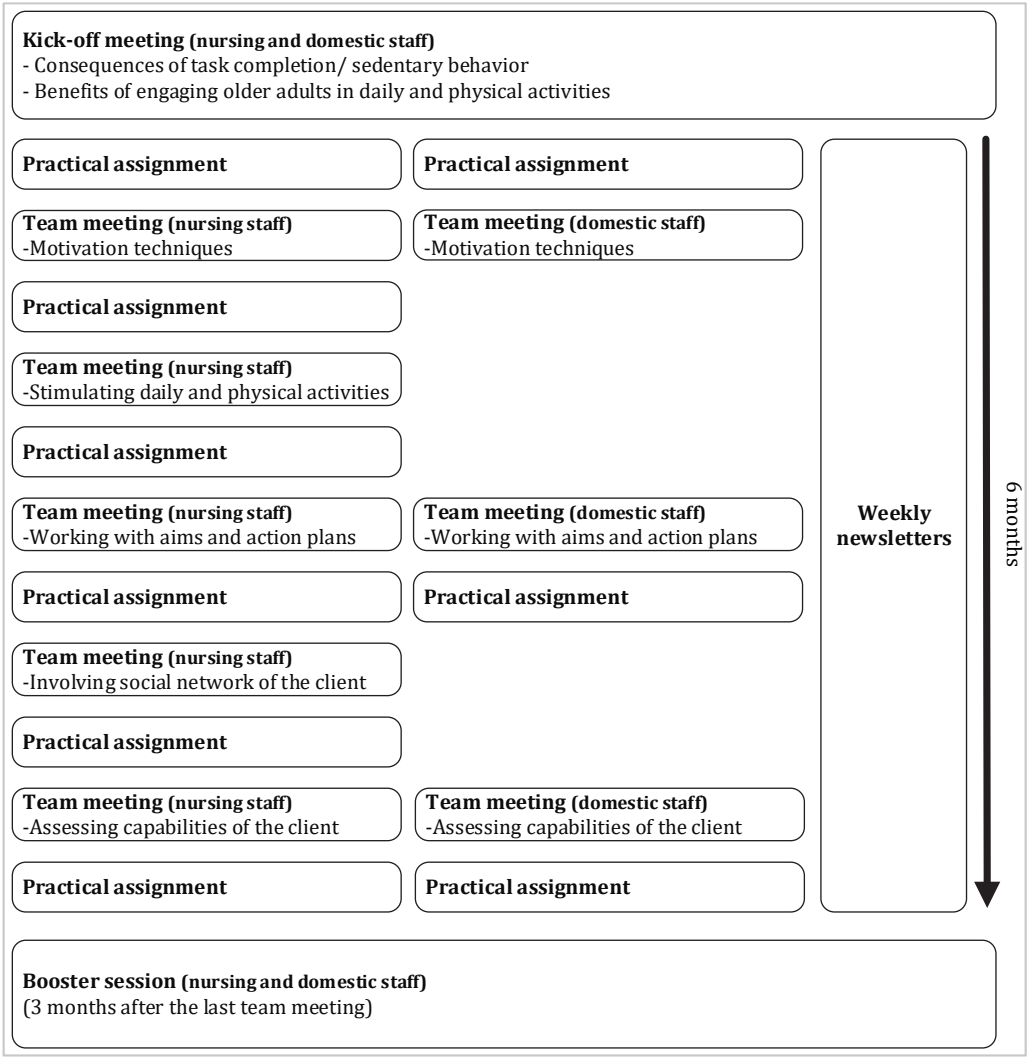

Figure 2. Format and content of the 'Stay Active at Home' program.

Effect evaluation

Data for the effect evaluation will be collected from older adults using a combination of performance-based and self-reported measures. An overview of all data that will be collected is provided in Table 1. At baseline, data about the primary and secondary outcomes will be assessed during a home visit. Moreover, relevant sociodemographic data of older adults will be collected (i.e., age, gender, educational level, marital status, ethnicity, socio-economic situation and living situation). Another home visit will be conducted twelve months after baseline. Due to a risk of recall bias, data about falls will be collected at both six and twelve months after baseline. The data collection at six

months will be done during a telephone interview, which is primarily conducted to assess data about the economic and process evaluation. All data will be collected by members of the research team (author THR or one of four research assistants). To increase and standardize the quality of data collection, the research team will follow an extended protocol. Author THR will train the research assistants in collecting the data according to this protocol and will be present at their first home visits. Additionally, author THR will monitor the data collection throughout the fieldwork.

Primary outcome

The aim of the 'Stay Active at Home' program is to reduce sedentary behavior in older adults and thereby increase their level of physical activity. The primary outcome, sedentary behavior, will be measured by means of a tri-axial wrist-worn accelerometer (ActiGraph GT9X Link, ActiGraph Inc., Pensacola, FL, USA). Accelerometers are a valid and reliable method, also in older adults, to measure sedentary time and physical activity by assessing the magnitude of the body's acceleration in terms of 'counts' per unit time.[40-44] The ActiGraph will be placed on the non-dominant wrist and will be worn for seven consecutive days (24 hours per day) at baseline and twelve months after baseline. As the accelerometer will also be worn during the night, information about sleep will also be obtained. Older adults are asked to keep a diary to register when they went to bed, when they got up and when they were napping during the day. Data will be collected at 30 Hertz and will be aggregated to 60-second epochs for the analyses.[45] Older adults are required to have at least one valid day of ten hours of wake/wear time to be included in the analyses. In additional analyses, older adults with five or more valid days will be selected. Wake time and wear time will be defined by an algorithm available in the ActiLife software version 6. Activity counts will be converted into average daily minutes of sedentary behavior during wake time using a vector magnitude cut-point of <1853 counts/minute.[46] In addition, mean wake time activity counts per minute will be compared between groups.

Secondary outcomes

The LASA Sedentary Behavior questionnaire will be used to assess self-reported sedentary behavior.[47] The questionnaire consists of ten items about sedentary activities such as watching television. Older adults will report the time that they generally spent on each sedentary activity per day. The items must be completed for one weekday and one weekend day. Total self-reported sedentary time (in minutes) for an average day will be calculated as ((total sedentary time on weekdays * 5) + (total sedentary time on weekend days * 2))/7. A previous study has shown that self-reported sedentary time

measured by the LASA Sedentary Behavior questionnaire can reliably rank sedentary time in older persons and was moderately associated with accelerometer-derived sedentary time.[47]

Physical functioning will be measured by the Short Physical Performance Battery (SPPB).[48] The SPPB is based on three objective tests of physical functioning: 3-meter walking speed, repeated chair stands (five times), and standing balance in progressively more-challenging positions (i.e., feet in side-by-side, semi-tandem, and full-tandem positions). Each test is scored from 0–4 by previously determined criteria.[49] Scores from the three tests will be summed into a composite score ranging from 0–12, with higher scores reflecting better physical functioning. The SPPB has excellent reliability and is highly sensitive to important changes such as self-reported decline in ability to walk a block or to climb one flight of stairs.[50] Decreased SPPB is a strong predictor of nursing home admission, disability in self-care tasks, and mobility in older adults.[49, 50]

The Groningen Activity Restriction Scale (GARS) will be used to collect data about daily functioning.[51] The GARS consists of two subscales and assesses disability in the domains of activities of daily living (ADL, eleven items, such as dressing or getting around in the house) and instrumental activities of daily living (IADL, seven items, such as preparing breakfast or doing household activities).[51] For each item, four hierarchical answer options are available ranging from *'Yes, I can do it fully independently without any difficulty'* to *'No, I cannot do it fully independently. I can only do it with someone's help'*. The scores for the total scale range from 18–72, with higher scores indicating more disability.[51] The GARS is a reliable and valid measure for assessing disability in the domains of ADL and IADL in older adults.[51]

The Patient Health Questionnaire-9 (PHQ-9) will be used to assess psychological functioning.[52] The PHQ-9 consists of nine items, which measure the presence of depressive symptoms according to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV). Older adults will score how often each of the symptoms (such as 'little interest or pleasure in doing things' or 'feeling tired or having little energy') was present during the last two weeks (0 = not at all; 1 = several days; 2 = more than half of the days; 3 = nearly every day). The summary score ranges from 0–27, with higher scores reflecting more severe symptoms of depression. The PHQ-9 has been shown to be a valid and reliable instrument to measure depression in community-dwelling older adults.[52]

Finally, the frequency of falls will be assessed by the question: *'How often did you fall during the past six months'*.[53] This question is included to monitor a potential negative outcome of physical activity, despite research has shown that stimulating older adults to be more active does not necessarily lead to an increase in fall incidents.[54]

Table 1. Overview of effect evaluation data collection.

Outcomes	Measures	No. of items	Range*	Time points		
				Baseline (T0)	6 months (T1)	12 months (T2)
Primary outcome						
Sedentary behavior	ActiGraph GT9X Link	N/A	N/A	X		X
Secondary outcomes						
Self-reported sedentary behavior	LASA Sedentary Behavior questionnaire[47]	10	0–1,440 minutes	X		X
Physical functioning	Short Physical Performance Battery[48]	3	0–12	X		X
Daily functioning	Groningen Activity Restriction Scale[51]	18	18–72	X		X
Psychological functioning	Patient Health Questionnaire-9[55]	9	0–27	X		X
Falls	N/A	1	N/A	X	X	X

* Underlined score indicates the most favorable scores; N/A: not applicable.

Economic evaluation

The economic evaluation will be conducted according to the Dutch guidelines of economic evaluations in healthcare,[56, 57] which were developed in agreement with international standards. A cost-effectiveness analysis (CEA) and cost-utility analysis (CUA) will be performed from a societal perspective, which implies that all relevant outcomes will be taken into account (i.e., intervention costs, healthcare costs, patient and family costs).[56, 57] Self-reported data will be collected together with the data for the effect evaluation by the research team at baseline and six and/or twelve months after baseline. In addition, data from client records will be extracted at the end of the study. An overview of all collected data is provided in Table 2. The time horizon will be the same period as the follow-up period of the effect evaluation (i.e., twelve months).

Clinical outcomes

The primary outcome for the CEA will be sedentary time. The primary outcome for the CUA will be generic quality-adjusted life years (QALYs), measured by means of the standard newest Dutch version of the EuroQol-5D-5L (EQ-5D-5L).[58, 59] The EQ-5D-5L consists of five dimensions of health-related quality of life, namely mobility, self-care, daily activities, pain/discomfort and depression/anxiety. Each dimension can be rated

at five levels: ranging from 'no problems' to 'major problems'.[60, 61] The five dimensions can be summed into a health state. Utility values can be calculated for these health states, using preferences elicited from a general population, the so-called algorithm.[62] The utilities at the three time points (baseline and six and twelve months after baseline) will be used to calculate QALYs by means of the area under the curve method. In addition, the EQ visual analogue scale will be used to assess current health status.[60, 63]

Healthcare utilization and costs

Volumes of healthcare utilization will be measured using a self-developed questionnaire (nine items), which is based on the iMTA Medical Consumption Questionnaire.[63] Additionally, data from client records will be extracted at the end of the study. Overall, the following healthcare and patient and family costs will be taken into account: 1) primary care (i.e., general practitioner, physiotherapy, day care); 2) hospital care, (i.e., acute care, outpatient medical services, hospital admission; 3) long-term care (i.e., rehabilitation clinic, nursing home, retirement home); 4) home care (i.e., domestic support, personal care, nursing care); and 5) informal care. Intervention costs will be based on the time staff spent on 'Stay Active at Home' training activities. The valuation of healthcare costs and patient and family costs will be based on the updated Dutch manual for cost analysis in healthcare research.[57] This manual recommends using standardized cost prices. Cost prices will be expressed in 2017 euros. If necessary, existing cost prices will be updated to 2017 using the consumer price index.

Table 2. Overview of economic evaluation data collection.

Outcomes	Measures	No. of items	Range*	Time points		
				Baseline (T0)	6 months (T1)	12 months (T2)
Clinical outcomes						
Sedentary behavior	ActiGraph GT9X Link	N/A	N/A	X		X
Health-related quality of life	QALYs (based on EQ-5D-5L)[58, 59]	5	0-<u>1</u>	X	X	X
Healthcare utilization and costs						
Healthcare utilization	Self-developed questionnaire (based on iMTA Medical Consumption Questionnaire)[63]	9	N/A	X	X	X
	Client records	N/A	N/A	Continuous registration		

*Underlined score indicates the most favorable scores; N/A: not applicable.

Process evaluation

To assess the feasibility of the ´Stay Active at Home´ program, data from older adults, homecare staff and other stakeholders (e.g., interventionists, managers) will be collected. A process evaluation plan is designed according to the guidelines of the

Medical Research Council framework for developing and evaluating complex interventions.[64] According to the guidelines, the key elements are: 1) the implementation of the intervention; 2) its mechanisms of impact; and 3) contextual factors that may affect its implementation and outcomes.

Implementation: what is implemented and how?
An intervention may have limited effects either because of weaknesses in its design or because it is not well implemented.[64] To be able to draw reliable conclusions about the effectiveness of the 'Stay Active at Home' program, the implementation of the program will be evaluated. More specifically, data on treatment fidelity (quality of implementation), dose (quantity of implementation), reach (whether the intended audience comes into contact with the intervention), and adaptations (alterations made) will be collected.

Mechanisms of impact: how does the delivered intervention produce change?
For an understanding of how potential effects occur, it is essential to get insight into how an intervention produces change.[64] The 'Stay Active at Home' program aims to change the behavior of homecare staff from doing things *for* the client towards doing things *with* them. Therefore, the program intends to: 1) increase knowledge; 2) improve attitude (i.e., self-efficacy and outcome expectations); 3) teach new skills; and 4) provide social and organizational support. The process evaluation will examine whether the 'Stay Active at Home' program produces changes through these mechanisms.

Context: how does context affect implementation and outcomes?
The implementation and effectiveness of interventions may vary from one context to another due to external factors, which may act as a barrier or a facilitator.[64] Therefore, data from various stakeholders will be collected to get insight into their experiences with the 'Stay Active at Home' program. More specifically, stakeholders will be asked which factors have hindered or facilitated the implementation of reablement in practice. Insight into these factors is critical to understand the implementation and effectiveness of the 'Stay Active at Home' program.

A mixed-methods design will be chosen for data collection, combining quantitative and qualitative data collection methods. More specifically semi-structured (group) interviews, telephone interviews, a project logbook, registration forms and checklists, client records, and self-report questionnaires will be used to measure the key

components. An overview of all data that will be collected according to these three elements is provided in Table 3.

Table 3. Overview of process evaluation data collection.

Component (definition)	Data collection				
	Source	Arm	Method	Specific data*	Timing
Implementation					
Fidelity (Quality of what is delivered)	Staff and other stakeholders	IG	Semi-structured (group) interviews	E.g., experienced benefits, burden, usefulness of 'Stay Active at Home'; involvement with the intervention	At the end of the implementation
	Older adults	IG, CG	Telephone interviews	E.g., satisfaction with homecare and awareness of staff behavioral change	six months after baseline (with data for effect and economic evaluation)
	Researchers	IG	Project logbook	Performance according to protocol	Continuously throughout the implementation
Dose (Quantity of what is delivered)	Staff	IG	Registration forms and checklists	Number of staff: attending program meetings; making practical assignments; reading weekly newsletters	Continuously throughout the implementation
	Older adults	IG	Client records	E.g., hours of care; staff turn-over; formulation and implementation of goal-setting and action-planning	At the end of the implementation
Reach (Extent to which the target group was reached)	Staff	IG	Project logbook	Number of staff who will refuse, drop out or complete the program and reasons for refusal and drop-out	Continuously throughout the implementation
	Older adults	IG	Project logbook	Number of older adults who will refuse, drop out or complete the program and reasons for refusal and drop-out	Continuously throughout the implementation
Adaptations (Alterations made to the intervention)	Researchers	IG	Project logbook	If applicable: changes in content, procedures, activities and processes	Continuously throughout the implementation

Table 3. (Continued).

Component (definition)	Data collection				
	Source	Arm	Method	Specific data*	Timing
Mechanisms of impact					
Mechanisms that are expected to produce change	Staff	IG, CG	Self-report questionnaire	Knowledge test and self-efficacy and outcome expectation questionnaire inspired by the work of Resnick et al[65-67]	Six and twelve months after baseline
	Older adults	IG, CG	Self-report questionnaire	Self-efficacy and outcome expectation questionnaire inspired by the work of Resnick et al[68]	Six and twelve months after baseline (with data for effect and economic evaluation)
Context					
Factors that may influence the implementation/ outcomes of the intervention	Staff and other stakeholders	IG	Semi-structured (group) interviews	E.g., facilitators and barriers in applying 'Stay Active at Home' in practice	At the end of the implementation
	Researchers	IG	Project logbook	E.g., facilitators and barriers in applying 'Stay Active at Home'	Continuously throughout the implementation

* Needs to be further specified; IG: intervention group; CG: control group.

Sample size

The sample size calculation will be based on the primary outcome of this study, namely sedentary time as measured by the ActiGraph GT9X Link (ActiGraph Inc., Pensacola, FL, USA). The 'Stay Active at Home' program is expected to create a 15% difference in sedentary time (minutes/ day) between the study groups. Based on a mean of 535.9 minutes (*SD* = 145.7), this is equivalent to an effect size of 0.55,[46] which can be interpreted as a medium effect size according to Cohen.[69] To achieve a power of 80% with an alpha of 0.05 (using two-tailed tests), a minimum sample size of 54 clients per group (*N* = 108 in total) is required. Considering an expected dropout rate of 30% before post-test, a total sample size of 154 older adults is needed. Finally, to compensate for a) inflation of sampling error arising from a clustering effect and b) mild variation in sample size per nursing team, a correction will be applied, taking into account an intraclass correlation of 0.02 and a coefficient of variation of 0.50, resulting in a total sample size of 260 older adults (130 for each arm).[70]

Data management

Data are handled confidentially and results will presented in an anonymized way. All original study forms will be entered electronically in Excel 2016 and kept on file at Maastricht University. All records that contain names or other personal identifiers, such as informed consent forms, will be stored separately from study records identified by a code number. All local databases will be secured with password-protected access systems. Forms, lists, logbooks, appointment books, and any other listings that link participant ID numbers to other identifying information will be stored in a separate, locked file in an area with limited access. Only two of the involved researchers (authors SFM, THR) will have access to the complete final dataset. Data integrity will be enforced through a variety of mechanisms (i.e., double data entry, range checks for data values). Data will be coded using digital codebooks, which are created for each questionnaire or registration form prior to the start of the study. The option to choose a value from a list of valid codes and a description of what each code means will be available where applicable.

Data analyses

Missing item responses within a given scale will be replaced by mean imputation using the mean of that client on the other items in that scale at that time point of measurement, assuming that the number of missing item responses does not exceed the missingness percentage suggested by the developers of the given scale.[71] If this information is not available, a missingness percentage of 25% is accepted.

Effect evaluation

Descriptive statistics will be used to describe the study groups regarding their sociodemographic characteristics and baseline scores of the primary and secondary outcomes. The primary and secondary outcomes will be analyzed according to the intention-to-treat principle, that is, all available data from all participants will be included in the analysis. Mixed (multilevel) linear regression will be applied with repeated outcome measures (baseline, post-test) nested in clients nested in nursing teams. 'Nursing team' is treated as random effect and outcome predictors are: intervention (yes/ no), time (baseline/ post-test), the intervention by time interaction, working area and its interaction with time, as well as the following covariates and their interactions with treatment and time: 1) older adults' baseline disability level (measured by means of the GARS[51]); 2) client type (existing vs. new clients); and 3) working area. The software package SPSS for Windows, version 24.0, will be used for all statistical analyses. The level of statistical significance will be set at 0.05 (using two-

tailed tests). If interaction effects for the three covariates (i.e., disability level; client type; and working area) are present, subgroup analyses will be conducted with a significance level of 0.10. The subgroup analyses will have an exploratory purpose only in view of the risk of type I errors due to multiple testing and of type II errors due to reduced sample size.

Economic evaluation

For the CEA and CUA incremental cost-effectiveness ratios (ICERs) will be calculated, representing the differences in mean costs between the intervention and control group in the numerator and the difference in mean outcomes in the denominator. Sampling uncertainty around the ICER will be assessed by means of non-parametric bootstrapping (percentile method).[72] The bootstrapped cost-effectiveness ratios will be subsequently plotted in a cost-effectiveness plane, in which the vertical line reflects the difference in costs and the horizontal line reflects the difference in effectiveness. The choice of treatment depends on the maximum amount of money that society is prepared to pay for a gain in effectiveness, which is called the willingness-to-pay (WTP) threshold. Therefore, the bootstrapped ICERs will also be depicted in a cost-effectiveness acceptability curve, showing the probability that 'Stay Active at Home' is cost-effective using a range of WTP thresholds. Additionally, to assess the robustness of the assumptions, multi-way sensitivity analyses will be performed. In the sensitivity analysis, uncertain factors of assumptions in the base-case analysis will be recalculated to assess whether the assumptions have influenced the ICERs, for example by varying cost-prices and volumes between minimum and maximum.

Process evaluation

For the process evaluation, a combination of quantitative and qualitative data analysis techniques will be used (need to be further specified).

Research participation: 'Nothing about us without us…'

To ensure a good match with the target group of the 'Stay Active at Home' program, the experience of relevant stakeholders (i.e., homecare staff, older adults, and informal caregivers) have been and will be incorporated in all research phases from pilot work until dissemination/implementation. By incorporating their experiential knowledge in research activities, findings are more likely to be relevant and the likelihood of successful implementation increases.[73-75] In addition, the project is embedded in the Living Lab in Ageing and Long-term Care (awolimburg.nl), in which researchers and

staff from various disciplines closely collaborate to develop and disseminate evidence-based healthcare programs.[76]

Arnstein differentiates between eight types of participation, which can be broadly categorized into: 1) non-participation (i.e., therapy, manipulation); 2) tokenism (i.e., placation, consultation, informing); and 3) citizen power (i.e., citizen control, delegated power, partnership).[77] This study will involve relevant stakeholders on different levels, depending on the phase of the project and the stakeholders' wishes to be involved.

Informing

We will inform homecare staff and older adults during all phases of the research by making use of newsletters, articles, presentations, and symposia. Furthermore, articles will be published in the journals of the involved healthcare organization.

Consultation

The 'Stay Active at Home' program is developed in close collaboration with relevant Dutch stakeholders (i.e., healthcare staff, policy makers, managers, researchers) and a panel of older adults to ensure that all interests are considered and respected in the development.[18] Furthermore, first data about the feasibility of the 'Stay Active at Home' program was collected during an exploratory trial (clinicaltrials.gov: #NCT02904889).[32] During the proposed study, additional data from homecare staff and older adults will be collected as part of the process evaluation.

Placation

During the study, two authors (SFM and THR) will have continuously contact with different stakeholders from MeanderGroep Zuid-Limburg (i.e., training officers, managers of nursing teams/domestic teams, and district nurses) to make sure that the training fits their working routines and to exchange experiences about the progress. In addition, a steering group will be created consisting of at least one representative from all collaborators (i.e., Maastricht University, Zuyd University of Applied Sciences, MeanderGroep Zuid-Limburg, GP association in South Limburg (OZL General Practitioners), Burgerkracht Limburg, Dutch Nursing Association (V&VN), and the research partners (also see next paragraph). The steering group will meet twice a year to discuss the progress of the study and the dissemination/implementation of the results.

Partnership

During the full trial period, four research partners (i.e., one nurse, one domestic worker, one older adult, one informal caregiver) will be extensively involved in the research activities. Together with author THR, they will prepare and execute the research activities and disseminate/implement the results. For example, they will be involved in the preparation and execution of qualitative data collection and analysis, writing articles, and giving presentations. The representatives of older adults and informal caregivers are supported by an employee of Burgerkracht Limburg (author MV), who will meet regularly with them and the authors to discuss the process of involvement. They can contact MV if they need support in their role to participate in the project.

Trial status

The recruitment of older adults and homecare staff started in September 2017. At the same time, the collection of baseline data began. The last older adults will be recruited by the end of June 2018. Consequently, the last follow-up measurements will be conducted in June 2019. The first results are expected by the end of 2019.

Discussion

'Stay Active at Home' is a training program that aims to equip homecare staff with knowledge, attitude (i.e., self-efficacy and outcome expectations), skills and social and organizational support to deliver day-to-day services at home according to the principles of reablement. This two-group cluster randomized controlled trial will be conducted to evaluate whether its implementation leads to a reduction in sedentary behavior in older adults and thereby an increase in their level of physical activity. Furthermore, it will be investigated whether the program leads to more cost-effective outcomes in terms of older adults' health and wellbeing. In addition, an extensive process evaluation will be conducted alongside the trial. The process evaluation is of utmost importance to explain the results of the effect and economic evaluation.

This study has several strengths. First, the 'Stay Active at Home' program was developed based on international research and in close collaboration with Dutch and foreign stakeholders.[18] Second, an exploratory trial was conducted prior to the present study (clinicaltrials.gov: #NCT02904889).[32] The aims of this exploratory trial were to obtain experiences with the 'Stay Active at Home' program and to test the study design. During the exploratory trial, challenges were identified which led towards some adaptations regarding the program and the study design. For example, the exploratory

trial showed that homecare staff did not identify with the interventionists, which is an essential requirement for successful behavior change according to behavior change theories.[78, 79] Therefore, staff who have already followed the 'Stay Active at Home' program will be used as role models during the upcoming training sessions to share their experiences with their colleagues. The recruitment procedure was also adapted. In the exploratory trial, the participating nursing teams were asked to recruit older adults, resulting in a low response rate because nursing staff felt not responsible for the recruitment. In the proposed cluster randomized controlled trial, older adults will receive a short information letter and flyer about the study as an announcement for a subsequent telephone call to assess if they are potentially interested in participating in this study. Written informed consent will be obtained by the research team during the first home visit. A strong aspect of the current study is that both an effect, economic and process evaluation will be conducted. Randomized controlled trials in the field of reablement combining these different evaluations are scarce, yet important to obtain a complete picture. However, some limitations of this study must be acknowledged. First, it is not feasible in this study to objectively measure whether a behavior change in homecare staff has taken place, as it is not possible to make use of (video) observations in the homecare setting. Therefore, we rely on self-reported behavior of staff, which may result in bias due to social desirability and unaware/unskilled behavior. Second, for this study, a follow-up period of twelve months has been chosen. This period may be too short to show effects, as homecare staff must first change their own behavior before we can expect a behavioral change in older adults or changes in the consequent cost-effective outcomes with regard to their health and wellbeing. However, a longer follow-up is not possible due to practical and financial reasons.

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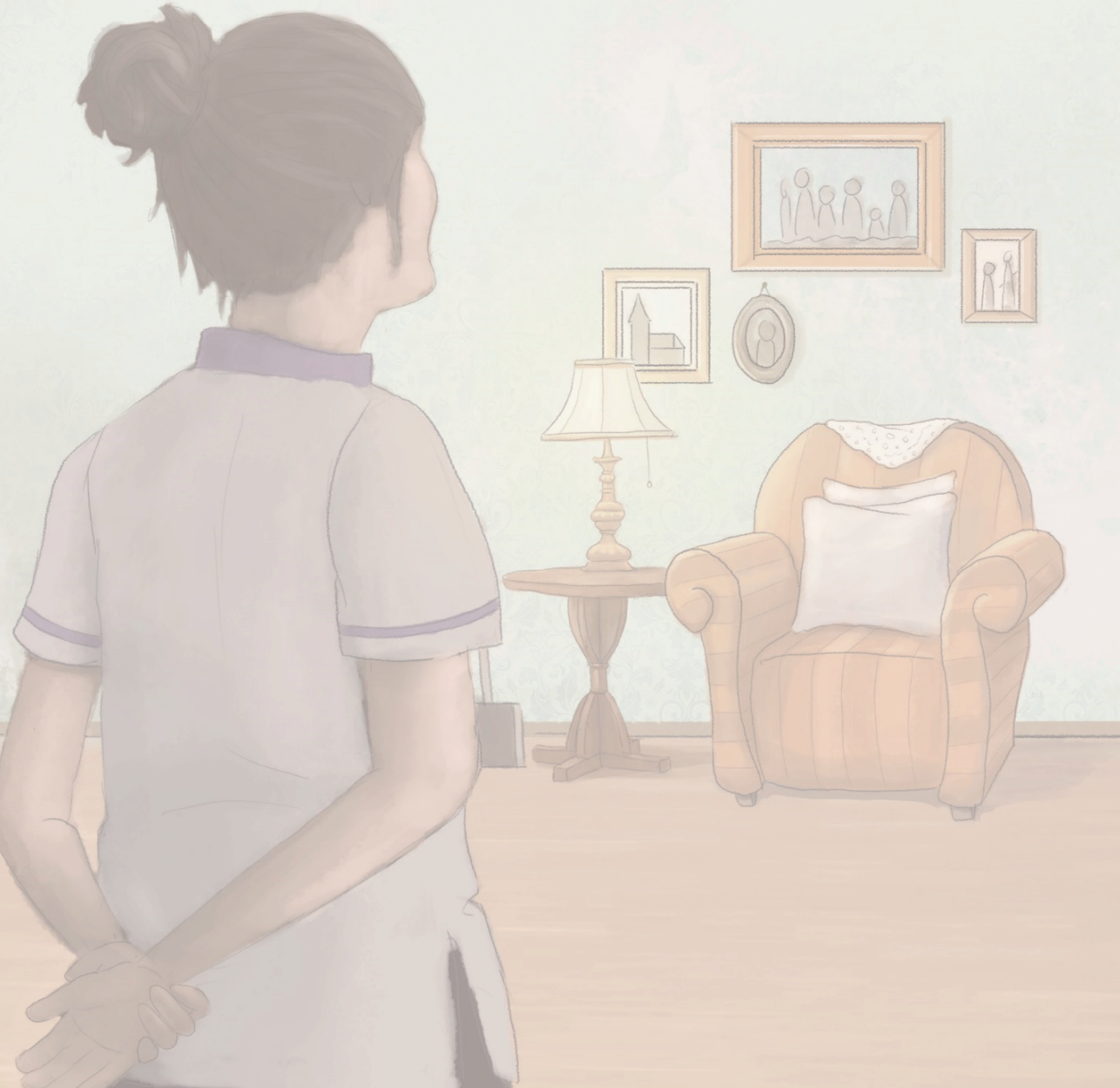
CHAPTER 3



Process evaluation of a reablement training program for homecare staff to encourage independence in community-dwelling older adults

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Abstract

Background: Many community-dwelling older adults experience limitations in (instrumental) activities of daily living, leading to the need for homecare services. While services should ideally aim at maintaining independence, homecare staff often take over activities, thereby undermining older adults' self-care capabilities. Reablement is an innovative approach aimed at optimizing independence. The reablement training program 'Stay Active at Home' for homecare staff was designed to support the implementation of reablement in the delivery of homecare services. This study evaluated the implementation, mechanisms of impact, and context of the program.

Methods: We conducted a process evaluation alongside a 12-month cluster randomized controlled trial, using an embedded mixed-methods design. One hundred fifty-four homecare staff members (23 nurses, 34 nurse assistants, 8 nurse aides and 89 domestic workers) from five working areas received the program. Data on the implementation (i.e., reach, dose, fidelity, adaptations and acceptability), possible mechanisms of impact (i.e., staff knowledge, attitude, skills and support), and context were collected using logbooks, registration forms, checklists, log data, and focus group interviews with homecare staff (n = 23) and program trainers (n = 4).

Results: The program was largely implemented as intended. Average staff compliance was 73.4%. Staff accepted the program, especially appreciating the practical elements and the team approach. They experienced positive changes in their knowledge, attitude and skills about reablement, and perceived social and organizational support from colleagues and team managers to implement reablement. However, the extent to which staff implemented reablement in practice varied. Perceived facilitators included digital care plans, the organization's lump sum funding system, and newly referred clients. Perceived barriers included resistance to change from clients or their social network, complex care situations, time pressure, and staff shortages.

Conclusion: The program was feasible to implement in the Dutch homecare setting and was perceived as useful in daily practice. Nevertheless, integrating reablement into the working practices of homecare staff remained challenging due to various personal and contextual factors. Future implementation of the training program may benefit from minor program adaptations and a more stimulating working environment.

Trial registration: ClinicalTrials.gov: #NCT03293303. Registered 26 September 2017.

Background

Because of the aging population, many high-income countries nowadays encourage an 'aging-in-place' policy to enable older adults to live independently at home for as long as possible.[1, 2] Consequently, the vast majority of older adults remain living at home, which is in line with their stated preferences.[3] However, many of them suffer from limitations in (instrumental) activities of daily living ((I)ADLs), which can lead to the need for homecare services.[4] In the Netherlands, these services are provided by different types of homecare workers. A team of nurses, nurse assistants and nurse aides provide personal and nursing care, often through short visits to older adults several times a week. Domestic staff provide domestic support. They usually visit older adults once per week for a couple of hours. Although staff should ideally strive to maintain older adults' independence, they often take over (I)ADLs because they are used to 'doing for' rather than 'doing with' older adults.[5] This practice can undermine older adults' self-care capabilities and jeopardize their ability to continue living at home.[6]

Innovative care approaches can support homecare staff in implementing a 'doing with' approach in homecare practice. This fits well with the person-centered and holistic approach of reablement.[7] Reablement, also termed restorative care, aims to enhance an individual's (physical) functioning, increase or maintain their independence in meaningful activities of daily living, and reduce their need for long-term services.[7-9] The approach includes an initial comprehensive needs assessment, followed by regular reassessments and the development of a goal-oriented support plan. A trained and coordinated interdisciplinary team supports the individual to achieve their goals, if applicable, through participation in daily activities, home modifications, assistive devices, and involvement of the social network. Previous studies have shown that staff knowledge, willingness (attitude), and skills to implement reablement are essential to its succes.[7, 9, 10] In addition, contextual factors, such as older adults' receptiveness to trying new things are considered vital.[7, 10] Despite these insights, little is currently known about the implementation of reablement, its underlying theory and mechanisms of impact, and the influence of context.[11-14] A more profound understanding of what reablement entails in terms of staff training and practice delivery may shed light on this.

The Dutch reablement training program 'Stay Active at Home' was recently designed to integrate reablement into the delivery of homecare services.[15, 16] The program seeks to equip homecare staff (i.e., nurses, nurse assistants, nurse aides, and domestic workers) with knowledge, attitude, skills, and social and organizational support to implement

reablement in homecare practice. With this, we aim to change staff behavior from taking over activities of older adults to encouraging older adults to perform activities on their own as much as possible, thereby supporting them to manage their daily lives as independently as possible.[6, 17] We pretested the program in a pilot study and an exploratory trial to obtain insight into staff experiences with the program.[15, 18] Staff generally experienced the program as useful to implement reablement, although they required more support in mastering particular skills, such as conversation skills and goal-setting, and in dealing with challenging situations. Further research into the program in the form of a process evaluation may provide a more detailed understanding of how the program works. The Medical Research Council (MRC) framework for designing and evaluating complex interventions recommends conducting a process evaluation that assesses implementation, clarifies causal mechanisms, and identifies contextual factors.[19] Therefore, the aim of this paper was to evaluate the implementation, mechanisms of impact and context of the 'Stay Active at Home' program in the homecare setting.

Methods

Study design

This process evaluation was conducted alongside a 12-month cluster randomized controlled trial (cRCT) in the Dutch homecare setting. For logistical reasons, the implementation and evaluation occurred in two waves. The first wave started in September 2017, the second in January 2018. We used an embedded mixed-methods design in which quantitative data were embedded in a mainly qualitative methodology,[20] thereby adhering to components of the Consolidated Criteria for Reporting Qualitative Research, the Good Reporting of a Mixed Methods Study checklist, and the Consolidated Standards of Reporting Trials statement (extension for cluster trials).[21-23] Details of the study design were previously reported and the study is registered at clinicaltrials.gov: #NCT03293303.[16]

Setting

The healthcare organization involved in this research has divided its region into seven working areas that are sub-divided into small-scale self-directed nursing teams, with on average eleven teams per working area (range 3–28). Each team consists of baccalaureate-educated registered nurses, vocationally-trained registered nurses, (certified) nurse assistants, and nurse aides. The team is jointly responsible for providing personal care (e.g., washing and dressing). Registered nurses only provide

nursing care (e.g., medication management). One of the nurses on the team, the district nurse, has a more supervising and coordinating role. In addition, each working area includes a group of domestic workers who provide domestic support (e.g., vacuuming and doing the laundry). They are not registered and do not need a formal domestic qualification. In this paper, we used the term 'nursing staff' when referring to nurses, nurse assistants, and nurse aides. The term 'homecare staff'' was used when referring to nursing and domestic staff simultaneously.

Participants

The healthcare organization appointed ten nursing teams from five working areas (two teams per area), which were pre-stratified by area and randomized into the intervention or control group, together with their clients and, if applicable, clients' domestic staff. The current paper focused on homecare staff in the intervention group, as they directly engaged in the program. Nursing staff were eligible to participate in the program if they worked in one of the intervention group nursing teams at the start of the study.[16] Domestic staff were eligible if they provided services to clients of one of the intervention group's nursing teams at the start of the study. Since the provision of the program was considered as a regular quality improvement strategy, all eligible staff in the intervention group were expected to participate. In addition, program trainers were included: two employees of the healthcare organization with extensive experience in training care staff and a background in homecare management and education, and two researchers with expertise in the program content and a background in occupational therapy (author SFM) and public health (author THR).

Intervention

The 'Stay Active at Home' reablement training program aims to improve the independence of older adults (*secondary intervention delivery pathways*) through equipping homecare staff with knowledge, attitude, skills and social and organizational support to implement reablement in daily practice (*primary intervention delivery pathways*). The implementation structure of the program is outlined in Figure 1.

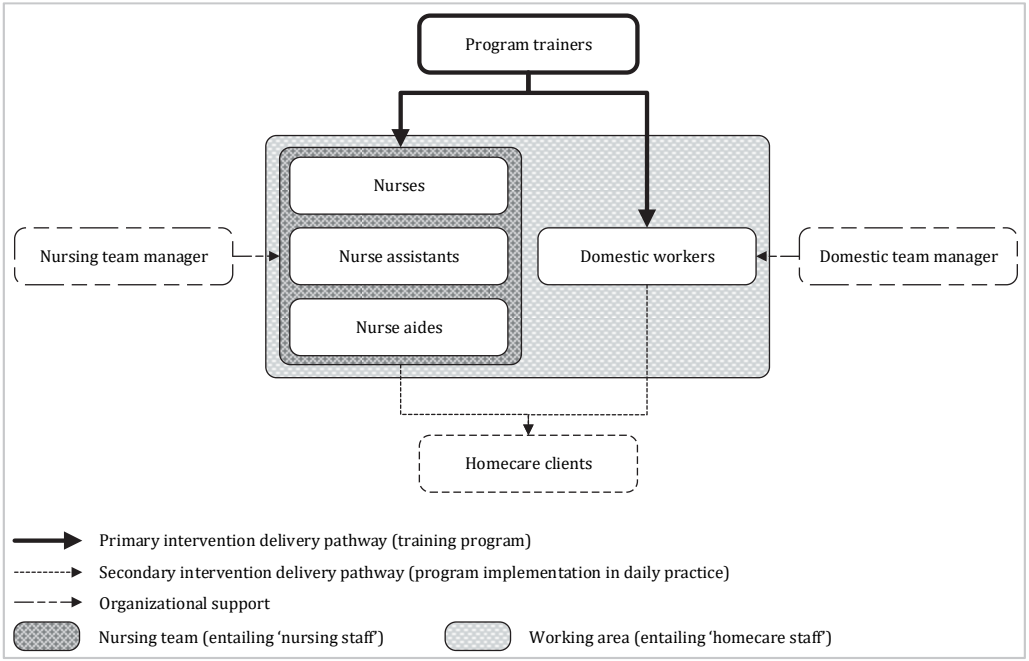

Figure 1. Implementation structure of the 'Stay Active at Home' program for homecare staff.

The program consisted of program meetings, practical assignments, and periodic newsletters. Program meetings were divided into a kick-off meeting (120 min), bi-(monthly) team meetings (60 min each) over a 6-month period, and a booster session at nine months (120 min). Although meetings were largely similar for all homecare staff, distinct trajectories were designed for nursing and domestic staff. The joint kick-off meeting for all staff of the same working area provided background information on why a reorientation of homecare was needed. Each team meeting then addressed a skill to facilitate the implementation of reablement in practice: 1) motivating clients, 2) increasing clients' engagement in daily and physical activities, 3) implementing goal-setting and action-planning, 4) involving the social network of clients, and 5) assessing clients' capabilities. Domestic staff received fewer meetings than nursing staff due to a lower annual time-budget for training activities in the Netherlands. Practical assignments were distributed at the end of each meeting to practice skills in-between the meetings. As part of the assignments, nursing staff also received a booklet with practice exercises and an ecomap (i.e., diagram depicting relationships between a client and his/her social network). Additionally, all staff received 20 weekly newsletters by email during the first six months of the program. In terms of procedures, all team meetings started with discussing the practical assignment, followed by a presentation

about the addressed skill, and a skills training including one or more interactive teaching methods. In the joint booster session, staff practiced conversational skills in role-plays with professional actors. Team managers were also invited to the program meetings and also received the weekly newsletters. An overview of the program is outlined in Figure 2. A full description of the program, based on the Template for Intervention Description and Replication checklist, has been published elsewhere.[15]

The program applied in the current study differed slightly from this based on lessons learned from previous findings.[18] We added first, identifiable role models (program champions from the pilot study) to share their experiences with reablement, second, supporting materials to help staff translate the program knowledge into practice (e.g., an exercise flyer, example communication questions and example goals and action plans), and third, a diploma ceremony for homecare staff who attended at least half of the program meetings.

Implementation

The program meetings were organized in the working areas where the staff were located. Two program trainers were present per meeting. They received a program manual and a 2-hour training by one of the researchers before the program started, and short preparatory sessions prior to each program meeting. Staff received an information letter and a program overview prior to the program, and presentation handouts, practical assignments, and other supporting materials at each meeting. If staff were unable to attend a meeting, we send them the materials by email. Additionally, we had regular contact with district nurses and team managers in-between the meetings to reflect on staff engagement in the program and, if applicable, to further tailor the program to staff needs and wishes.

Data collection

We collected both quantitative and qualitative data from homecare staff and program trainers to assess different research questions, in which the quantitative data provided a supportive role to the qualitative data.[20, 24]

Baseline characteristics

Background characteristics (i.e., age, sex, educational level, job function, years of work experience and the number of hours worked weekly) were assessed through a baseline questionnaire during the first program meeting.

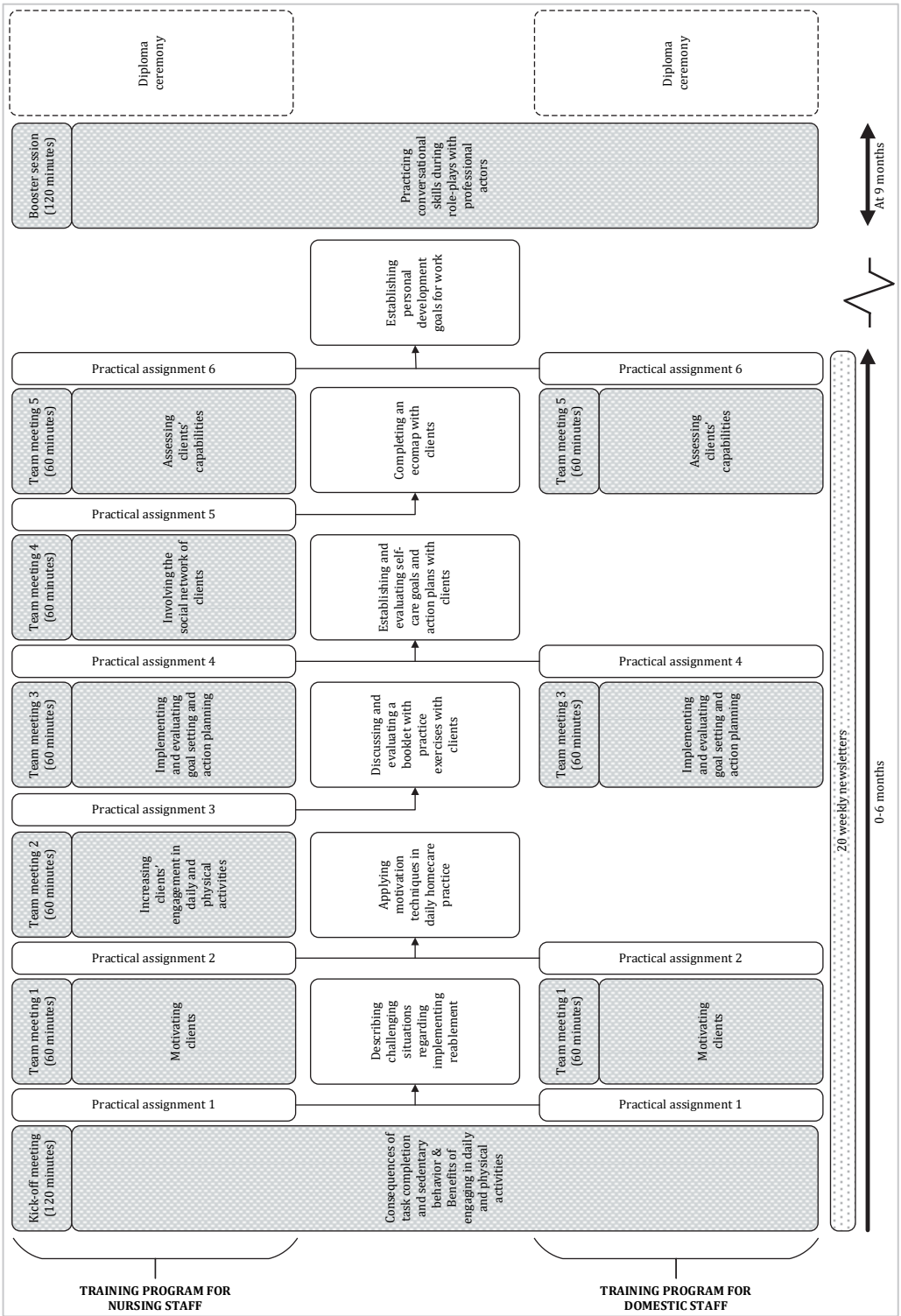

Figure 2. Format and content of the 'Stay Active at Home' program for homecare staff.

Process evaluation

We collected information on the process domains implementation, mechanisms of impact, and context of the MRC framework,[19] see Table 1. For implementation, we assessed the process indicators reach, dose, fidelity, adaptations, and acceptability. All process domains and indicators are described below.

Reach was defined as the extent to which the intended audience came into contact with the program. A project logbook was consulted to assess the number of staff who refused, dropped out or completed the program. The reasons for refusals and dropouts were also assessed.

Dose was defined as the quantity of the program that was delivered by program trainers and received by homecare staff. Registration forms and checklists were completed prior to each program meeting to record the number of program meetings attended and practical assignments completed by the staff. Log data from the software program LaPosta (LaPosta BV, Zutphen) were used to monitor the extent to which staff consulted the weekly newsletters.

Fidelity was defined as the extent to which the program was implemented as planned. The project logbook was consulted to assess whether the program was conducted according to the protocol. *Adaptations* made to the program to achieve better contextual fit (i.e., changes in content, procedures, activities, and processes) were also assessed. In addition, focus group interviews were conducted with staff and program trainers after the implementation period to gain insight into their level of engagement in the program and with applying the program in practice. In total, five focus groups were performed: one with a subsample of nursing staff (November 2018), one with a subsample of domestic staff (November 2018), two with district nurses to interview all of them (December 2018), and one with the program trainers (August 2019). Subsamples were selected through quota sampling in a two-step selection process. First, staff who attended at least half of the program meetings were selected. Second, two nursing team members and two domestic workers per working area were invited by email, taking age, gender, and years of work experience into account, to capture a wide range of perspectives.[25] When a staff member was unable or unwilling to participate, another staff member was invited. In total, four program trainers, six district nurses, ten nursing team members (i.e., two nurses, six nurse assistants and two nurse aides), and seven domestic workers participated in the interviews. They were all interviewed once. Author THR led the interviews with the staff, assisted by one observer (author SFM or GARZ). Author GARZ led the interview with the program

trainers. Interviews were performed at the healthcare organization and at Maastricht University, and were guided by pilot-tested interview guides that were developed for the current study based on the process domains and indicators (see Appendix 1 and 2). All interviews started with a 6-minute video summarizing the program, were audio-recorded, and lasted about two hours. The main focus group findings were summarized at the end of each interview for participants to correct or add information.

Acceptability was defined as the extent to which staff and program trainers were satisfied with the program. Their opinion about the program, including their most/least appreciated program aspects and experiences with using the program in practice were assessed through focus groups interviews as described above.

Mechanisms of impact were defined as mechanisms through which the program may produce change. Based on previous research, these mechanisms were assumed to be staff knowledge, attitude, and skills about reablement, and social and organizational support from colleagues and team managers to implement reablement.[6, 15, 17] Therefore, by using the focus group interviews, information was collected about experienced changes in the knowledge, attitude, skills, social and organizational support of the staff.

Context was defined as factors that may influence the implementation and outcomes of the intervention. A project logbook was used to assess contextual factors. Additionally, focus group interviews provided insight into factors that may have facilitated or impeded the application of the program in practice.

Suggestions for change were assessed to further improve the program or facilitate its implementation.

Data analysis

Quantitative data were used to asses reach and dose, and were analyzed using descriptive statistics in SPSS Statistics for Windows version 25.0 (IBM Corp., Armonk, NY). Qualitative data were used to assess the remaining process domains and indicators, and were analyzed using a directed qualitative content approach in ATLAS.ti version 8.4 (Scientific Software Development GmbH, Berlin). Interviews were transcribed verbatim and coded using a coding scheme developed prior to the analysis based on the process domains and indicators. As the analysis proceeded, additional codes were generated by marking relevant sections, phrases or sentences. Two researchers (authors THR and RGMV) independently coded one-third of the transcripts. Author THR coded the remaining transcripts. Subsequently, the two researchers

independently established categories by grouping codes. Any differences in coding or categorizing were discussed until consensus was reached. In a final step, one researcher (author SFM) verified the codes and categories and made minor adjustments in the assignment of the categories to the process domains and indicators in consultation with authors THR and RGMV. A detailed description of the findings, supported with verbatim quotes from the focus group interviews, which were translated into English by a professional translator, is reported.

Trustworthiness

Different strategies were adopted to ensure the trustworthiness of the findings regarding credibility, dependability, confirmability, and transferability.[27] Credibility was ensured by prolonged engagement in the field, triangulation of data sources, data investigators (three researchers to code, analyze, and interpret), and data collection methods. To ensure dependability and confirmability, four research partners (i.e., one nurse, one domestic worker, one older adult, and one informal caregiver) were extensively involved in the research activities, from participating in the program meetings to commenting on the research findings. In addition, the procedures followed in this study were meticulously described. Transferability was ensured by describing the sample, setting, and context in which the program was implemented.

Table 1. Overview of process domains, indicators, definitions, and data collection.

Component (definition)	Data collection			
	Source	**Method**	**Operationalization**	**Timing**
Implementation				
Reach (Extent to which the target group was reached)[19]	Staff	Project logbook	- The number who refused, dropped out or completed the program - Reasons for refusal and dropout	Throughout the implementation
Dose (Quantity of what is delivered)[19]	Staff	Registration forms Checklists	- The number who attended program meetings - The number who conducted practical assignments	Prior to every program meeting
		Log data	- The number who consulted weekly newsletters	Throughout the implementation
Fidelity (Quality of what is delivered)[19]	Researchers	Project Logbook	- Performance according to the protocol	Throughout the implementation
	Staff; Program trainers	Focus group interviews	- Performance according to the protocol - Engagement in the program and with applying the program in practice	After the implementation
Adaptations (Alterations made to the intervention)[19]	Researchers	Project Logbook	- If applicable: changes in content, procedures, activities and processes	Throughout the implementation
Acceptability (Participant satisfaction with the intervention)[26]	Staff; Program trainers	Focus group interviews	- Opinion about the program - Experiences with using the program in practice	After the implementation
Mechanisms of impact				
Mechanisms that are expected to produce change[19]	Staff; Program trainers	Focus group interviews	- Experienced changes in knowledge, attitude, skills, social and organizational support	After the implementation
Context				
Factors that may influence the implementation/ outcomes of the intervention[19]	Staff; Program trainers	Focus group interviews	- Factors that may have facilitated or impeded the implementation of the program in practice	After the implementation
	Researchers	Project Logbook	- Factors that may have facilitated or impeded the program's implementation	Throughout the implementation
Suggestions for change				
	Staff; Program trainers	Focus group interviews	- Suggestions to improve the intervention or facilitate the implementation	After the implementation

Note. Adapted version of outcome measures of the process evaluation as published earlier;[17] client data and quantitative data on the mechanisms of impact will be covered in a separate article.

Results

Implementation

Reach

The selected working areas included 67 nursing team members and 102 domestic workers, who delivered care to a total of 354 clients. The majority of staff (*n* = 154) agreed to participate in the program (i.e., 23 nurses, 34 nurse assistants, 8 nurse aides, and 89 domestic workers). Table 2 provides their baseline characteristics. Reasons for refusal included health problems and personal reasons. Some 140 staff members (90.9% of 154) were involved until the end of the program. The main reason for dropout was staff turnover.

Table 2. Baseline characteristics of homecare staff (*N* = 154).

	Nursing staff (*n* = 65)		Domestic staff (*n* = 89)
Age (years), mean (SD)	47.8 (12.4)		47.9 (10.7)
Sex (female), *n* (%)	62 (95.4)		88 (98.8)
Educational level, *n* (%)[a]			
Low	18 (27.7)		62 (69.7)
Intermediate	38 (58.5)		25 (28.1)
High	9 (13.8)		2 (2.2)
Job function, *n* (%)			
Registered nurse	23 (35.4)	–	
Certified nurse assistant	34 (52.3)	–	
Nurse aid	8 (12.3)	–	
Work experience (years), mean (SD)	16.8 (12.3)		11.1 (8.3)
Working hours per week, mean (SD)	23.7 (6.4)		16.7 (5.5)

Note. n: sample size; SD: standard deviation.

[a] Low: Low vocational or advanced elementary education; Intermediate: Intermediate vocational or higher secondary education; High: Higher vocational education, university.

Dose

All program meetings, practical assignments, and 20 weekly newsletters were delivered, with the exception of two newsletters that were sent to only 80% or 90% of staff members due to technical issues. On average, nursing and domestic staff attended 66.6% and 78.4% of the program meetings, respectively. Nevertheless, compared to the kick-off meeting, all the following meetings were less well attended (Table 3). The majority of nursing staff (73.8%) and domestic staff (86.5%) attended at least half of all program meetings and received a diploma. Eight nursing team members (12.3%) and 39 domestic workers (43.8%) attended all program meetings. Main reasons for not attending the meetings were illness or vacation. Additionally, nursing and domestic

staff conducted on average 55.4% and 57.6% of the practical assignments and consulted 76.5% and 42.1% of the weekly newsletters.

Table 3. Dose delivered, dose received and number of homecare staff invited and present per meeting (N = 154).

	Nursing staff (*n* = 65)		**Domestic staff (*n* = 89)**	
	Dose delivered, *n*	**Average dose received, *n* (%)**	**Dose delivered, *n***	**Average dose received, *n* (%)**
Program components				
Program meetings	7	4.7 (66.6)	5	3.9 (78.4)
Practical assignments	6	3.3 (55.4)	4	2.3 (57.6)
Weekly newsletters[a]	20	15.3 (76.5)	20	8.4 (42.1)
Diploma[b]	–	48 (73.8)	–	77 (86.5)
	Invited, *n*[c]	**Present, *n* (%)**	**Invited, *n*[c]**	**Present, *n* (%)**
Program meetings				
Kick-off meeting	65	55 (84.6)	89	77 (86.5)
Team meeting 1	65	43 (66.2)	88	75 (85.2)
Team meeting 2	63	43 (68.3)	–	–
Team meeting 3	62	38 (61.3)	87	72 (82.8)
Team meeting 4	62	41 (66.1)	–	–
Team meeting 5	60	46 (76.8)	84	67 (75.3)
Booster session	57	37 (64.9)	83	58 (65.2)

Note. n: sample size.

[a] All 20 newsletters were sent, with the exception of two that were only sent to 80% and 90% of all professionals, respectively, due to technical issues.

[b] Staff who attended at least half of the program meetings received a diploma (i.e., four meetings for nurses and three for domestic workers).

[c] Fewer people were invited per meeting as the program progressed due to dropout.

The following process domains and indicators were analyzed mainly using the focus group data. The educational level of the interviewed staff was significantly higher than that of the other staff members who participated in the program (78.3% and 42.7% had an intermediate or high educational level, respectively). This was mainly due to the large representation of district nurses among the interviewed staff.

Fidelity

The project logbook showed no major deviations from the protocol. Program trainers felt sufficiently prepared to provide the program meetings and covered all components of the program meetings (i.e., discussing the practical assignment, giving a skills presentation, and applying interactive teaching methods). Only the time spent on the different components varied due to the different needs and wishes of the teams. Nevertheless, the skills presentation often took up most of the time.

According to the staff and program trainers interviewed, there was variation in the extent to which staff engaged during program meetings. Program trainers assumed that the large training groups, on average 14.3 ± 5.1 staff at the team meetings and 25.5 ± 9.1 staff at the kick-off/ booster session, undermined active staff participation. Furthermore, they surmised that staff did not always actively participate because the meetings predominantly focused on explaining rather than practicing skills: *'We frequently used PowerPoint presentations (during the program), and people may or may not be learning from those. In the healthcare organization, on the other hand, we would normally use more interactive methods. I think that is a little more effective.' (program trainer 1)*

Adaptations

One minor adaptation was made in the implementation of the program. Because of variation in staff engagement in the program, the district nurses and team managers were asked to emphasize the importance of participating in the program to their teams by mail or during team meetings that were not related to the program. No changes were made to the program itself. Nevertheless, the program trainers were able to share more examples from practice after the first wave of trainings due to the shared experiences during this wave.

Acceptability

Staff were generally satisfied with the program. They particularly valued the practical elements (i.e., role-plays, booklet with practice exercises, and weekly newsletters). According to many staff members, the role-plays provided insight into how to encourage older adults in practice and helped them reflect on their own behavior. However, some domestic workers felt out of their comfort zone because the professional actors remained in their role all the time, challenging them to react verbally and behaviorally: *'They (the actors) stayed in their role while I was thinking about how to respond. That was pretty intense. But I did get a taste of what it would be like in real life, and I also learned from the way others responded.' (domestic worker 4)*

Most nursing team members appreciated the booklet with practice exercises, which contained comprehensible examples of how to remain active at an older age. This supported them to motivate older adults to participate in daily and physical activities: *'(I liked) the booklet with the practice exercises, because if I am telling clients that they should be keeping physically active, now at least I can show them what kind of exercises will help them.' (nurse assistant 4).* According to some staff members, the practical

assignments in general helped to practice skills in an accessible manner and to reflect on one's own actions in, initiating a process of continuous learning. Others, however, considered the assignments a burden, due to a perceived lack of time or because they were not used to putting things down on paper.

Many staff members considered the newsletters useful reminders with valuable information about the benefits of remaining physically active and practical tips on how to motivate older adults to performing activities for themselves. This supported staff in conversations with older adults about encouraging independence: *'I especially liked the newsletters with the tips, which also provide some explanation and background information. Some of our team members even showed the newsletters to their people (clients). It helped them to explain to clients why it is good to stay physically active, because it is quite difficult to explain something like that.' (district nurse 3)* Some district nurses, though, felt that nursing staff read fewer newsletters by the end of the program due to their high frequency (once per week).

Most staff members appreciated the team approach, because this allowed them to get to know each other and exchange experiences about what older adults can still do themselves and how to approach them in the best way. Many staff members indicated that they would like to interact even more with colleagues during and outside the program, in order to learn from each other's working practices: *'There now is a lot of interaction (with colleagues), and that encourages people to ask each other questions, like: Oh I saw you with that client, so how would you approach this?' (nurse assistant 5)*

Staff opinions were divided as to whether the program fitted with their daily practice. District nurses and program trainers indicated that the program fitted the roles and responsibilities of staff. However, some district nurses considered the meeting on goal-setting and action-planning too difficult for nurse assistants and nurse aides. Consequently, one district nurse did the assignment on goal-setting and action-planning together with the team to support them: *'Everyone had to set goals and design action plans for their own clients. I noticed that most of the nurses could do that quite well, but some of the others found it harder (nurse assistants and nurse aides). They were not sure how to describe some of the things they do. They know what they are doing in practice, but they do not always know how to describe that properly.' (district nurse 3).*

Opinions were also divided about the duration of the program. Most staff members appreciated the gradual structure of the program, allowing them to implement changes

step-by-step by alternating between learning, experimenting, and reflecting. However, some nursing team members considered the 1-hour team meetings too short to practice skills and some domestic workers considered the 2 months between team meetings too long to remain continuously aware of the program while providing homecare services.

Mechanisms of impact

Experienced changes in staff knowledge

According to many staff members, their knowledge of reablement improved because of the program. They mentioned several benefits for older adults (e.g., more confidence in performing activities) and for themselves (e.g., increased work efficiency). They also mentioned tips on alternative ways to provide care (e.g., using an eyedropper or grabber) and other strategies to improve older adults' activity levels (e.g., deploying volunteers for doing groceries together). This knowledge raised awareness among staff and helped them think differently: *'If there is a client who needs to be showered twice a week, then you would also help them to get dressed afterwards. But for the rest of the week, they would be doing that by themselves, so I do not actually need to help them to do that. So sometimes it is just about thinking differently.' (nurse assistant 4)* The program trainers, though, noted that some staff members found certain parts of the program complicated (e.g., implementing goal-setting and action-planning). They therefore expected that not all program content led to increased staff knowledge. Most district nurses indicated that the knowledge to encourage older adults was generally present, but that staff sometimes considered it challenging to integrate this knowledge into practice: *'In the past, the work was really about taking care of people and basically doing everything for them. That is how I learned to do it from the start. And that makes it hard to think about your work in a different way.' (nurse aide 1)*

Experienced changes in staff attitudes

Most staff members experienced positive changes in their attitude toward reablement as a result of the program. A frequently mentioned reason for this were successes in encouraging older adults to perform activities themselves again: *'When I go to visit a client, and I find them standing by the door waiting to tell me that they have cleaned out their cupboard on their own – that is what makes it really worthwhile! They look so proud of themselves and that is motivating because we have really achieved something.' (domestic worker 6).* Another reason was the impact that successes had on the older adults' view about themselves: *'He feels more involved now. Before, he used to think he could not do anything for himself anymore, but now he is happy that he is able to do things*

independently. He does not have to bother other people anymore.' (domestic worker 1) Some staff members were still doubtful about reablement, though, for instance, due to negative outcome expectations (e.g., implementing reablement takes more time and staff are being left with only the more challenging tasks), a preference for or habit of taking over activities, or a short-term vision of care where it is faster to take over tasks.

Experienced changes in staff skills

Team meetings 1 and 2: Many staff members now used the different communication strategies that were part of the program more consciously in practice, such as motivating and complimenting, being firm, negotiating, and joking. They also gave more tips to older adults on how to engage in daily and physical activities: *'Now I talk more to the clients about their health - and for example, when I tell them about the 10% decrease in muscle mass, that really gets them thinking. I had never thought about mentioning that, but it really opens their eyes.' (domestic worker 6)* Program trainers, however, indicated that staff conversational skills varied considerably. They therefore assumed that conversations might not always have been conducted in the best possible way.

Team meeting 3: Most district nurses spent more attention on reablement during the needs assessment with newly referred clients because of the program. They also formulated client-centered goals more specifically to clarify to their colleagues which activities (not) to take over: *'I learned to set more specific goals. In the past, I would often formulate goals like 'performing ADL', or 'showering or washing at the washbasin', but things are not always clear then. It does not say, for instance, that he (the client) should try to wash his upper body himself.' (district nurse 4)* Most domestic staff often did not work with goals and action plans, but rather made verbal agreements with older adults.

Team meeting 4: Many district nurses spoke more frequently with the social network of older adults than before the program, for instance, about resistance to change. Some other nursing team members also had more contact with the social network: *'We had one lady who was slowly able to start doing more things for herself again, but her son used to stop her all the time. He would say: '(staff member X) will be here soon, so leave that for her to do.' I told him that if she can do things for herself, she really should be doing them because that is much better for her.' (nurse assistant 3)* Some district nurses, however, indicated that not everyone was equipped for such conversations, especially when the social network unnecessarily took over activities and resisted the change. The domestic workers rarely had substantive contact with the social network of older adults.

Team meeting 5: Many staff members assessed older adults' capabilities more often because of the program. They looked more consciously at what older adults could still do for themselves and defined better to older adults what to expect from them: *'In the past, when I had a new client, I would just arrive at the agreed time and start working right away. Now I arrive 10 to 15 minutes early and I use that time to talk (to the client) about what they are still able to do and what I can do for them. Then they know what they can expect from me and what I will expect from them, and I can refer back to that.' (domestic worker 4)* District nurses indicated that the extent to which staff succeeded in this varied. They also got the impression that some staff considered the assessment of capabilities to be the responsibility of the district nurse. They therefore expected that staff did not always consciously look at what older adults could still do for themselves.

Experienced changes in social support

Most district nurses indicated that the program led to increased support and cooperation within the team. They spoke more frequently with their team about how to implement reablement in practice. They also set goals more often in consultation with the team to create a shared responsibility in the care provided. Consequently, most nursing team members started to report more extensively on goals, thereby gaining more insight into each other's working practices. If someone on the team deviated from agreements made in the team, he or she was called to account by colleagues, which reduced differences in working practices. Most domestic workers had little contact with their colleagues outside the program, although some did have more contact with nursing staff than before: *'In the past, we would just do the household chores, and the nurses would get on with their own work. But since the program, we have started talking more. Now it feels more like a joint effort.' (domestic worker 7)*

Experienced changes in organizational support

According to the homecare staff interviewed, the extent to which team managers attended program meetings and supported staff in implementing reablement varied. Most domestic workers and some district nurses valued the presence and support of team managers during program meetings and meetings not related to the program: *'My team found it (the support of the team manager) very positive. The interest, the compliments, and the personal attention – they appreciated that.' (district nurse 1)* Many staff members also felt free to consult the team manager in challenging situations. However, some domestic workers found it challenging to express themselves when the team manager was present at the program meetings or to approach team manager when they encountered problems.

Contextual factors

Contextual facilitators

Staff mentioned several contextual factors that facilitated the implementation of the program. First, the use of digital care plans provided nursing staff with better insight into goals set with older adults, which made them more inclined to report on them. Besides, the care plans were also accessible to the social network of older adults, which also allowed them to monitor the care process (i.e., the new way of working). Second, the lump sum funding system of the healthcare organization (meaning that the organization receives a fixed amount of money per client irrespective of the amount of care delivered) ensured that staff were less time-bound in providing care. Lastly, newly referred clients could be more easily encouraged, since they did not experience the traditional system of care provision in which activities were often taken over: *'What I see is that our team still makes the most progress with new clients who need care. They (staff) actively focus on engaging them (newly referred clients).' (district nurse 4)*

Contextual barriers

Staff also mentioned some contextual barriers. First, resistance to change from older adults or their social network impeded staff in implementing reablement. Reasons frequently mentioned for this were older adults feeling too old or too weak, feeling entitled to care, being afraid of losing care, or having unrealistic expectations about homecare created by other stakeholders (e.g., hospitals, general practitioners). Second, nursing staff still struggled to encourage independence in older adults with complex care needs. Lastly, particularly nursing staff indicated that time pressure and staff shortages could lead them to take over activities: *'Time pressure - for me that is one of the biggest challenges. You have a busy day, and you know that people need to receive care at a particular time, so very quickly you're inclined to just say 'let me do that for you' (the clients).' (nurse aide 2)*

Suggestions for change

Homecare staff and program trainers had some suggestions to improve the program and facilitate its practice implementation. To improve staff attendance and engagement in the program, staff suggested to make the training mandatory and program trainers suggested smaller training groups and more interactive teaching methods. To improve staff knowledge, attitude, skills, and social and organizational support, staff suggested to include coaching on the job, practical assignments on a team level, and more role-plays. Program trainers suggested to further tailor the program to the needs and wishes

of staff to better support them during the process of behavior change. Additionally, they suggested to first train team managers and district nurses about how to support staff in implementing reablement before training other staff members. To reduce resistance to change, homecare staff and program trainers suggested providing information about reablement to clients, their social network, and other relevant stakeholders.

Discussion

This comprehensive process evaluation provided insight into the implementation, mechanisms of impact, and context of the reablement training program 'Stay Active at Home' program implemented in the daily practice of Dutch homecare for older adults. The program was largely implemented as intended. Compliance with the program meetings by homecare staff was reasonably good; however, the extent to which they conducted the practical assignments and consulted the weekly newsletters varied. Staff generally experienced positive changes in their knowledge about and attitude toward reablement, learned new skills or further developed already existing skills to encourage clients toward independence, and perceived social and organizational support from colleagues and team managers to implement reablement in practice. Contextual factors that potentially facilitated the implementation were digital care plans, the funding model of the organization (lump sum funding instead of fee-per-hour), and newly referred clients. Potential barriers were resistance to change from older adults or their social network, complex care situations, time pressure, and staff shortages.

To understand how the program may have produced a change in the behavior of homecare staff, it is essential to unravel its mechanisms of impact.[19] Based on previous research, staff knowledge, attitude, skills, and perceived support are assumed to contribute to the desired behavior change.[6, 17] A possible precondition for bringing about change in these behavioral determinants is intervention acceptability. Staff mainly valued the practical elements (i.e., role-plays, booklet with practice exercises, newsletters) and the team approach of the program. First, role-plays provided a realistic representation of staff behavior, which helped staff in reflecting on their own skills and the extent to which they applied them in practice. Since learning through observation and reflection can be quite useful when working on behavior change, this may have facilitated staff to integrate reablement into their working practices.[28] Second, the booklet with practice exercises and newsletters provided comprehensible examples and practical tips for remaining active in daily life. This encouraged staff to discuss with older adults the importance of performing activities on their own as much

as possible. As a result, these tools may have eased the translation of program knowledge into practice.[29] Third, the team approach allowed staff to share practice experiences, work together on goals, and improve conversation and collaboration skills (wtih other disciplines). This may also have facilitated the intended behavior change, as regular team support and a framework for cooperating and applying professional expertise and judgment are assumed essential in the adoption of reablement.[30, 31]

Although most staff members held a positive opinion about reablement, it was sometimes difficult to change their behavior. This is in line with other studies confirming that working with reablement can be challenging.[7, 9, 10] Behavior change is a complex process with various prerequisites, such as being receptive to new ideas, understanding the desired behavior, willingness to change, and being able to change.[32] First, a lack of *receptiveness* may have affected staff compliance with the program. Domestic staff were more compliant with attending the program than nursing staff, possibly because they receive little training in the Netherlands, thereby making them more eager to participate. Another explanation may be that mainly nursing staff suffered from time restraints and staff shortages. Second, a lack of *understanding* may have limited staff in internalizing reablement. Some program parts were perceived as difficult and some found it challenging to integrate the program knowledge into practice, which is in line with other research.[33] This may have meant that staff understanding of reablement and knowledge transfer were not optimal. It is possible that differences in staff education and experience prior to training could explain this. 'Stay Active at Home' is a fairly generic program for different disciplines, so the program may not always have fitted staff prior knowledge. Third, staff *willingness* to implement reablement may have been impeded by a preference for or habit of taking over activities or by negative outcome expectations of reablement. This indicates that staff were likely in different stages of behavior change and that the program possibly did not always meet their needs and wishes to successfully move to the next stage.[30, 32] Fourth, the *ability* of staff to change behavior may have been impeded by a variety of behavioral factors (e.g., lack of confidence), contextual factors (e.g., unclear roles, responsibilities or expectations), or a combination of these. Nevertheless, by implementing 'Stay Active at Home' in Dutch homecare, we have been able to take some first steps in changing staff behavior from taking over activities of older adults to encouraging them to perform activities for themselves.

Future program implementation may benefit from minor adaptations. First, further tailoring the program to the needs and wishes of staff may likely improve their

engagement in the program and with delivering the program in daily practice. In doing so, it might be valuable to take into account differences in educational backgrounds and experiences, so that the program is explained in a comprehensible manner to all staff involved.[34] In addition, taking into consideration the different roles and responsibilities of staff in providing care, could possibly contribute to them feeling more responsible for the implementation of reablement.[30, 34] Second, implementing reablement requires patience and time from staff. This implies that healthcare organizations and policy-makers should support a stimulating working environment, thereby considering the extra efforts and time needed to change staff behavior. Nevertheless, one must keep in mind that reablement is a relatively new approach, which evidence base is still limited and inconsistent.[7, 12, 13, 17, 35] Although the current evidence suggests that 'Stay Active at Home' is a promising approach to implement reablement, further research on the 'Stay Active at Home' program in terms of its effectiveness and cost-effectiveness for older adults and healthcare systems is needed prior to broader implementation.[7]

This study has several strengths. Using the MRC framework provided a profound understanding of the program and its implementation, and gave indications for mechanisms of impact and contextual factors that may influence the intended behavior change.[19] Furthermore, combining multiple qualitative and quantitative methods, incorporating data from staff and program trainers, using three researchers to analyze the data, and collaborating with relevant stakeholders, increased the trustworthiness of the findings.[27] Limitations of the study included the higher educational level of the staff interviewed compared to the other staff participating in the program, due to an overrepresentation of district nurses. Besides, motivated staff may have been overrepresented in the interviews because only those who had reasonable program exposure (i.e., attendance of at least half of the program meetings) were selected. Nevertheless, the more interviews were conducted, the fewer new codes were generated, which may indicate data saturation. A second limitation may be social desirability bias of staff, because the researcher who performed the interviews with staff was also involved as program trainer. Moreover, two of the program trainers were researchers, thereby potentially introducing experimenter bias. We tried to minimize bias by using a pilot-tested interview guide, indicating to interviewees that data would be pseudonymized and treated with confidence, and appointing a moderator who was not involved in the program for the interviews with program trainers. Third, the staff interviewed were predominantly positive about using the program in practice, while program trainers were more critical of the performance of staff in practice. Video- or

audiotaping would have been valuable to add to the data collection methods to provide more valid information about the actual performance of staff in practice.[36]

Conclusion

The reablement training program 'Stay Active at Home' program was feasible to implement in Dutch homecare and was perceived as useful in daily practice. The program seemed to have a positive impact on the knowledge, attitude, skills, and social and organizational support of homecare staff to implement reablement. However, integrating reablement into the working practices of staff remained challenging due to personal and contextual factors. This study contributes to the growing body of evidence that shifting homecare services from 'doing for' to 'doing with' older adults involves a major paradigm shift for homecare staff. Future program implementation may benefit from minor program adaptations and a more stimulating work environment.

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Appendix 1. Interview guide for focus group interviews with homecare staff (*n* = 23).

Process domains/indicators and interview questions
Implementation
To what extent did you actively engage during program meetings? (fidelity)
To what extent did you apply the program in practice? (fidelity)
What did you think of the program in general (e.g., program rationale, content, teaching methods and duration)? (acceptability)
What program aspects did you appreciate the most/ least (e.g., program meetings, practical assignments, weekly newsletters)? Why? (acceptability)
To what extent did the program fit into your daily practice? (acceptability)
Mechanisms of impact
What did you learn from the program? (knowledge, skills)
To what extent did the program influence your way of thinking/ working? (attitude)
To what extent did you receive social and organizational support from colleagues and the organization to apply the program in practice? (social and organizational support)
What experiences did you have with applying the program in practice?
Context
What contextual factors facilitated/impeded you in attending the program meetings?
What contextual factors facilitated/ impeded you in applying the program in practice?
Suggestions for change
Do you have suggestions to improve the program (e.g., planning, program content, teaching methods and duration)?
Do you have suggestions to facilitate the implementation of the program in practice?
What do you need to continue to apply the program in practice?

Appendix 2. Interview guide for focus group interview with program trainers (n = 4).

Process domains/indicators and interview questions
Implementation
To what extent did you feel facilitated and prepared to provide the program meetings? (fidelity)
How would you reflect on your own functioning in providing the program meetings? (fidelity)
To what extent did homecare staff actively engage during program meetings? (fidelity)
To what extent did you think homecare staff applied the program in practice? (fidelity)
What did you think of the program in general (e.g., program rationale, content, teaching methods and duration)? (acceptability)
To what extent did the program fit in with other programs offered by the healthcare organization? (acceptability)
Mechanisms of impact
To what extent did you think the program influenced the knowledge, attitude and skills of homecare staff?
To what extent did you think homecare staff received social and organizational support from colleagues and the organization to apply the program in practice?
Context
What contextual factors facilitated/impeded you in providing the program meetings?
What contextual factors may have facilitated/ impeded homecare staff in attending the program meetings?
What contextual factors may have facilitated/ impeded homecare staff in applying the program in practice?
Suggestions for change
Do you have suggestions to improve the program (e.g., planning, program content, teaching methods and duration)?
Do you have suggestions to facilitate the implementation of the program in practice?

CHAPTER 4

Effectiveness of a reablement training program for homecare staff on older adults' sedentary behavior: A cluster randomized controlled trial

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Abstract

Background/Objectives: Homecare staff often take over activities instead of 'doing activities with' clients, thereby hampering clients from remaining active in daily life. Training and supporting staff to integrate reablement into their working practices may reduce clients' sedentary behavior and improve their independence. This study evaluated the effectiveness of the 'Stay Active at Home' reablement training program for homecare staff on older homecare clients' sedentary behavior.

Design: Cluster randomized controlled trial (c-RCT).

Setting: Dutch homecare (ten nursing teams comprising 313 staff members).

Participants: 264 clients (aged ≥65 years).

Intervention: 'Stay Active at Home' seeks to equip staff with knowledge, attitude, and skills on reablement, and to provide social and organizational support to implement reablement in homecare practice. 'Stay Active at Home' consists of program meetings, practical assignments, and weekly newsletters over a 9-month period. The control group received no additional training and delivered care as usual.

Measurements: Sedentary behavior (primary outcome) was measured using tri-axial wrist-worn accelerometers. Secondary outcomes included daily functioning (GARS), physical functioning (SPPB), psychological functioning (PHQ-9), and falls. Data were collected at baseline and at twelve months; data on falls were also collected at six months. Intention-to-treat analyses using mixed-effects linear and logistic regression were performed.

Results: We found no statistically significant differences between the study groups either for sedentary time expressed as daily minutes (adjusted mean difference: ß 18.5 [95% confidence interval (CI) -22.4, 59.3], $P = 0.374$) and as proportion of wake/wear time (ß 0.6 [95% CI -1.5, 2.6], $P = 0.589$) or for most secondary outcomes.

Conclusion: Our c-RCT showed no evidence for the effectiveness of 'Stay Active at Home' for all client outcomes. Refining 'Stay Active at Home', by adding components that intervene directly on homecare clients, may optimize the program and requires further research. Additional research should explore the effectiveness of 'Stay Active at Home' on behavioral determinants of clients and staff and cost-effectiveness.

Trial registration: ClinicalTrials.gov: #NCT03293303.

Key points

- This c-RCT evaluated the effectiveness of a reablement training program for homecare staff ('Stay Active at Home') on sedentary behavior in older homecare clients.
- Our study showed no evidence for the effectiveness of 'Stay Active at Home' on sedentary behavior; daily, physical, and psychological functioning; and falls in older homecare clients.
- Adjustments to 'Stay Active at Home', such as adding program components that intervene directly on older homecare clients, revising program materials, and clarifying staff roles and responsibilities in implementation, may optimize the program and require further research.

Why does this paper matter?

Integrating reablement in homecare may support older adults to remain active and independent in daily life, but this requires staff training and ongoing support. 'Stay Active at Home' is a systematically developed and comprehensive reablement training program for homecare staff to reduce older adults' sedentary behavior. This c-RCT showed no beneficial effects for 'Stay Active at Home' compared to usual care. Refining the training program could benefit its effectiveness.

Introduction

The demographic transition toward an aging population increases demands for healthcare services.[1] Combined with an expected decline in financial resources and trained staff, this development challenges the sustainability of healthcare systems.[2] Hence, today, there is an increasing emphasis on 'aging in place' and providing homecare rather than residential care, which may achieve better outcomes at lower costs and is preferred by the majority of older adults.[3, 4] In order to continue living at home, older adults must remain physically active to some extent to diminish functional limitations, disability, and loss of independence.[5] Nevertheless, many older adults have a predominantly sedentary lifestyle. They spend approximately 65–80% of their waking hours in sedentary activities.[6]

Long-term care staff who provide community care at home, such as nurses, nurse assistants, nurse aides, and domestic workers, can play a pivotal role in supporting older adults to become more active throughout the day. They can engage older adults in personal care, nursing care, and domestic support activities, so that older adults can manage their everyday lives as independently as possible. Although staff generally aspire to promote independence, in daily practice they often take over activities from older adults rather than supporting them (e.g., giving instructions) or supervising them (e.g., observing and only interfering if necessary) in activities, as they are used to doing activities *for* rather than *with* older adults.[7-9] This traditional approach to homecare may induce a more sedentary lifestyle.[10]

Previous research targeting sedentary behavior in older adults receiving care and support emphasized that, to successfully and sustainably decrease sedentary behavior and increase activity throughout the day, interventions must be embedded in routine practice, and include staff and clients working together to find the best individualized approach.[11] This fits well with the person-centered and holistic approach of reablement (also known as restorative care). Reablement aims to enhance individuals' (physical) functioning, increase or maintain their independence in meaningful activities of daily living, and reduce their need for long-term services.[12] The effect of reablement interventions on sedentary behavior has not yet been investigated,[13] and research of varying methodological quality has yielded inconsistent findings on other outcomes,[14] such as daily functioning,[15-17] physical functioning,[18-20] psychological functioning,[21, 22] and falls.[23, 24] This highlights the need for more methodologically robust trials to support or refute the effectiveness of reablement.

Working with reablement can be challenging, due to a lack of staff knowledge, willingness and skills to adopt a reablement approach or resistance from clients or their social network.[25] Not surprisingly, previous research has emphasized that providing reablement services require staff training and ongoing supervision.[26, 27] Currently, however, there is little information on staff training programs and on the effects of training programs on staff and client outcomes.[28] Evaluation of reablement training programs can provide valuable insights into their effectiveness and inform the development or optimization of other reablement training programs and interventions.

The Dutch reablement training program 'Stay Active at Home' was designed to equip homecare staff with knowledge, attitude, and skills on reablement, and to provide social and organizational support to implement reablement in daily practice, thereby reducing older adults' sedentary behavior and improving their independence.[29] A previous pilot study and an exploratory trial showed promising findings regarding the feasibility of 'Stay Active at Home' in the Dutch homecare setting.[29, 30] Furthermore, a process evaluation alongside a cluster randomized controlled trial (c-RCT) found that staff generally accepted the program, experienced positive changes in their knowledge, attitude, and skills about reablement, and perceived social and organizational support to implement reablement.[31] The effects of the c-RCT have not yet been examined. The aim of this paper was to evaluate the effectiveness of 'Stay Active at Home' in the c-RCT on sedentary behavior (primary outcome), daily functioning, physical functioning, psychological functioning, and falls (secondary outcomes) in older homecare clients.

Methods

Study design

This c-RCT was conducted between September 2017 and July 2019 in a Dutch healthcare organization in the Netherlands. Ten nursing teams from five working areas (two teams per area) were pre-stratified by working area and randomized into the intervention or control group, together with their clients and, if applicable, clients' domestic staff. The study protocol was approved by the Dutch Medical Research Committee Zuyderland (METC #17N110) and registered at clinicaltrials.gov: #NCT03293303. Details of the study design and sample size calculation were reported elsewhere.[32] Reporting follows the guidelines of the CONSORT extension for Cluster Trials statement.[33]

Setting

The healthcare organization has divided its region into seven working areas that are sub-divided into small-scale self-directed nursing teams with on average eleven teams per area. Each team consists of about ten staff members (i.e., baccalaureate-educated and vocationally-trained registered nurses, (certified) nurse assistants, and nurse aides) who provide personal and nursing care, often through short visits to clients several times a week. One of the nurses on the team, the district nurse, has a more supervising and coordinating role. Domestic support is provided by domestic staff. They usually visit clients once per week for multiple hours. In the Netherlands, physical and occupational therapists are not routinely involved in providing homecare.

Participants

Clients were eligible to participate in the study if they received homecare services from one of the selected nursing teams and were ≥65 years of age.[32] Clients who were terminally ill or bedbound, had serious cognitive or psychological problems, or were unable to communicate in Dutch were excluded. All participating clients provided written informed consent and were blinded to treatment assignment.

Intervention

'Stay Active at Home' is a systematically developed and comprehensive reablement training program to equip homecare staff with knowledge, attitude, and skills on reablement, and to provide social and organizational support to integrate reablement in homecare practice. It consists of program meetings, practical assignments in-between meetings, and 20 weekly newsletters. Program meetings are divided into a kick-off meeting (120 min), (bi-)monthly team meetings over a 6-month period (60 min each), and a booster session at nine months (120 min). The kick-off describes why a reorientation of homecare is needed (*knowledge*). Each team meeting addresses a skill to facilitate the use of reablement in practice: 1) motivating clients, 2) increasing clients' engagement in daily and physical activities, 3) implementing goal-setting and action-planning, 4) involving the social network of clients, and 5) assessing clients' capabilities. Each team meeting starts with discussing the practical assignment and stimulating staff to provide each other feedback (*social support*), followed by a presentation about the addressed skill (*knowledge*), and a skills training including interactive teaching methods (*skills*) and using continuous motivation, mentoring and Bandura's self-efficacy theory to improve staff self-efficacy and strengthen positive outcome expectations on reablement (*attitude*). In the booster session, staff practice conversational skills in role-plays with professional actors (*skills*). Team managers are

also invited to participate in program meetings and also receive the newsletters (*organizational support*). A full description of the program, its underlying assumptions, and the intended results for staff and clients have been published elsewhere.[29]

Staff in the control group (*n* = 159) received no training and provided care as usual.

Implementation

The intervention group consisted of 169 staff members of whom 154 agreed to participate in the training program. On average, staff attended 73.4% of the program meetings, conducted 56.7% of the practical assignments, and consulted 56.6% of the weekly newsletters; however, compliance differed across working areas (Appendix 1). Due to staff turnover, there were 14 dropouts (9.1%). Because 'Stay Active at Home' was integrated into usual homecare, the district nurse set goals and action plans with older adults, and as much as possible in consultation with the rest of the team. More information on the implementation of the program can be found elsewhere.[31]

Data collection

All outcomes were measured at baseline and after twelve months. To reduce the risk of recall bias, data on falls were also measured after six months. Data were collected through accelerometers, paper questionnaires, and physical performance tests by trained researchers or research assistants following standardized protocols.

Baseline characteristics

The following baseline characteristics were collected: age, sex, body mass index, country of origin, educational level, marital status, and living situation. Furthermore, disability in (instrumental) activities of daily living ((I)ADLs) was measured with the Groningen Activity Restriction Scale (GARS).[34] Types of homecare received (i.e., personal care, nursing care and domestic support) and duration of homecare received (in years) were retrieved from client records.

Primary outcome

Sedentary time was assessed with tri-axial wrist-worn accelerometers (ActiGraph GT9X Link, ActiGraph Inc., Pensacola, FL). Participants were instructed to wear the accelerometer on the non-dominant wrist for 24 hours/day for seven consecutive days (excluding days on which the accelerometer was distributed and retrieved). Placement on the dominant wrist was allowed if non-dominant placement would interfere with other monitoring equipment. Raw acceleration data were collected at 30 Hertz and

aggregated to 60-second epochs using ActiLife version 6.13.4. Activity counts per minute (counts.min^{-1}) were derived for each axis and for the composite measure of the three axes, known as vector magnitude. Sequentially, we identified sleep time, non-wear time, and wake/wear time before calculating sedentary time. Sleep time and non-wear time were determined using the Cole-Kripke Sleep Scoring algorithm and the Choi Wear Time algorithm, respectively.[35, 36] Remaining minutes were labeled wake/wear time. Sedentary time during wake/wear time was determined using vector magnitude cut-points of Koster et al.: <1853 counts.min^{-1} for the non-dominant wrist and <2303 counts.min^{-1} for the dominant wrist.[37] Sedentary time was defined in two ways: 1) average daily minutes and 2) average proportion of wake/wear time to ensure comparability across participants with different wake/wear times (in both cases averaging across days within each participant). Average vector magnitude activity counts.min^{-1} were also obtained.

Secondary outcomes

Daily functioning in (I)ADL was assessed using the GARS (score range 18–72).[34] Physical functioning was assessed using the Short Physical Performance Battery (SPPB) (score range 0–12), consisting of balance tests, a gait speed test, and a repeated chair stand test.[38] Psychological functioning was assessed using the Patient Health Questionnaire-9 (PHQ-9) (score range 0–27).[39] Falls were included to monitor for a potentially negative impact of increasing physical activity and were assessed using the following question: 'How often did you fall during the past six months?'[40] Despite our intention,[32] the LASA Sedentary Behavior Questionnaire was not used because many participants experienced difficulties answering its questions, which led us to question the reliability of the data.[41]

Statistical methods

Descriptive data are presented as means (standard deviations) or frequencies (percentages). Data were analyzed according to the intention-to-treat principle on condition that participants had ≥1 valid accelerometer wear day of ≥10h.day^{-1} of wake/wear time. Missing values were imputed using mean imputation.[32] Mixed linear regression was applied for all outcomes to analyze the difference in changes between the study groups over time using REML estimation (except for falls, which, due to excessive zeros, was dichotomized as 1 (≥1 fall in the past six months) and 0 (no fall), and analyzed with logistic regression). By design, our data structure consisted of three levels (repeated measures nested in clients nested in nursing teams). However, results were presented based on two-level models with adjustment for working area as the

small sample size of the third level (only ten nursing teams) led to instability of the random effect parameters. In all models, an unstructured residual variance-covariance matrix was assumed for the repeated outcome measures to allow change in outcome variance over time. Treatment, time, and treatment x time interaction together with working area and baseline covariates age, sex, educational level, disability, and duration of homecare received were included in the models as fixed factors, irrespective of their statistical significance. Participants were specified as random factors. To assess the robustness of results, we also ran the models with additional adjustment for the baseline status of the outcome variables.

Subgroup and sensitivity analyses

The three-way interactions of treatment, time, and the covariates that were included in the model were tested using a hierarchical approach to variables' selection. If a significant three-way interaction was detected, subgroup analyses were conducted with subgroups based on the covariate that interacted with treatment x time. Furthermore, we performed a sensitivity analysis for the primary outcome, including only participants with ≥5 valid accelerometer wear days.[42] Data were analyzed with SPSS version 25.0 (IBM Corp., Armonk, NY) and SAS version 9.4 (SAS Institute Inc., Cary, NC). The significance threshold was set at 0.05 (two-tailed tests). For technical details on the model building strategy, see Appendix 2.

Results

Participant flow and baseline characteristics

Of the 742 participants screened for eligibility, 290 were not eligible (main reason: serious cognitive/psychological problems), 156 declined to participate, and 32 dropped out before baseline measurements, resulting in 264 participants who agreed to participate and were measured at baseline (133 intervention and 131 control group participants) (Figure 1). Participants' mean age was 82.1 (SD 6.9) years, 67.8% were female, and 67.4% had a low educational level (Table 1). During the full trial period, 63 participants (23.9%) dropped out. Dropouts were significantly less physically active, had worse daily, physical, and psychological functioning, and fell more often at baseline than study completers (Appendix 3). Dropout characteristics, dropout rates, and reasons for dropout were comparable between the study groups.

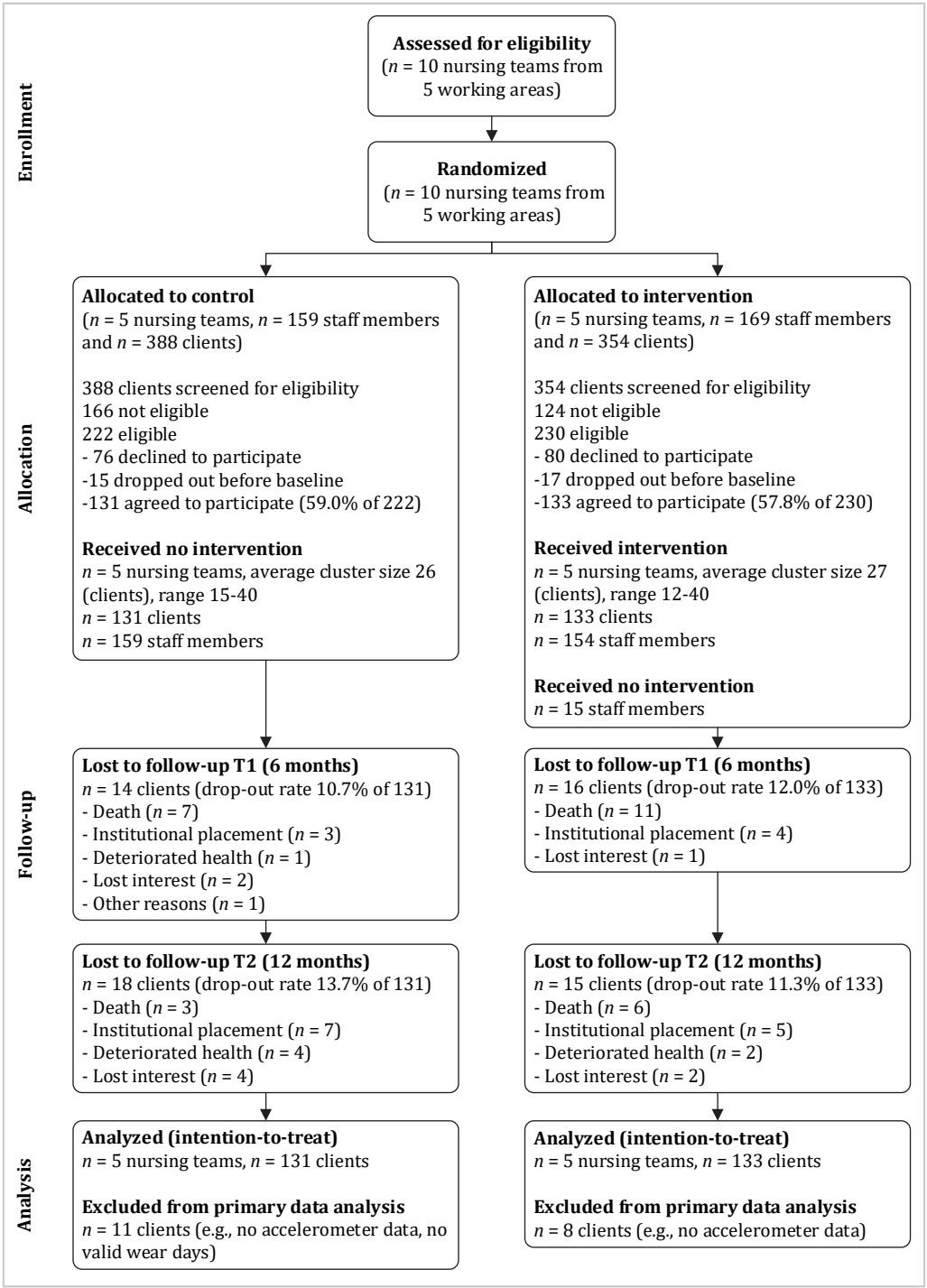

Figure 1. Flow diagram of participants of the 'Stay Active at Home' intervention.

Table 1. Baseline characteristics of participants in the control and intervention groups (*N* = 264).

	Control group (*n* = 131)	**Intervention group (*n* = 133)**
Age (years), mean (SD)	81.5 (7.0)	82.7 (6.8)
Sex (male), n (%)	38 (29.0)	47 (35.3)
BMI (kg/m^2), mean (SD)[a]	28.6 (5.8)	29.2 (6.1)
Country of origin (Netherlands), n (%)	128 (97.7)	128 (96.2)
Educational level, n (%)[b]		
Low	85 (64.9)	93 (69.9)
Intermediate	33 (25.2)	31 (23.3)
High	13 (9.9)	9 (6.8)
Marital status, n (%)		
Single	7 (5.3)	8 (6.0)
Married	41 (31.3)	29 (21.8)
Divorced	13 (9.9)	8 (6.0)
Widowed	70 (53.4)	88 (66.2)
Living situation (living alone), n (%)	86 (65.6)	97 (72.9)
Disability (<u>18</u> – 72), mean (SD)[c]	41.6 (10.6)	41.7 (10.6)
Duration of care received (years), mean (SD)	5.4 (5.4)	5.8 (5.4)
Types of homecare received, n (%)		
Personal care	114 (87.0)	118 (88.7)
Nursing care	69 (52.7)	66 (49.6)
Domestic support	73 (55.7)	78 (58.6)

Note. n: sample size; SD: standard deviation; BMI: body mass index; kg/m^2: kilogram per square meter.

[a] Control group: *n* = 126; Intervention group: *n* = 126.

[b] Low: Low vocational or advanced elementary education; Intermediate: Intermediate vocational or higher secondary education; High: Higher vocational education, university.

[c] Underlined score indicates the most favorable score.

Primary outcome

Of the participants, 245 (92.8%) had ≥1 valid accelerometer wear day and were included in the primary data analysis (on average, participants had 7.0 ± 1.7 valid days). Between baseline and twelve months, there was no statistically significant difference between the study groups for sedentary time expressed as daily minutes (adjusted mean difference: ß 18.5 [95% confidence intervals (CI) -22.4, 59.3], *P* = 0.374) and for sedentary time expressed as proportion of wake/wear time (ß 0.6 [95% CI -1.5, 2.6], *P* = 0.589) (Table 2). Re-running the analyses with additional adjustment for the baseline status of the outcome variables yielded comparable results (data not shown).

Table 2. Estimated means with 95% confidence intervals per study group per time point, adjusted mean difference (ß for treatment x time interaction) with 95% confidence intervals, and *P*-values for the primary outcomes.

	Time	Control group	Intervention group	Adjusted mean difference	*P*-value
	T	Mean (95% CI)	Mean (95% CI)	ß (95% CI)	*P*
Sedentary behavior					
Sedentary time (daily minutes)	T0 T2	836.6 (800.2, 873.1) 827.6 (786.1, 869.2)	799.1 (760.8, 837.4) 808.6 (764.8, 852.3)	18.5 (-22.4, 59.3)	0.374
Sedentary time (% of wake/wear time)	T0 T2	76.1 (74.0, 78.2) 77.5 (75.1, 79.8)	74.1 (71.9, 76.3) 76.0 (73.5, 78.5)	0.6 (-1.5, 2.6)	0.589
Vector magnitude activity counts (counts.min^{-1})	T0 T2	1156.4 (1063.6, 1249.2) 1138.6 (1022.2, 1254.9)	1234.1 (1136.5, 1331.7) 1154.1 (1031.9, 1276.3)	-62.1(-186.2, 61.9)[a]	0.324

Note. The treatment * time effects of the multivariable two-level mixed linear and logistic regression models are adjusted for baseline age, sex, educational level, disability, and duration of care (covariance structure: unstructured). Treatment: control group is reference. Time: baseline is reference. T0: Baseline; T1: 6 months; T2: 12 months; 95% CI: 95% Confidence Interval. Underlined score indicates the most favorable score.

[a] Two-way interactions 'time * disability' and 'time * duration of care' were significant (P = 0.042 and P = 0.016, respectively).

Secondary outcomes

Regarding the secondary outcomes, we observed a statistically significant difference in favor of the control group in the overall SPPB score (ß -0.6 [95% CI -1.1, -0.1], *P* = 0.028) and in the gait speed subscale score (ß -0.3 [95% CI -0.5, -0.0], *P* = 0.030) (Table 3). For the remaining secondary outcomes, no statistically significant differences were observed. Appendix 4 and 5 show the results of the full models for the primary and secondary outcomes.

Subgroup and sensitivity analyses

For vector magnitude activity counts (in counts.min^{-1}), a three-way interaction between treatment, time, and disability was observed (*P* = 0.025) (Figure 2A). Subgroup analysis by median disability showed no statistically significant differences between the study groups. For daily functioning in IADL, a three-way interaction between treatment, time, and working area was observed (*P* = 0.019) (Figure 2B). Subgroup analysis by working area showed a statistically significant treatment effect in favor of the intervention group for working area two at twelve months (ß -3.7 [95% CI -7.4, -0.0], *P* = 0.050). These are weak indications only, given multiple testing. No three-way interactions of treatment and time with the other covariates (i.e., age, sex, educational level, and duration of homecare received) were observed.

The results of the sensitivity analysis for the primary outcome including only participants with ≥5 valid accelerometer wear days (*n* = 236, 89.4%) did not substantially differ from those of the intention-to-treat analysis for sedentary time expressed as daily minutes (ß 21.4 [95% CI -20.0, 62.8], *P* = 0.309) and for sedentary expressed time as proportion of wake/wear time (ß 0.7 [95% CI -1.3, 2.8], *P* = 0.482).

Table 3. Estimated means with 95% confidence intervals per study group per time point, adjusted mean difference (ß for treatment x time interaction) with 95% confidence intervals, and *P*-values for the secondary outcomes.

	Time	Control group	Intervention group	Adjusted mean difference	*P*-value
	T	Mean (95% CI)	Mean (95% CI)	ß (95% CI)	*P*
Daily functioning					
GARS (18–72)	T0	41.5 (39.4, 43.7)	40.8 (38.5, 43.0)	-1.1(-2.9, 0.8)	0.252
	T2	42.8 (40.5, 45.0)	40.9 (38.6, 43.2)		
GARS ADL (11–44)	T0	21.4 (20.2, 22.6)	21.1 (19.8, 22.3)	-0.6 (-1.7, 0.5)[a]	0.267
	T2	21.7 (20.4, 23.0)	20.8 (19.4, 22.1)		
GARS IADL (7–28)	T0	19.0 (18.0, 20.1)	18.5 (17.4, 19.7)	-0.4 (-1.4, 0.6)	0.406
	T2	20.0 (18.9, 21.0)	19.0 (17.9, 20.1)		
Physical functioning					
SPPB (0–12)	T0	4.2 (3.7, 4.6)	4.3 (3.8, 4.8)	-0.6 (-1.1, -0.1)[b]	**0.028***
	T2	4.4 (4.0, 4.9)	3.9 (3.4, 4.5)		
SPPB Balance (0–4)	T0	2.0 (1.7, 2.2)	2.1 (1.9, 2.4)	-0.3 (-0.6, 0.0)	0.076
	T2	2.1 (1.9, 2.4)	2.0 (1.7, 2.2)		
SPPB Gait Speed (0–4)	T0	1.7 (1.5, 1.9)	1.7 (1.5, 1.9)	-0.3 (-0.5, -0.0)[c]	**0.030***
	T2	1.8 (1.6, 2.0)	1.6 (1.3, 1.8)		
SPPB Chair Stand (0–4)	T0	0.5 (0.4, 0.7)	0.5 (0.3, 0.6)	-0.1 (-0.3, 0.1)	0.370
	T2	0.6 (0.4, 0.7)	0.4 (0.2, 0.6)		
Psychological functioning					
PHQ-9 (0–27)[e]	T0	1.8 (1.6, 1.9)	1.7 (1.6, 1.9)	0.0 (-0.2, 0.2)	0.948
	T2	1.6 (1.4, 1.8)	1.5 (1.3, 1.7)		
Falls					
≥1 fall in the past six months, n (%)	T0	50 (38.2)	57 (42. 9)		
	T1	37 (28.2)	42 (31.6)	-0.0 (-0.7, 0.6)[d]	0.930
	T2	27 (20.6)	36 (27.1)	0.0 (-0.7, 0.7)[d]	0.951

Note. The treatment * time effects of the multivariable two-level mixed linear and logistic regression models are adjusted for baseline age, sex, educational level, disability, and duration of care (covariance structure: unstructured). Treatment: control group is reference. Time: baseline is reference. T0: Baseline; T1: 6 months; T2: 12 months; 95% CI: 95% Confidence Interval; GARS: Groningen Activity Restriction Scale; ADL: Activities of Daily Living; IADL: Instrumental Activities of Daily Living; PHQ-9: Patient Health Questionnaire-9; SPPB: Short Physical Performance Battery. Underlined score indicates the most favorable score.

[a] Two-way interaction 'time * duration' in care was significant (*P* = 0.040).

[b] Two-way interaction 'time * disability' was significant (*P* = 0.043).

[c] Two-way interaction 'time * age' was significant (*P* = 0.030).

[d] Two-way interactions 'time * duration in care' and 'time * disability' were significant (*P* = 0.030, *P* = 0.012, respectively).

[e] Ln (x+1).

* P ≤ .05.

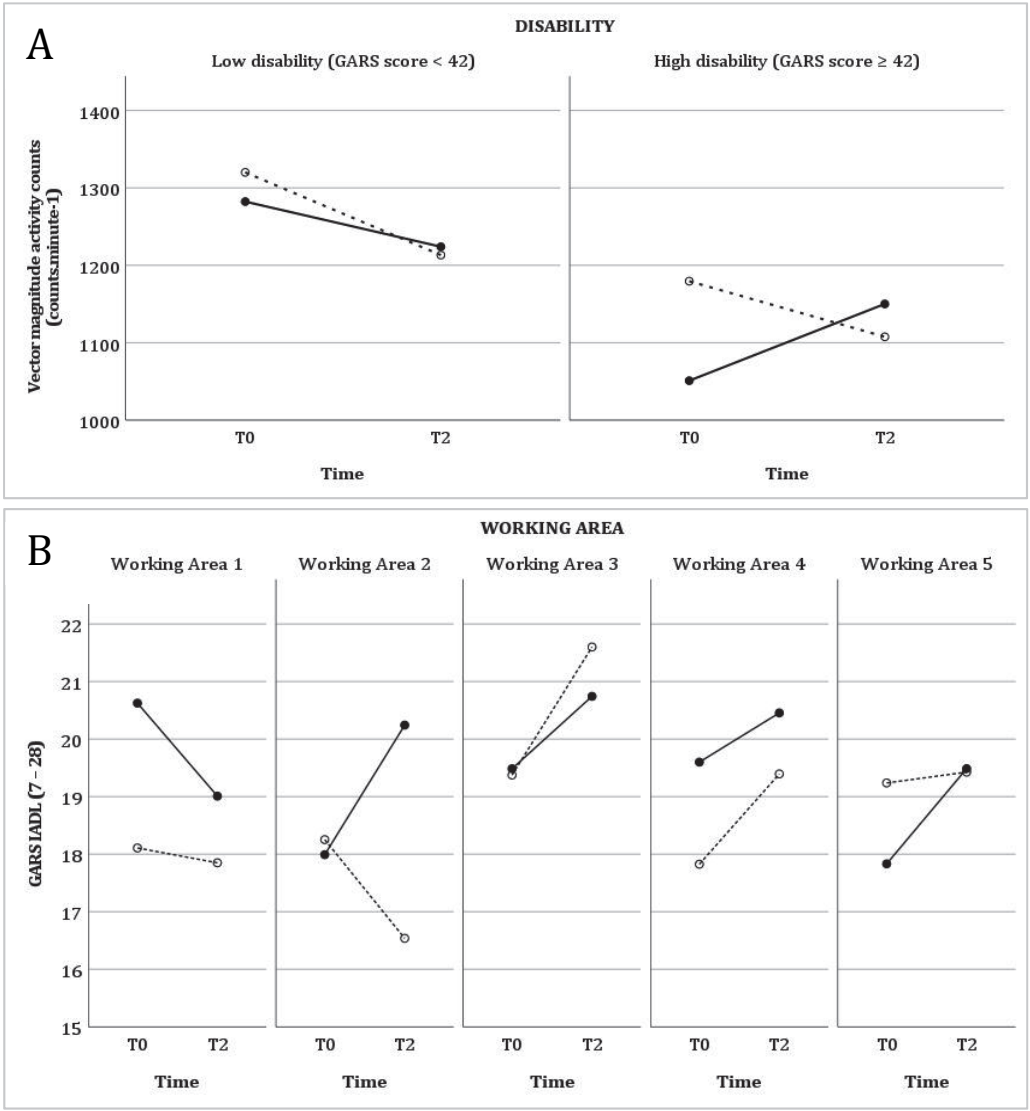

Figure 2. Graphs of three-way interaction effects. The solid line represents the control group; the dashed line represents the intervention group. A: three-way interaction of treatment, time, and disability predicting vector magnitude activity counts (counts.min^{-1}) based on the multivariable two-level model. Subgroup analysis by median disability showed no statistically significant differences between the study groups. B: three-way interaction of treatment, time, and working area predicting daily functioning in instrumental activities of daily living (GARS IADL, scale ranges from 7 to 28, underlined score indicates the most favorable score). Subgroup analysis by working area showed a statistically significant treatment effect in favor of the intervention group for working area 2 at twelve months (T2) (P = 0.050).

Discussion

This study evaluated the effectiveness of the reablement training program 'Stay Active at Home' for homecare staff on older homecare clients' outcomes (i.e., sedentary behavior; daily, physical, and psychological functioning; and falls). Our c-RCT showed no evidence for differences between the study groups for any of these outcomes, except for a significant improvement in physical functioning (in the overall SPPB score and in the gait speed subscale score) in the control group compared to the intervention group.

To our knowledge, this is the first study that investigated the effect of a reablement training program on sedentary behavior. Encouragement by staff was assumed to lead to increased activity throughout the day and reduced sedentariness among older homecare clients. Nevertheless, our trial showed no statistically significant differences between the study groups for the primary outcome. According to several (systematic) reviews, other interventions, not primarily focused on reablement or embedded in homecare, have reduced sedentary behavior in (older) adults.[43-48] These interventions varied substantially regarding their components and delivery methods, but focused on improving physical activity or reducing sedentary time,[43-48] or on self-monitoring or digital technology to change behavior.[46-48] Noteworthy is that in all (systematic) reviews, a need for studies with higher methodological quality was emphasized, including larger trials with longer follow-up, with health outcomes relevant for older people, and with study populations representing the less healthy older people.[43-48] These needs were incorporated in our trial evaluating 'Stay Active at Home'. Nevertheless, where 'Stay Active at Home' targeted older adults via the behavior of staff, previous research has focused directly on the behavior of (older) adults.[43-48] Therefore, supplementing 'Stay Active at Home' with program components that directly intervene on older homecare clients may increase its effectiveness.

Regarding the secondary outcomes, we observed no beneficial effects in favor of the intervention group in the current study. A systematic review on reablement interventions in older adults receiving homecare reported that about half of the studies showed improvements in daily and physical functioning, a few studies showed reductions in falls, and hardly any study showed improvements in psychological functioning.[28] Several reasons may explain the differences in findings between the current study and previous research. First, as a reablement training program integrated into usual care, staff were stimulated to incorporate the new approach to homecare delivery in their daily practice. 'Stay Active at Home' provided practical examples,

showing, for example, that while using a regular care plan, one can talk with a client about the importance of physical activity and what goals the client would be interested in setting. In contrast to other reablement programs that showed effective in physical functioning,[18, 19] 'Stay Active at Home' did not introduce new assessment forms or goal-setting instruments, specify staff roles and responsibilities regarding the practical application of reablement, and let clients set their own goals. Incorporating these elements in 'Stay Active at Home' may lead to better guidance and motivation of staff and clients toward the new behavior. Second, 'Stay Active at Home' involved homecare staff only (nurses, nurse assistants, nurse aides, and domestic workers), whereas other reablement programs used a more interdisciplinary approach, involving for instance, occupational therapists, social workers, and physical therapists.[49] This may increase client exposure to reablement and foster cooperation and application of professional expertise and judgment.[50] Third, we did not distinguish between newly referred clients and those who had been used to staff taking over care tasks for at least some time. As reablement seems to be most beneficial for newly referred clients,[26, 51] clients receiving ongoing support may have been less inclined to change their behavior due to habituation. Fourth, we used objective and validated, but generic outcome measures, such as accelerometers, to capture the full range of activities throughout the day and detect small differences in client's activity level. In contrast, previous research has also used more tailored, subjective outcome measures that focus on clients' perceived difficulty and satisfaction in completing activities, and goal-setting interviews to identify and monitor outcomes prioritized by clients.[52] Lastly, the contrast between 'Stay Active at Home' and usual care may have been too small to elicit substantial effects, because healthcare delivery in the Netherlands is at a relatively high standard.[53]

Changing care and the manifestation of its potential impact requires a major paradigm shift on the part of both homecare staff and older adults. A one-year time window may not suffice to bring about change at both levels. This is consistent with findings of the earlier process evaluation, which found that staff experienced positive changes in their knowledge, attitude, and skills about reablement, and perceived social and organizational support to implement reablement, but still considered it challenging to integrate reablement into their way of working.[31] More time and effort may be needed to change the behavior of staff and older adults to allow for a more adequate evaluation of how these changes impact health outcomes (both in terms of improving function and reducing the rate of decline in function). Adjustments to 'Stay Active at Home', such as adding components that directly intervene on clients, revising program materials, and clarifying staff roles and responsibilities in implementation, may optimize the program

and require further research. In addition, since the potential of reablement is likely to be influnced by broader health and social care services, policy incentives to encourage activity and self-care capabilities may warrant attention.

A strength of the study was that 'Stay Active at Home' was embedded in a healthcare organization, reflecting a real-world setting. Additionally, to maximize data reliability, a mix of performance-based and self-reported measures with good psychometric properties was used. Clients were highly compliant with wearing the accelerometer. A limitation, however, was that the wrist may not have been the most suitable place to measure sedentary time — this would require a thigh-worn accelerometer taped on the skin, which is more invasive, especically for older adults with fragile skin. The wrist-worn accelerometer may have underestimated sedentary time by misclassifying sole movements of the upper body as non-sedentary. This was, however, not considered problematic for the scope of this research, as it affected both study groups in the same way. Moreover, dropouts resulted in missing data. Because dropout rates were comparable across study groups, comparisons are likely not biased. Nevertheless, as dropouts had more vulnerable health, a misrepresentation of the estimated means and proportions in both groups (for the better) cannot be ruled out. Lastly, the results cannot be generelized due to the use of two-level multivariable models in which working area was treated as fixed effect instead of nursing team as random effect.

To conclude, we observed no evidence for the effectiveness of the 'Stay Active at Home' reablement training program for homecare staff on sedentary behavior; daily, physical, and psychological functioning; and falls in older homecare clients. Further research should examine the effectiveness of the combined 'Stay Active at Home' staff training and client intervention on staff and client outcomes (behavior and behavioral determinants) and cost-effectiveness. Moreover, questions remain about the client groups that are most likely to benefit from reablement and the most appropriate outcome measures and assessment tools to measure relevant outcomes for reablement.

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Appendix 1. Average compliance with the program components by homecare staff, stratified by working area.

	Program meetings (%)[a]	Practical assignments (%)	Weekly newsletters (%)[b]
	Median (IQR)	Mean (SD)	Median (IQR)
Working Area 1 (Heerlen)	80.0 (57.1–100)	63.7 (29.3)	60.0 (5.0–95.0)
Working Area 2 (Brunssum)	85.7 (80.0–100.0)	59.1 (28.4)	95.0 (60.0–100.0)
Working Area 3 (Kerkrade)	80.0 (57.1–85.7)	29.0 (50.3)	70.0 (5.0–95.0)
Working Area 4 (Simpelveld)	85.7 (80.0–96.4)	59.4 (31.8)	70.0 (25.0–100.0)
Working Area 5 (Beekdaelen/Voerendaal)	60.0 (41.4–100.0)	51.2 (39.2)	55.0 (7.5–90.0)

Note. IQR: interquartile range; SD: standard deviation.

[a] Working areas 1, 2, and 4 had a significantly higher compliance with attending program meetings than working area 5 ($P = 0.035$, $P = 0.002$ and $P = 0.006$, respectively).

[b] Working area 2 had a significantly higher compliance with consulting the weekly newsletters than working areas 1 and 5 ($P = 0.029$, $P = 0.008$, respectively).

Appendix 2. Technical details of the model building strategy.

Model building strategy:

Linearity was checked for all continuous variables. Two variables (i.e., 'duration of care' and 'psychological functioning') were log-transformed since they were skewed to the right. Because of many zeros, the ln(x+1) transformation was applied. Assumptions of normality and homoscedasticity of the residuals were checked and held. Mixed linear regression models were applied for all outcomes to analyze the difference in changes between the study groups over time using REML estimation. Due to excessive zeros, data on falls were dichotomized and analyzed with logistic regression. Three models were run and compared: a three-level model with a time-dependent random team effect (random slope), a three-level model with a stable random team effect (random intercept), and a two-level model with working area as fixed effect (see SPSS syntaxes for the primary outcome measure below). The three-level time-dependent model had no better fit than the three-level stable model. The three-level stable model did not always converge as the small sample size of the third level led to instability of the random effect parameters. Therefore, results of the two-level model were presented. An unstructured residual variance-covariance matrix was assumed for the repeated outcome measures, to allow change in outcome variance over time. Treatment (0 = control; 1 = treatment), time (0 = baseline; 1 = 12 months), and treatment * time interaction together with baseline covariates age (continuous), sex (0 = male; 1 = female), educational level (1 = low; 2 = intermediate; 3 = high), disability (continuous), and duration of care (log-transformed), and for the two-level model also working area (dummy coding), were included in the models, irrespective of their statistical significance. Their three-way interactions with treatment and time were also tested. A hierarchical approach to variables' selection was applied. That is, for each covariate X, the terms X, X*time, X*treat, X*treat*time were included in the model (and treat, time, treat*time). If the three-way term was not significant, it was removed after which the two-way terms X*treat and X*time were tested and removed if not significant. If the three-way term was significant, the interaction pattern and strength were explored to decide if treat*time effects per covariate level needed to be reported on top of the treat*time effect that was always reported based on the model without the three-way term.

Three-level model with time-dependent random team effect (random slope model):

```
MIXED SedentaryTime BY WorkingArea Education Treatment Time_R1 WITH Time_R2 Age Sex DurationOfCare Disability
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1) SINGULAR(0.000000000001) HCONVERGE(0, ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001, ABSOLUTE)
/FIXED= Treatment Time_R1 Treatment*Time_R1 WorkingArea Education Age Sex DurationOfCare Disability | SSTYPE(3)
/METHOD=REML
/PRINT=G SOLUTION TESTCOV
/RANDOM=Time_R1 Time_R2 | SUBJECT(NursingTeam) COVTYPE(UN)
/EMMEANS=TABLES(Treatment*Time_R1) COMPARE (Treatment) ADJ (LSD)
/REPEATED=Time | SUBJECT(Reg_client*NursingTeam) COVTYPE(UN).
```

* Notes: Time_R1 (0 = baseline; 1 = 12 months); Time_R2 (0 = 12 months; 1 = baseline).

Appendix 2. (Continued).

Three-level model with stable random team effect (random intercept model):

```
MIXED SedentaryTime BY WorkingArea Education Treatment Time WITH Age Sex DurationOfCare Disability
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1) SINGULAR(0.000000000001) HCONVERGE(0,
ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001, ABSOLUTE)
/FIXED=Treatment Time Treatment*Time WorkingArea Education Age Sex DurationOfCare Disability |
SSTYPE(3)
/METHOD=REML
/PRINT=G R SOLUTION TESTCOV
/RANDOM=INTERCEPT | SUBJECT(NursingTeam) COVTYPE(ID)
/EMMEANS=TABLES(Treatment*Time) COMPARE (Treatment) ADJ (LSD)
/REPEATED=Time | SUBJECT(ID*NursingTeam) COVTYPE(UN).
```

Two-level model with working area as fixed effect:

```
MIXED SedentaryTime BY WorkingArea Education Treatment Time WITH Age Sex DurationOfCare Disability
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1) SINGULAR(0.000000000001) HCONVERGE(0,
ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001, ABSOLUTE)
/FIXED=Treatment Time Treatment*Time WorkingArea Education Age Sex DurationOfCare Disability |
SSTYPE(3)
/METHOD=REML
/PRINT=G R SOLUTION TESTCOV
/EMMEANS=TABLES(Treatment*Time) COMPARE (Treatment) ADJ (LSD)
/REPEATED=Time | SUBJECT(ID) COVTYPE(UN).
```

Appendix 3. Baseline characteristics of study completers and dropouts (N = 264).

	Study completers (n = 201)	**Dropouts (n = 63)**
Baseline characteristics		
Age (years), mean (SD)	81.8 (6.7)	83.0 (7.4)
Sex (male), n (%)	61 (30.3)	24 (38.1)
BMI (kg/m^2), mean (SD)[a]	29.3 (5.9)	27.6 (6.1)
Country of origin (Netherlands), n (%)	195 (97.0)	61 (96.8)
Educational level, n (%)[b]		
Low	136 (67.7)	42 (66.7)
Intermediate	51 (25.4)	13 (20.6)
High	14 (7.0)	8 (12.7)
Marital status, n (%)		
Single	11 (5.5)	4 (4.8)
Married	53 (26.4)	17 (27.0)
Divorced	18 (9.0)	3 (61.9)
Widowed	119 (59.2)	39 (6.3)
Living situation (living alone), n (%)	138 (68.7)	45 (71.4)
Disability (<u>18</u>–72), mean (SD)[c]	**40.2 (10.2)**	**46.3 (10.5)*****
Duration of care (years), mean (SD)	5.5 (5.3)	5.9 (5.7)
Types of homecare received, n (%)		
Personal care	175 (87.1)	57 (90.5)
Nursing care	**96 (47.8)**	**39 (61.9)***
Domestic support	118 (58.7)	33 (52.4)
Baseline scores		
Sedentary time (daily minutes), mean (SD)[d]	**782.8 (165.1)**	**853.3 (186.5)****
Sedentary time (% of wake/wear time), mean (SD)[d]	**73.8 (10.7)**	**80.6 (9.3)*****
Vector magnitude activity counts (counts.min^{-1}), mean (SD)[d]	**1265.9 (487.7)**	**947.0 (355.8)*****
GARS (<u>18</u>–72), mean (SD)[c]	**40.2 (10.2)**	**46.3 (10.5)*****
SPPB (0–<u>12</u>), mean (SD)	**4.6 (2.7)**	**3.3 (2.6)****
PHQ-9 (<u>0</u>–27), mean (SD)	**5.3 (4.2)**	**7.6 (5.5)****
≥1 fall in the past six months, n (%)	**73 (36.3)**	**34 (54.0)****

Note. n: sample size; SD: standard deviation; BMI: body mass index; kg/m^2: kilogram per square meter; GARS: Groningen Activity Restriction Scale; ADL: Activities of Daily Living; IADL: Instrumental Activities of Daily Living; PHQ-9: Patient Health Questionnaire-9; SPPB: Short Physical Performance Battery. Underlined score indicates the most favorable score.

[a] Completers: n = 194; Dropouts: n = 58.

[b] Low: Low vocational or advanced elementary education; Intermediate: Intermediate vocational or higher secondary education; High: Higher vocational education, university.

[c] Completers: n = 200; Dropouts n = 62.

[d] Completers n = 193; Dropouts n = 52.

$^{*}P \leq .05$, $^{**}P \leq .01$, $^{***}P \leq .001$.

Appendix 4. Estimated fixed effect parameters and residual variance-covariance matrices of the multivariable two-level models for the primary outcomes.

	Sedentary time (daily minutes)	**Sedentary time (% of wake/wear time)**	**Vector magnitude activity counts (counts.min^{-1})[a]**
	ß (95% CI)	**ß (95% CI)**	**ß (95% CI)**
Intercept	**789.9 (506.9, 1073.0)*****	**64.6 (48.1, 81.0)*****	**1892.2 (1164.8, 2619.7)*****
Treatment	-37.5 (-79.9, 4.9)	-2.0 (-4.4, 0.4)	-160.3 (-383.6, 62.9)
Time	-9.0 (-37.7, 19.7)	1.4 (-0.0, 2.8)	**-279.2 (-541.6, -16.8)***
Age (years)	-0.8 (-3.9, 2.3)	-0.1 (-0.3, 0.1)	2.8 (-5.2, 10.7)
[Sex = female]	**78.9 (33.4, 124.5)****	**6.6 (3.9, 9.2)*****	**-302.3 (-419.1, -185.5)*****
[Education = low]	**-93.0 (-170.7, -15.2)***	-3.3 (-7.8, 1.2)	142.8 (-56.3, 341.8)
[Education = intermediate]	**-143.1 (-225.9, -60.3)****	**-7.7 (-12.5, -2.8)****	**301.9 (89.9, 513.9)****
Duration of care (years)[b]	8.8 (-16.7, 34.3)	-0.2 (-1.7, 1.3)	-68.5 (-156.2, 19.2)
Disability (<u>18</u>–72)	1.2 (-0.8, 3.3)	**0.4 (0.3, 0.5)*****	**-16.6 (-21.9, -11.3)*****
[Working Area = 1]	24.9 (-36.8, 86.6)	-0.9 (-4.5, 2.7)	75.8 (-83.1, 234.6)
[Working Area = 2]	-4.2 (-75.3, 67.0)	-3.7 (-7.8, 0.5)	116.3 (-66.8, 299.5)
[Working Area = 3]	**70.6 (2.5, 138.7)***	-1.9 (-5.8, 2.1)	94.6 (-80.3, 269.4)
[Working Area = 4]	8.7 (-44.9, 62.2)	-2.8 (-5.9, 0.4)	123.0 (-14.7, 260.7)
Treatment * Time	18.5 (-22.4, 59.3)	0.6 (-1.5, 2.6)	-62.1 (-186.1, 61.9)
Vcov matrix[c]	$\begin{pmatrix} 26784.3 & 20610.1 \\ & 33380.0 \end{pmatrix}$	$\begin{pmatrix} 87.8 & 76.7 \\ & 111.2 \end{pmatrix}$	$\begin{pmatrix} 171930.9 & 134466.9 \\ & 270841.2 \end{pmatrix}$

Note. Sedentary time was defined in two ways: first, as the average daily minutes, and second, as the average proportion of wake/wear time (in both cases averaging across days within each participant). The first assumes that at least one of two conditions is met: (1) wearing time is the same for all participants and days, or (2) sedentary time never occurs without wearing. The second assumes that sedentary time is unrelated to wearing yes/no. By comparing the results of both definitions, robustness against assumptions is checked. The estimated fixed effect regression coefficient (ß) for the continuous variables represents average change in the outcome for a 1-unit increase in explanatory variable; for the categorical variables, ß represents average change in the highlighted category with respect to the reference group (omitted). Treatment: control group is reference. Time: baseline is reference. 95% CI: 95% Confidence Interval; Vcov: Variance-Covariance. Underlined score indicates the most favorable score.

[a] Two-way interactions 'time * disability' and 'treatment * duration of care' were statistically significant (P = 0.042 and P = 0.016, respectively).

[b] Ln (x+1).

[c] Interpretation: Row 1 column 1, residual variance at baseline; Row 2 column 2, residual variance at 12 months; Row 1 column 2, covariance.

$^{*}P \leq .05$, $^{**}P \leq .01$, $^{***}P \leq .001$.

Appendix 5. Estimated fixed effect parameters and residual variance-covariance matrices of the multivariable two-level models for the secondary outcomes.

	Daily functioning			Physical functioning				Psychological functioning	Falls
	GARS (18–72)	GARS ADL (11–44)[a]	GARS IADL (7–28)	SPPB (0–12)[b]	SPPB Balance (0–4)	SPPB Gait Speed (0–4)[c]	SPPB Chair Stand (0–4)	PHQ-9 (0-27)[d]	≥1 fall in the past 6 months[d]
	ß (95% CI)	ß (95% CI)	ß (95% CI)	ß (95% CI)	ß (95% CI)	ß (95% CI)	ß (95% CI)	ß (95% CI)[d]	ß (95% CI)
Intercept	**20.4 (4.1, 36.7)***	**13.6 (4.4, 22.8)****	5.2 (-2.8, 13.1)	**16.2 (12.8, 19.6)*****	**7.5 (5.7, 9.3)*****	**5.8 (4.3, 7.3)*****	**3.1 (2.0, 4.3)*****	**1.6 (0.4, 2.7)***	**-3.1 (-6.0, -0.2)***
Treatment	-0.8 (-3.3, 7.8)	-0.3 (-1.7, 1.1)	-0.5 (-1.8, 0.8)	0.1 (-0.4, 0.6)	0.1 (-0.2, 0.4)	0.0 (-0.2, 0.3)	-0.0 (-0.2, 0.1)	-0.0 (-0.2, 0.1)	0.1 (-0.4, 0.7)
[Time = T1]	–	–	–	–	–	–	–	–	-0.9 (-2.5, 0.6)
[Time = T2]	1.2 (-0.1, 0.4)	**1.4 (0.2, 2.7)***	**0.9 (0.2, 1.6)***	-0.9 (-2.0, 0.3)	0.1 (-0.1, 0.4)	**-1.6 (-3.1, -0.1)***	0.0 (-0.1, 0.2)	**-0.2 (-0.4, -0.0)***	0.7 (-0.9, 2.3)
Age (years)	**0.2 (0.0, 0.4)***	0.1 (-0.0, 0.2)	**0.1 (0.0, 0.2)****	**-0.1 (-0.1, -0.0)*****	**-0.0 (-0.1, -0.0)*****	-0.0 (-0.0, 0.0)	**-0.0 (-0.0, -0.0)****	-0.0 (-0.0, 0.0)	0.0 (-0.0, 0.0)
[Sex = female]	1.4 (-1.3, 4.1)	0.2 (-1.3, 1.7)	1.3 (-0.1, 2.6)	0.2 (-0.4, 0.8)	0.1 (-0.2, 0.4)	0.1 (-0.2, 0.3)	0.0 (-0.2, 0.2)	-0.1 (-0.2, 0.1)	**-0.5 (-1.0, -0.0)***
[Education = low]	0.8 (-3.8, 5.3)	0.4 (-2.1, 3.0)	0.3 (-1.9, 2.5)	0.4 (-0.6, 1.3)	0.2 (-0.3, 0.8)	0.0 (-0.4, 0.4)	0.1 (-0.2, 0.4)	-0.2 (-0.5, 0.1)	0.2 (-0.6, 1.1)
[Education = intermediate]	-2.4 (-7.2, 2.4)	-1.5 (-4.2, 1.3)	-0.7 (-3.1, 1.6)	0.7 (-0.3, 1.7)	0.2 (-0.3, 0.8)	0.3 (-0.2, 0.7)	0.3 (-0.1, 0.6)	-0.2 (-0.5, 0.2)	0.3 (-0.7, 1.2)
Duration of care (years)[e]	**2.7 (1.3, 4.2)*****	**2.0 (1.1, 2.8)****	**1.0 (.3, 1.7)****	-0.1 (-0.4, 0.2)	-0.0 (-0.2, 0.1)	-0.0 (-0.1, 0.1)	-0.1 (-0.2, 0.0)	0.1 (-0.0, 0.2)	0.0 (-0.3, 0.4)
Disability (18–72)	–	–	–	**-0.1 (-0.1, -0.9)*****	-0.1 (-0.1, -0.0)*****	**-0.0 (-0.1, -0.0)*****	**-0.0 (-0.0, 0.0)*****	**0.0 (0.0, 0.0)*****	0.0 (0.0, 0.1)
[Working Area = 1]	-0.9 (-4.5, 2.7)	-0.5 (-2.5, 1.6)	-0.3 (-2.0, 1.5)	-0.0 (-0.8, 0.7)	0.2 (-0.2, 0.6)	-0.2 (-0.5, 0.1)	-0.0 (-0.3, 0.2)	0.2 (-0.0, 0.5)	0.1 (-0.5, 0.7)
[Working Area = 2]	-2.1 (-6.2, 2.0)	-1.2 (-3.5, 1.1)	-0.6 (-2.6, 1.4)	-0.3 (-1.2, 0.5)	-0.1 (-0.6, 0.3)	-0.1 (-0.5, 0.2)	-0.1 (-0.4, 0.2)	0.1 (-0.2, 0.4)	-0.6 (-1.3, 0.1)
[Working Area = 3]	1.8 (-2.3, 5.9)	0.8 (-1.5, 3.1)	1.2 (-.7, 3.2)	-0.3 (-1.1, 0.6)	0.1 (-0.3, 0.6)	-0.2 (-0.6, 0.1)	-0.2 (-0.4, 0.1)	0.2 (-0.1, 0.5)	0.0 (-0.7, 0.7)
[Working Area = 4]	-0.3 (-3.5, 2.8)	-0.4 (-2.2, 1.4)	0.3 (-1.3, 1.8)	0.2 (-0.4, 0.9)	0.1 (-0.3, .4)	-0.0 (-0.3, 0.3)	0.2 (-0.0, 0.4)	0.0 (-0.2, 0.2)	-0.2 (-0.7, 0.3)
Treatment * Time 1	–	–	–	–	–	–	–	–	-0.0 (-0.7, 0.6)
Treatment * Time 2	-1.1 (-2.9, .8)	-0.6 (-1.7, .5)	-0.4 (-1.4, .6)	**-0.6 (-1.1, -0.1)***	-0.3 (-0.6, 0.0)	**-0.3 (-0.5, -0.0)***	-0.1 (-0.3, 0.1)	0.0 (-0.2, 0.2)	0.0 (-0.7, 0.7)
Vcov matrix[f]	$\begin{pmatrix} 104.6 & 79.6 \\ \square & 100.0 \end{pmatrix}$	$\begin{pmatrix} 33.2 & 25.2 \\ \square & 33.6 \end{pmatrix}$	$\begin{pmatrix} 26.8 & 18.1 \\ \square & 23.0 \end{pmatrix}$	$\begin{pmatrix} 4.4 & 2.8 \\ \square & 5.1 \end{pmatrix}$	$\begin{pmatrix} 1.4 & 0.7 \\ \square & 1.4 \end{pmatrix}$	$\begin{pmatrix} 0.8 & 0.5 \\ \square & 0.9 \end{pmatrix}$	$\begin{pmatrix} 0.5 & 0.3 \\ \square & 0.6 \end{pmatrix}$	$\begin{pmatrix} .5 & .2 \\ \square & .8 \end{pmatrix}$	$\begin{pmatrix} 1.0 & .3 & .3 \\ \square & 1.0 & .3 \\ \square & \square & 1.0 \end{pmatrix}$

Note. The estimated fixed effect regression coefficient (ß) for the continuous variables represents average change in the outcome for a 1-unit increase in explanatory variable; for the categorical variables, ß represents average change in the highlighted category with respect to the reference group (omitted). Treatment: control group is reference. Time: baseline is reference. T1 (six months); T2 (12 months); 95% CI (95% Confidence Interval); GARS (Groningen Activity Restriction Scale); ADL (Activities of Daily Living); IADL (Instrumental Activities of Daily Living); PHQ-9 (Patient Health Questionnaire-9); SPPB (Short Physical Performance Battery); Vcov (Variance-Covariance). Underlined score indicates the most favorable score.

[a] Two-way interaction 'time * duration in care' was significant ($P = 0.040$).

[b] Two-way interaction 'time * disability' was significant ($P = 0.043$).

[c] Two-way interaction 'time * age' was significant ($P = 0.030$).

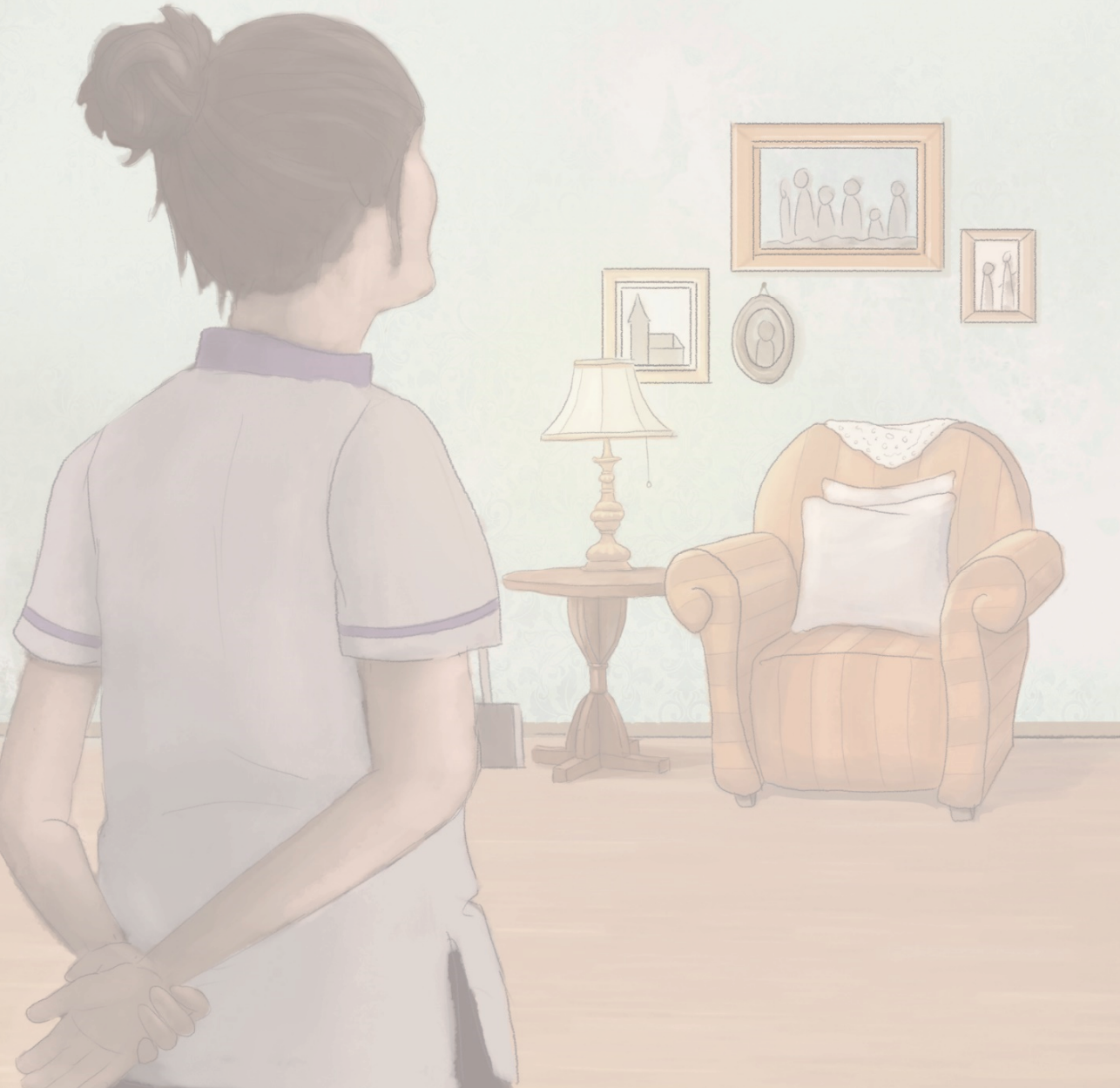
[d] Two-way interactions 'time * duration in care' and 'time * disability' were significant at T2 ($P = 0.030$, $P = 0.012$, respectively).

[e] Ln (x+1).

[f] Interpretation: Row 1 column 1, residual variance at baseline; Row 2 column 2, residual variance at 12 months; Row 1 column 2, covariance.

$^{*}P \leq .05$, $^{**}P \leq .01$, $^{***}P \leq .001$.

CHAPTER 5



Effectiveness of a reablement training program on self-efficacy and outcome expectations regarding client activation in homecare staff: A cluster randomized controlled trial

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Abstract

Training and supporting homecare staff in reablement aims to change staff behavior from 'doing for' to 'doing with' older adults, i.e., supporting client activation. We evaluated the effectiveness of the reablement training program 'Stay Active at Home' on staff self-efficacy and outcome expectations regarding client activation in a cluster randomized controlled trial. Ten Dutch homecare nursing teams, comprising 135 nursing team members and 178 domestic workers, were randomized into the intervention group ('Stay Active at Home') or control group (usual care). Data on self-efficacy and outcome expectations were collected at baseline, six and twelve months using scales developed for this study. Mixed-effects regression showed no differences between the study groups on either outcome. Therefore, widespread implementation of 'Stay Active at Home' in its current form cannot be recommended. More research is needed on the development and psychometric properties of scales to assess staff behavior and behavioral determinants (e.g., self-efficacy and outcomes expectations) regarding client activation.

Highlights

- This c-RCT evaluated the effectiveness of a reablement training program ('Stay Active at Home') on the self-efficacy and outcome expectations of homecare staff regarding client activation in Dutch homecare.
- Our study showed no evidence for the effectiveness of 'Stay Active at Home' on either outcome, except for a positive effect on self-efficacy in the intervention group in a sensitivity analysis based on staff compliance to the training program.
- Given the lack of improvement in staff self-efficacy and outcome expectations regarding client activation, it is possible that little or no behavior change occurred among staff (and thus older adults), which could explain the lack of effects on client outcomes in a previous study.
- Further research on the development and psychometric properties of scales to assess staff behavior and behavioral determinants (e.g., self-efficacy and outcomes expectations) regarding client activation is needed.

Introduction

An active lifestyle in old age is vital to successful aging because it contributes to improved physical function and quality of life, reduced disability, and independent living.[1-3] Despite these benefits, the majority older adults living in the community have a predominantly sedentary lifestyle,[4] especially those who require care and support.[5] Homecare staff, such as nursing and domestic staff, could play a central role in supporting activity in older adults. They can engage older adults in daily and physical activities, such as washing, dressing, or doing household chores, by giving verbal cues, using assistive devices, or breaking tasks down into smaller, achievable steps. Traditionally, however, homecare staff have been accustomed to working in a task-oriented rather than person-centered manner.[6] As a result, staff often tend to take over activities from older adults,[7] i.e., a 'doing for' approach, even when older adults could perform these activities at least partly themselves.[8] In an effort to change staff behavior toward client activation in homecare, concepts such as reablement and function-focused care (FFC), i.e., 'doing with' approaches, have received increasing attention.[9, 10]

Reablement and FFC have in common that they are person-centered, holistic approaches that aim to help older adults achieve and maintain their highest level of (physical) functioning and independence for as long as possible, rather than extending services to compensate for progressing functional loss and dependence.[9, 10] In an effort to change staff behavior toward integrating such an approach in daily care practice, previous FFC research has often used Bandura's self-efficacy theory.[11-14] This theory explains behavior as the result of one's perceived self-efficacy and outcome expectations.[15, 16] Perceived self-efficacy is defined as one's belief that one is capable of performing a behavior that will result in an expected outcome.[8] Outcome expectations are the outcome(s) one expects from performing the behavior.[16] The theory posits that the stronger one's self-efficacy and the more positive one's outcome expectations are regarding a particular behavior, the more likely one is to perform and persist with that behavior when faced with challenges.[15, 16] These expectations are reportedly the strongest predictors of relevant behavior, and influencing them can improve compliance with the desired behavior.[17] Four underlying sources are believed to influence self-efficacy and outcome expectations: enactive attainment, vicarious experience, verbal persuasion, and physiological feedback.[13, 18] Previous FFC research has used these sources in educating, mentoring and motivating staff to facilitate change in self-efficacy and outcome expectations, and ultimately staff behavior.

'Stay Active at Home' is a Dutch reablement training program for homecare staff (nurses, nurse assistants, nurse aides, and domestic workers), developed using the concepts of reablement and FFC.[19] 'Stay Active at Home' aims to improve staff self-efficacy and outcome expectations regarding client activation in homecare by using sources of the self-efficacy theory.[15] In doing so, 'Stay Active at Home' intends to change staff behavior towards increasing older adults' participation in daily and physical activities and reducing their sedentary behavior.[19] A previous pilot study, early trial, and process evaluation alongside a cluster randomized controlled trial (c-RCT) showed that 'Stay Active at Home' was feasible in Dutch homecare, and that staff experienced positive changes in their knowledge, attitude, skills and perceived social and organizational support to apply client activation in homecare.[19-21] Despite these promising findings, 'Stay Active at Home' was neither effective in reducing sedentary behavior in older adults nor cost-effective compared to usual care in the c-RCT.[22] To date, it is unknown whether staff self-efficacy and outcomes expectations, as potential precursors to staff behavior change and change in client outcomes, were influenced by 'Stay Active at Home'. Hence, the aim of this paper was to evaluate the effectiveness of the 'Stay Active at Home' reablement training program on staff self-efficacy and outcome expectations regarding client activation in Dutch homecare. We hypothesized that training homecare staff in reablement using sources of the self-efficacy theory (i.e., enactive attainment, vicarious experience, verbal persuasion, and physiological feedback) would lead to increased staff self-efficacy and outcome expectations regarding client activation in homecare, and ultimately change staff behavior.[15]

Material and methods

Study design

This c-RCT was conducted in a Dutch healthcare organization in the Netherlands from September 2017 to July 2019. Ten nursing teams from five working areas (two teams per area) participated, selected by the organization's team managers. Teams were pre-stratified by area and randomized into the intervention group ('Stay Active at Home') or control group (usual care), along with their clients and, if applicable, clients' domestic staff. The study was approved by the Dutch Medical Research Committee Zuyderland (METC #17N110) and registered at clinicaltrials.gov: #NCT03293303. A detailed description of the study design and sample size calculation is published elsewhere.[23] Reporting follows the guidelines of the CONSORT extension for Cluster Trials statement.

Setting

The healthcare organization provides homecare to approximately 5,750 clients, residing in one of the organization's seven working areas. Homecare is provided by small-scale self-directed nursing teams, with an average of eleven teams per area (range 3–28). Each team consists of about ten nursing team members: baccalaureate-educated registered nurses (4-year degree), vocationally-trained registered nurses (4-year degree), certified nurse assistants (2/3-year degree), nurse assistants (2-year degree), and nurse aides (0.5/1-year degree). Together, they provide personal care (i.e., assistance with activities of daily living such as washing and dressing) and nursing care (i.e., medical assistance such as tending to wounds or administering injections), often through short visits to clients several times a week. The baccalaureate-educated nurse, also called the district nurse, has a more supervisory and coordinating role. She conducts the formal needs assessment, organizes and coordinates the decision-making and care provision involving older adults and their social network, and acts as a link within healthcare between the domains of health and social care. Each working area further includes a group of domestic workers who provide domestic support (i.e., assistance with instrumental activities of daily living such as doing laundry and vacuuming), often once a week for several hours. Domestic staff usually do not need a formal domestic qualification, and are generally low educated.

Participants

All nursing staff were eligible to participate in the study.[23] Domestic staff were eligible if they provided services to clients who met the eligibility criteria for older adults.[23] They were identified as follows. First, the district nurse on each team assessed clients for eligibility criteria based on their clinical judgement. This yielded ten lists of eligible older adults. Second, each list was shared with the corresponding team manager, who indicated which clients were also receiving domestic support and by which domestic worker, who were then invited. All eligible staff received detailed information about the study in advance. Participation was voluntary, and staff could withdraw from the study at any moment without providing a reason. Submission of a completed questionnaire was considered informed consent. Given the nature of the study, staff were not blinded to treatment allocation.

Intervention

'Stay Active at Home' is a 9-month staff reablement training program consisting of program meetings, practical assignments between meetings, and 20 weekly newsletters. The program meetings were divided into a kick-off meeting (120 min), a

series of (bi-) monthly team meetings over a 6-month period (60 min each), and a booster session at nine months (120 min). The joint kick-off meeting for staff from the same working area provided information on the required reorientation of homecare. Following the kick-off meeting, nursing staff received five team meetings and domestic staff three team meetings (meeting one, three, and five, respectively). Each team meeting addressed a skill to facilitate the implementation of reablement in practice: 1) motivating clients; 2) increasing clients' engagement in daily and physical activities; 3) implementing goal-setting and action-planning; 4) involving clients' social network; and 5) assessing clients' capabilities. In terms of procedures, all team meetings started with discussing the practical assignment, followed by a presentation about the addressed skill and a skills training that included interactive teaching methods. In the joint booster session, staff practiced conversational skills during ordinary and challenging situations in role-plays with professional actors. Intervention details have been published elsewhere.[19]

To support staff with the intended behavior change, 'Stay Active at Home' used sources of the self-efficacy theory (i.e., enactive attainment, vicarious experience, verbal persuasion and physiological feedback),[15, 16] and a simplified version of the transtheoretical model of behavior change.[24] In practice, this meant that staff performed the skills of interest themselves during interactive teaching methods (enactive attainment); observed appropriate role models (i.e., program champions from the previous pilot study and professional actors) perform skills (vicarious experience); discussed practical assignments with and received reinforcement for success experiences from program trainers, set personal learning goals and action plans to reach these goals, received social and organizational support from colleagues and team managers (verbal persuasion); and explored positive and negative experiences when implementing 'Stay Active at Home' (physiological feedback).[15] With regard to the simplified transtheoretical model, two behavior change phases for clients were distinguished, each with its own staff strategies to activate clients: (1) a preparation phase, in which clients were not yet aware of the need to change and strategies focusing on providing information about reablement and strengthening the self-efficacy of clients using sources of the self-efficacy theory, and (2) an action phase, in which clients were intended to begin the new behavior, and strategies focusing on assessing capabilities, implementing goal-setting and action-planning, and evaluating goals.

The control group received no training and delivered care as usual.

Data collection

All outcomes were measured at baseline (T0) and after six months (T1) and twelve months (T2). Data were collected using questionnaires completed during program meetings or regular team meetings at work.

Baseline characteristics

Baseline characteristics (i.e., age, sex, educational level, job function, years of work experience, and the number of hours worked weekly) were assessed through a baseline questionnaire.

Staff self-efficacy regarding client activation

The Client Activation Self-Efficacy Scale for nurses (CA–SE–n) and domestic workers (CA–SE–d) were used to assess staff self-efficacy regarding client activation. These scales were developed for the current study, yet inspired by a scale developed and validated in the United States for the nursing home setting (i.e., the Nursing Assistant's Self-Efficacy for Restorative Care Activities Scale [NASERCA]).[14, 25] To overcome language and setting-specific barriers, the original scale was translated and adapted to the Dutch homecare setting using a structured translation and adaptation process, including forward and backward translation.[26] The CA–SE–n and CA–SE–d have since been validated using cross-sectional data and made available.[27] Both scales had moderate construct validity, high internal consistency (Cronbach's α of 0.905 and 0.847, respectively), and the CA–SE–n showed a slight ceiling effect.[27] Each scale includes ten items, with the CA–SE–n focusing on activities of daily living (ADL) such as washing or dressing, and the CA–SE–d on instrumental ADL (IADL) such as cleaning or doing laundry (Appendix 1). The first six items deal with client activation in ordinary circumstances; the last four items deal with client activation in more challenging circumstances (e.g., client resistance). For each item, participants ranked their level of confidence in successful client activation on a scale of 1 (‘no confidence’) to 5 (‘total confidence’). This results in a total score ranging between 10 and 50, with higher scores indicating higher self–efficacy.

Staff outcome expectations regarding client activation

The Client Activation Outcome Expectations Scale for nurses (CA–OE–n) and domestic workers (CA–OE–d) were used to assess staff outcome expectations regarding client activation. These scales were developed for the current study by translating and adapting the Nursing Assistant's Outcome Expectations for Restorative Care Activities Scale (NAOERCA)[14, 25] to the Dutch homecare setting,[26] and were subsequently

validated.[27] Both scales had moderate construct validity, high internal consistency (Cronbach's α for of 0.922 and 0.899, respectively), and the CA–OE–n showed a ceiling effect, indicating a high level of outcome expectations among nurses. Each scale includes 10 items, with the CA–OE–n focusing on ADL, and the CA–OE–d on IADL (Appendix 1). The first six items focus on client benefits regarding independent functioning (e.g., client activation maintains or improves independent functioning); the last four items focus on staff benefits (e.g., client activation improves job satisfaction). For each item, participants ranked their level of agreement with the benefits of client activation on a scale from 1 ('strongly disagree') to 5 ('strongly agree'). This results in a total score ranging between 10 and 50, with higher scores indicating higher outcome expectations.

Data analysis

Descriptive statistics are presented as means (standard deviations) or frequencies (percentages). Mixed linear regression with restricted maximum likelihood estimation was used to analyze the difference in changes in outcomes between the study groups over time, following the intention-to-treat principle. Missing item responses within a given scale were imputed using mean imputation, using that participant's mean on the other items in the scale at that measurement time, provided that no more than 25% was missing.[23, 28] If the percentage of missing items responses was higher, the participant was still included in the analysis, but the scale score on that time point was treated as missing. Given the c-RCT study design, we planned to apply three-level models with repeated measures nested in participants nested in nursing teams. However, because the small sample size of the third level (only ten teams) led to instability of the random effect parameters, two-level models with adjustment for working area were applied. In all models, we used an unstructured residual variance-covariance matrix, with participants as a random factor, and treatment, time, their interaction, working area (dummy coding) and discipline (i.e., nursing or domestic staff) as fixed factors.

Subgroup and sensitivity analyses

We tested the three-way interactions of treatment and time with, respectively, working area and discipline, using a hierarchical approach to the selection of variables.[22] If a significant three-way interaction was detected, subgroup analyses were conducted for the covariate that interacted with treatment x time. Furthermore, we conducted a sensitivity analysis using only intervention group participants who attended ≥50% of the program meetings. Data were analyzed using SPSS version 25.0 (IBM Corp., Armonk, NY) with two-sided significant tests ($P < 0.05$). We obtained insight into the

effectiveness of the intervention compared with the control at various time points and reported estimated means and associated 95% confidence intervals (CIs) per group per time point and adjusted mean differences (β for treatment x time interaction) with 95% CIs.

Results

Participant flow and baseline characteristics

Of the 328 eligible staff, 159 participated in the control group (n = 70 nursing team members, n = 89 domestic workers), 154 in the intervention group (n = 65 nursing team members, n = 89 domestic workers), and 15 declined to participate. Reasons for decline were health problems (n = 1), personal reasons (n = 4), and contractual reasons (n = 10). The participant flow diagram is reported in Figure 1. At baseline, participants were on average 47.7 (SD 11.2) years old, predominantly female (98.4%), had a low educational level (52.0%), an average work experience of 13.5 (SD 10.0) years, and an average workweek of 19.4 (SD 6.5) hours (Table 1). During the full trial period, 67 participants (21.7%) dropped out (n = 35 control group, n = 32 intervention group). Reasons for dropout were comparable between groups (Figure 1).

Table 1. Baseline characteristics of participants in the control and intervention group (N = 309).

	Total study group (N = 309)	**Control group (n = 155)**	**Intervention group (n = 154)**
Age (years), mean (SD)[a]	47.7 (11.2)	47.4 (11.0)	47.9 (11.4)
Sex (female), *n* (%)	304 (98.4)	154 (99.4)	150 (97.4)
Educational level, *n* (%)[b]			
Low	155 (52.0)	70 (48.6)	85 (55.2)
Intermediate	122 (40.9)	64 (44.4)	58 (37.7)
High	21 (7.0)	10 (6.9)	11 (7.1)
Job function, *n* (%)[c]			
Registered nurse	44 (14.3)	21 (13.7)	23 (14.9)
Certified nurse assistant	72 (23.5)	38 (24.8)	34 (22.1)
Nurse aid	16 (5.2)	8 (5.2)	8 (5.2)
Domestic worker	175 (56.6)	86 (56.2)	89 (57.8)
Work experience in years, mean (SD)[d]	13.5 (10.0)	13.5 (9.5)	13.5 (10.5)
Working hours per week, mean (SD)[d]	19.4 (6.5)	19.1 (6.2)	19.7 (6.8)

Note. *n*, sample size; SD, standard deviation.

[a] Control group n = 141.

[b] Low: Low vocational or advanced elementary education; Intermediate: Intermediate vocational or higher secondary education; High: Higher vocational education or university. Control group: n = 144.

[c] Control group: n = 153.

[d] Control group: n = 141.

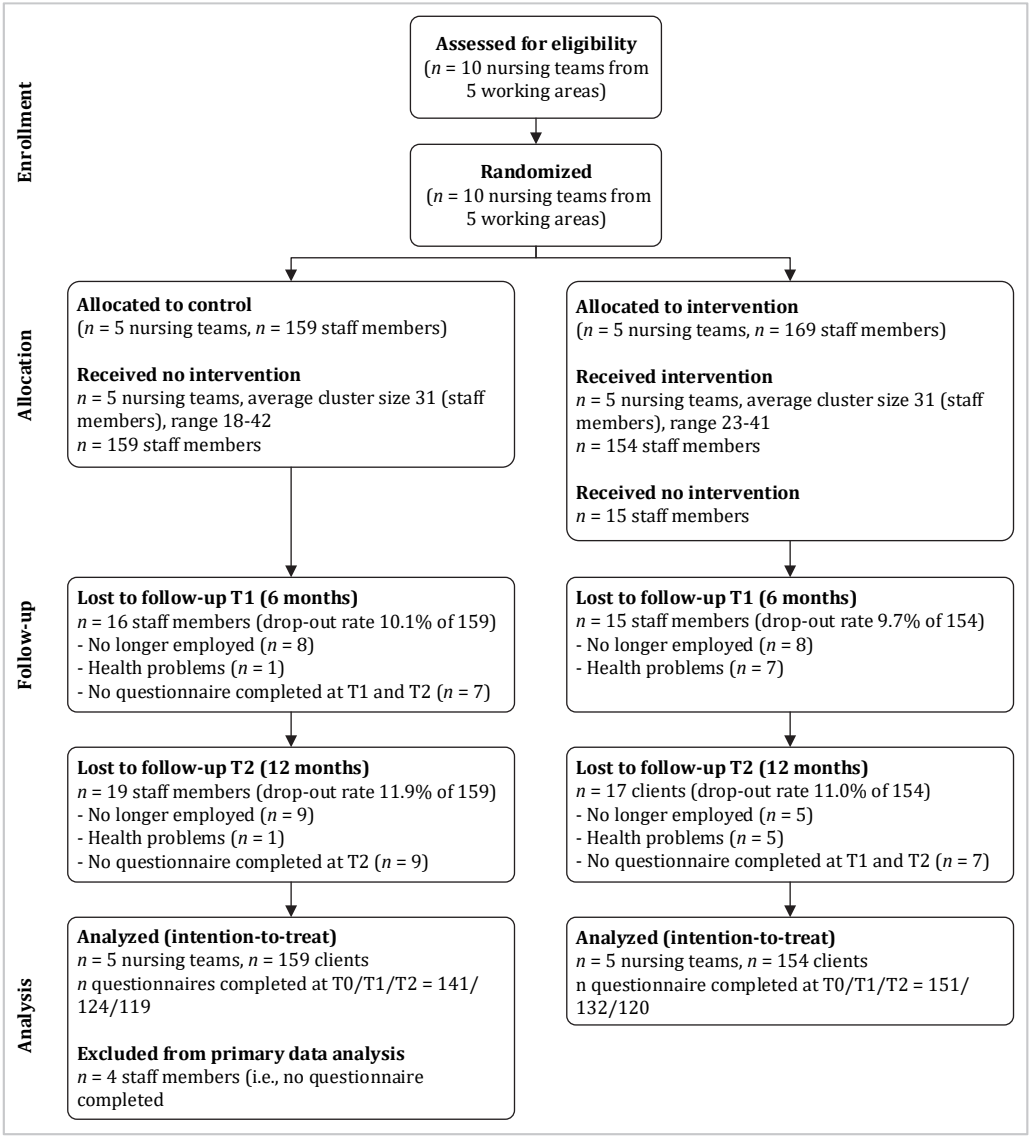

Figure 1. Flow diagram of participants of the 'Stay Active at Home' intervention.

Staff self-efficacy and outcome expectations regarding client activation

Of the participants, 309 (99.0%) had completed at least one questionnaire and were included in the analysis. No statistically significant differences were observed between the study groups for self-efficacy regarding client activation between baseline and six months (β -1.0 [95% CI 0.5, 2.5]) and between baseline and twelve months (β 1.7 [95% CI -0.1, 3.4]) or for outcome expectations between baseline and six months (β -0.6 [95%

CI -2.3, 1.0]) and between baseline and twelve months (β -1.0 [95% CI –2.8, 0.8]) (Table 2). Appendix 2 shows the output of the full models.

Table 2. Estimated means with 95% confidence intervals per study group per time point and adjusted mean differences (β for treatment x time interaction) with 95% confidence intervals for self-efficacy and outcome expectations for all staff (N = 309).

	Time	Control group	Intervention group	Adjusted mean difference
	T	Mean (95% CI)	Mean (95% CI)	β (95% CI)
Self-efficacy				
CA–SE–n/d (10–50)	T0	38.5 (37.5, 39.5)	38.7 (37.7, 39.6)	
	T1	38.9 (38.0, 39.8)	40.1 (39.1, 41.0)	1.0 (-0.5, 2.5)[a,b]
	T2	39.3 (38.2, 40.4)	41.1 (40.1, 42.2)	1.7 (-0.1, 3.4)[a]
Outcome expectations				
CA–OE–n/d (10–50)	T0	40.2 (39.2, 41.3)	41.9 (40.9, 43.0)	
	T1	42.1 (41.2, 43.0)	43.2 (42.4, 44.1)	-0.6 (-2.3, 1.0)
	T2	42.9 (41.9, 43.8)	43.6 (42.7, 44.5)	-1.0 (-2.8, 0.8)

Note. The treatment x time effects of the multivariable two-level mixed linear regression models are adjusted for working area and discipline (covariance structure: unstructured). Treatment: control group is reference. Time: baseline is reference. T0: Baseline; T1: 6 months; T2: 12 months; 95 CI: 95% confidence interval. Underlined score indicates the most favorable score.

[a] In the underlying model, we also found a statistically significant two-way interaction for 'time x working area' (P = 0.008), implying that an increase in self-efficacy over time was observed in only one working area (working area 4), in particular the former between T1 and T2

[b] The Wald statistics p-value was 0.062.

Subgroup and sensitivity analyses

No statistically significant three-way interactions were observed for treatment x time with working area and discipline, respectively. However, we deemed it conceptually interesting to note that, despite the non-significant interaction with discipline for self-efficacy (P = 0.136) and outcome expectations (P = 0.182), an exploratory investigation indicated some noteworthy treatment differences in outcome expectations between nursing staff and domestic staff. Subgroup analysis showed an average decrease in outcome expectations for nursing staff in the intervention group compared with the control group, both between baseline and six months (β -2.5 [95% CI -4.6, -0.3]) and between baseline and twelve months (β -2.5 [95% CI -4.5, -0.5]). No differences were observed between domestic staff in the intervention and control groups (Appendix 3).

The results of the sensitivity analysis that included only intervention group participants who attended ≥50% of the program meetings (n = 125, 81%) and all control group participants were largely consistent with the intention-to-treat analysis. Nevertheless, for self-efficacy, an average increase was observed for the intervention group as

compared to the control group between baseline and twelve months (β 1.9 [95% CI 0.1, 3.7]).

Discussion

This c-RCT evaluated the effectiveness of the 'Stay Active at Home' reablement training program on self-efficacy and outcome expectations of homecare staff regarding client activation in homecare. No differences were found for changes in self-efficacy and outcome expectations between the study groups ('Stay Active at Home' versus usual care) either between baseline and six months or between baseline and twelve months. A comparison of intervention group participants with ≥50% compliance to the program meetings with all control group participants showed a statistically significant, albeit small, increase in self-efficacy in the intervention group between baseline and twelve months.

We hypothesized that 'Stay Active at Home' would lead to increased staff self-efficacy and outcome expectations regarding client activation in homecare.[19] Despite higher scores on self-efficacy and outcome expectations in the intervention group compared to the control group at all time points, no study group differences were found. Although comparable studies in this area are scare, our findings are largely consistent with those of some earlier FFC studies.[17, 29-33] These studies varied in terms of study design (i.e., one-group pretest-posttest or cluster randomized trial) and setting (i.e., institutionalized long-term or acute care), but the interventions evaluated in these studies all included an education component, goal setting, and motivating and mentoring by a nurse coordinator or staff champion through the self-efficacy theory.[17, 29-33] Some interventions were further supplemented with environmental and policy assessments.[29, 30, 32, 33] Only three studies found improvements in staff self-efficacy[32] or outcome expectations.[17, 29] These were all one-group pretest-posttest studies, while the studies that found no evidence were mainly c-RCTs.[30, 33] Two systematic reviews on FFC provide an overview of the aforementioned.[10, 34]

There are several possible explanations for why our c-RCT showed no differences in outcomes between study groups. First, despite an extensive development period,[19] including a pilot study and early trial,[20] 'Stay Active at Home' may not have fully addressed staff needs and wishes to change these expectations. To this end, 'Stay Active at Home' used strategies related to the sources of the self-efficacy theory,[15] including, in particular, interactive teaching methods to practice skills. However, in the process

evaluation, staff expressed a need for more interactivity, such as more role-plays, coaching on the job, and team-level assignments.[21] Viewed from the perspective of the self-efficacy theory, this mainly comes down to strategies of enactive attainment. Enactive attainment is considered the most effective source for reinforcing self-efficacy and outcome expectations,[35] so (too) little use of its strategies during training could explain the current findings. The findings may be further explained by variation among staff in attending program meetings and conducting practical assignments (average compliance of 73% and 57%, respectively). This is supported by the sensitivity analysis, showing that self-efficacy had increased among intervention group participants with ≥50% compliance to the program meetings compared to control group participants between baseline and twelve months. The foregoing might argue for additional opportunities to practice skills and for making the training program mandatory.

Second, the intervention may not have been fully implemented in practice as planned because of organizational and community factors. Motivating and supporting older adults to perform activities independently as much as possible usually requires more time in the beginning. Therefore, staff providing reablement services are likely to visit clients more frequently and stay longer than in traditional homecare.[36] However, staff in our study experienced barriers to implementation, including time constraints and staff shortages.[21] This may have led to staff feeling little room to apply skills in routine practice, limiting their ability to experience the benefits that client activation can bring to themselves and older adults (i.e., outcome expectations). In addition, staff experienced resistance to change from clients or their social network and the support they received from colleagues and team managers varied across teams.[21] This may have affected the extent to which staff felt competent in applying client activation in homecare (i.e., self-efficacy). To enhance self-efficacy and outcome expectations, previous FFC research in institutionalized long-term and acute care often designated a nurse coordinator or staff champion to provide ongoing support and supervision.[17, 29-33] They supported staff in developing goals and action plans,[14] observed staff during routine care interactions with clients,[32] provided one-on-one role modeling,[17] monitored staff documentation,[29] and acted as an interface between staff, clients, their social network, and the management.[17, 29, 33] Appointing such a coordinator in homecare is more complex because care is provided individually in clients' homes. Nevertheless, it may potentially benefit the implementation of 'Stay Active at Home' and the self-efficacy and outcome expectations of staff regarding client activation.

Third, the scales used in the current study may not have been specific enough to capture the behavior of interest. The scales were inspired by scales used in previous FFC research,[17] and their psychometric properties were tested in a cross-sectional study using the baseline data from this c-RCT.[27] All scales had moderate construct validity and high internal consistency, but the scales for nursing staff exhibited a ceiling effect. In addition, the test-retest reliability and sensitivity to change of the scales are unknown to date.[27] The ceiling effect may have complicated comparing the average scores between the study groups to determine if the intervention made any difference compared to the control. Furthermore, given the relatively high self-efficacy and outcome expectation scores at baseline and the small variation in both study groups at all time points, one may question whether the scales are sensitive enough to detect changes. Two previous cluster trials using similar scales also reported high self-efficacy and outcomes expectations scores and no or only small changes over time,[30, 33] leading to the scale developers questioning the sensitivity to change of their scales.[14] They suggested adding additional items to better differentiate between levels of staff self-efficacy (e.g., items that focus on staff engaging clients in specific activities and on staff subskills needed to support client activation) and outcome expectations (e.g., items that address the negative impact staff may experience when supporting client activation, such as fear of losing their jobs).[11, 14] These findings underscore the importance of further research into the psychometric properties of our scales, for example through confirmatory factor analyses, to be sure of their reliability, validity and sensitivity to change and thus better understand their suitability for future (reablement) research.[14]

The present findings are consistent with the previous client-level effect evaluation, which also found no beneficial effects of 'Stay Active at Home' compared to usual care on sedentary behavior; daily, physical and psychological functioning; and falls in older adults.[22] Given the lack of improvement in staff self-efficacy and outcome expectations regarding client activation, it is possible that little or no behavior change occurred among staff (and thus older adults), although the latter was not directly measured. Nevertheless, although self-efficacy and outcome expectations are reportedly the strongest predictors of relevant behavior,[17] behavior is predicted by more factors than these expectations alone.[18] For example, the social-ecological model, which provides an overarching framework for designing complex (behavioral) interventions, suggests that behavior is influenced by various individual, interpersonal, organizational, community, and policy factors.[37, 38] 'Stay Active at Home' focused primarily on individual (i.e., knowledge, attitude, and skills) and interpersonal factors (i.e., support). More attention to other factors from the social-ecological model and involving multiple

levels of influence in 'Stay Active at Home' including older adults and their network may be necessary to effect the intended behavior change, and requires further research.[38, 39]

This study has several strengths and limitations. One strength is that 'Stay Active at Home' was evaluated in routine practice as provided by homecare staff, so our findings reflect implementation in a real-world setting. Moreover, it is one of the first studies on reablement designed to provide insight into staff determinants as potential precursors to staff behavior change.[22] In addition, our c-RCT had a large sample size and relatively high response rates at all times of data collection (95%, 83% and 77% at T0, T1 and T2, respectively). A limitation, however, was the use of new scales whose test-retest reliability and sensitivity to change are still unknown.[27] Without an understanding of test-retest reliability, it is uncertain whether the data accurately reflect staff performance and are not due to artifacts. Without an understanding of sensitivity to change, it is unknown whether the scales are powerful enough to detect change. In case of low test-retest reliability and sensitivity to change, there could be an intervention effect that the scales cannot demonstrate. Second, we have limited insight into the sample selection process and its possible implications for the study validity, as the team managers of the healthcare organization selected both the nursing and domestic staff. Third, dropouts resulted in missing data, although the dropout rate was close to the acceptable trial dropout rate of 20%.[40] Because rates were similar between study groups, comparisons are unlikely to be biased. Nevertheless, dropout may have made finding statistically significant differences between the study groups more difficult. Finally, nursing teams could not be treated as a random effect in the analysis, but instead working area was treated as a fixed effect. As such, the results cannot be generalized beyond this study. This means that our study design is fairly close to a quasi-experimental design,[41] implying that the possibility of confounding bias cannot be completely eliminated.

Based on these and previous findings of 'Stay Active at Home',[22] implementation in its current form is not recommended. 'Stay Active at Home' could benefit from the inclusion of additional practice opportunities for staff, both during training and in routine practice, depending on staff needs and wishes.[21] In addition, the appointment of a coordinator or staff champion could ensure that staff receive ongoing support and supervision to support client activation in homecare, and act as an interface between multiple levels of influence. Furthermore, consideration of the social-ecological model could help to better understand the interrelations among various factors relevant for behavior change and inform (ongoing) program development and evaluation.[18] Finally,

more research is needed on the development and psychometric properties of scales to assess staff behavior and behavioral determinants regarding client activation.

Conclusion

In this c-RCT, we could not demonstrate beneficial effects for the 'Stay Active at Home' reablement training program on the self-efficacy and outcome expectations of homecare staff regarding activation of older homecare clients. It is unclear whether the lack of effect can be attributed to the intervention, implementation challenges, the outcome measures used, or a combination of these. Nonetheless, reablement seems to be 'the right thing to do', especially in light of the challenges of the aging population. To further explore whether 'Stay Active at Home' can add value to the integration of reablement into usual homecare, the training program should be critically reviewed, with suggestions for improvement from this and previous evaluations of 'Stay Active at Home' serving as a starting point for possible optimization.[21, 22]

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Appendix 1. Client Activation Self-Efficacy Scale for nurses (CA–SE–n) and domestic workers (CA–SE–d), and Client Activation Outcome Expectations Scale for nurses (CA–OE–n) and domestic workers (CA–OE–d).

CA–SE–n	How confident are you that you are able: 1. To actively engage clients in **washing** or **bathing**. 2. To actively engage clients in **dressing**. 3. To actively engage clients in **personal care** (e.g., combing hair, brushing teeth/ dentures, shaving). 4. To actively engage clients in **toileting activities**. 5. To actively engage clients in **making transfers**. 6. To encourage clients to **walk short distances** (e.g., to the bathroom or living room). How confident are you that you are also able to apply client activation in challenging situations, such as: 7. The client refuses to participate in care activities. 8. You get assigned more clients than usual. 9. The client is concerned to not be ready in time for an appointment or a visit from someone. 10. The family wants you to provide total care.
CA–SE–d	How confident are you that you are able: 1. To actively engage clients in **light housework** (e.g., dusting, cleaning, dishwashing, making the bed). 2. To actively engage clients in **heavy housework** (e.g., vacuuming/mopping, cleaning the kitchen or bathroom). 3. To actively engage clients in **changing bed sheets**. 4. To actively engage clients in **washing and ironing**. 5. To actively engage clients in **putting away groceries**. 6. To actively engage clients in **preparing meals** (e.g., sandwich or hot meal). How confident are you that you are also able to apply client activation in challenging situations, such as: 7. The client refuses to participate in care activities. 8. You get assigned more clients than usual. 9. The client is concerned to not be ready in time for an appointment or a visit from someone. 10. The family wants you to provide total care.
CA–OE–n	To what extent do you agree that: 1. Actively engaging clients in **washing** or **bathing** helps them to maintain or improve their independent functioning. 2. Actively engaging clients in **dressing** helps them to maintain or improve their independent functioning. 3. Actively engaging clients in **personal care** (e.g., combing hair, brushing teeth/ dentures, shaving) helps them to maintain or improve their independent functioning. 4. Actively engaging clients in **toileting activities** helps them to maintain or improve their independent functioning. 5. Actively engaging clients in **making transfers** helps them to maintain or improve their independent functioning. 6. Encouraging clients to **walk short distances** (e.g., to the bathroom or living room) helps them to maintain or improve their independent functioning. 7. Applying client activation makes your work easier. 8. Applying client activation improves your job satisfaction. 9. Applying client activation gives you the feeling that you provide care that is important. 10. Applying client activation makes you feel prouder of the work that you do.

Appendix 1. (Continued).

CA-OE-d	To what extent do you agree that: 1. Actively engaging clients in **light housework** (e.g., dusting, cleaning up, dishwashing, making the bed) helps them to maintain or improve their independent functioning. 2. Actively engaging clients in **heavy housework** (e.g., vacuuming/mopping, cleaning the kitchen or bathroom) helps them to maintain or improve their independent functioning. 3. Actively engaging clients in **changing bed sheets** helps them to maintain or improve their independent functioning. 4. Actively engaging clients in **washing** or **ironing** helps them to maintain or improve their independent functioning. 5. Actively engaging clients in **putting away groceries** helps them to maintain or improve their independent functioning. 6. Actively engaging clients in **preparing meals** (e.g., sandwich or hot meal) helps them to maintain or improve their independent functioning. 7. Applying client activation makes your work easier. 8. Applying client activation improves your job satisfaction. 9. Applying client activation gives you the feeling that you provide care that is important. 10. Applying client activation makes you feel prouder of the work that you do.

Appendix 2. Estimated fixed effect parameters and residual variance-covariance matrices of the multivariable two-level models for self-efficacy and outcome expectations for all staff (N = 309).

	Self-efficacy (10–<u>50</u>)[a]	**Outcome expectations (10–<u>50</u>)**
	ß (95% CI)	**ß (95% CI)**
Intercept	**34.3 (32.8, 35.8)*****	**35.8 (34.5, 37.2)*****
Treatment	0.2 (-1.2, 1.5)	**1.7 (0.2, 3.2)***
[Time = T1]	1.3 (-0.3, 2.9)	**1.9 (0.7, 3.1)*****
[Time = T2]	1.2 (-0.6, 3.0)	**2.6 (1.3, 3.9)****
[Discipline = Nursing staff]	**7.4 (6.4, 8.5)*****	8.0 (7.1, 9.0)
[Working Area = 1]	1.3 (-0.6, 3.2)	0.4 (-1.0, 1.7)
[Working Area = 2]	**2.2 (0.2, 4.3)***	1.2 (-0.3, 2.6)
[Working Area = 3]	0.8 (-1.3, 3.0)	0.5 (-1.1, 2.1)
[Working Area = 4]	-1.7 (-3.7, 0.4)	-0.2 (-1.6, 1.2)
Treatment * Time 1	1.0 (-0.5, 2.5)	-0.6 (-2.3, 1.0)
Treatment * Time 2	1.7 (-0.1, 3.4)	-1.0 (-2.8, 0.8)
Vcov matrix[b]	$\begin{pmatrix} 34.5 & 12.3 & 9.3 \\ & 28.1 & 17.0 \\ & & 34.2 \end{pmatrix}$	$\begin{pmatrix} 42.2 & 9.6 & 6.2 \\ & 25.1 & 10.6 \\ & & 27.2 \end{pmatrix}$

Note. The estimated fixed effect regression coefficient (ß) for the continuous variables represents average change in the outcome for a 1-unit increase in explanatory variable; for the categorical variables, ß represents average change in the highlighted category with respect to the reference group (omitted). Treatment: control group is reference. Time: baseline is reference. T0: Baseline; T1: 6 months; T2: 12 months; 95% CI: 95% Confidence Interval; Vcov: Variance-Covariance. Underlined score indicates the most favorable score.

[a] In the underlying model, we found a statistically significant two-way interaction for 'time x working area' (P = 0.008), implying that an increase in self-efficacy over time was observed in only one working area (working area 4), in particular the former between T1 and T2.

[b] Interpretation: Row 1 column 1, residual variance at T0; Row 2 column 2, residual variance at T1; Row 3 column 3, residual variance at T2; Row 1 column 2, covariance T0–T1; Row 1 column 3, covariance T0–T2; Row 2 column 3, covariance T1–T2.

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.

Appendix 3. Estimated means with 95% confidence intervals per study group per time point and adjusted mean differences (β for treatment x time interaction) with 95% confidence intervals for self-efficacy and outcome expectations for nursing staff (n = 134) and domestic staff (n = 175) separately.

	Time	Control group	Intervention group	Adjusted mean difference
	T	Mean (95% CI)	Mean (95% CI)	β (95% CI)
Self-efficacy				
Nursing staff: CA–SE–n (10–50)	T0	42.5 (41.4, 43.7)	43.0 (41.8, 44.2)	
	T1	42.2 (41.0, 43.5)	43.4 (42.1, 44.7)	0.7 (-1.2, 2.6)[a]
	T2	43.5 (42.1, 44.9)	44.1 (42.7, 45.5)	0.1 (-1.9, 2.1)[a]
Domestic staff: CA–SE–d (10–50)	T0	34.5 (32.9, 36.0)	34.7 (33.3, 36.1)	
	T1	35.6 (34.3, 37.0)	36.8 (35.5, 38.0)	0.9 (-1.3, 3.1)
	T2	35.2 (33.7, 36.8)	37.8 (36.3, 39.3)	2.3 (-0.4, 5.0)
Outcome expectations				
Nursing staff: CA–OE–n (10–50)	T0	44.2 (42.9, 45.5)	47.1 (45.7, 48.4)	
	T1	46.3 (45.2, 47.4)	46.7 (45.6, 47.8)	**-2.5 (-4.6, -0.3)**[b,*]
	T2	46.8 (45.7, 47.8)	47.1 (46.1, 48.1)	**-2.5 (-4.5, -0.5)**[b,*]
Domestic staff: CA–OE–d (10–50)	T0	36.3 (34.6, 38.0)	37.3 (35.7, 38.8)	
	T1	38.0 (36.7, 39.3)	39.6 (38.4, 40.9)	0.7 (-1.8, 3.1)
	T2	39.0 (37.5, 40.4)	40.0 (38.6, 41.5)	0.1 (-2.7, 2.9)

Note. The treatment x time effects of the multivariable two-level mixed linear regression models are adjusted for working area and discipline (covariance structure: unstructured). Treatment: control group is reference. Time: baseline is reference. T0, baseline; T1, 6 months; T2, 12 months; 95% CI, 95% confidence interval. Underlined score indicates the most favorable score.

[a] In the underlying model, we found a statistically significant two-way interaction for 'time x working area' (P = 0.005), implying that the groups differed substantially at T0, but these differences were less accentuated in the other time points.

[b] In the underlying model, we found a statistically significant two-way interaction for 'time x working area' (P = 0.006), implying that an increase in outcome expectations over time was observed in only one working area (working area 4), in particular the former between T1 and T2.

$^{*}P \leq 0.05$, $^{**}P \leq 0.01$, $^{***}P \leq 0.001$.

CHAPTER 6

Economic evaluation of a reablement training program for homecare staff targeting sedentary behavior in community-dwelling older adults compared to usual care: A cluster randomized controlled trial

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Abstract

Purpose: Training and supporting homecare staff in reablement aims to change staff behavior from 'doing for' to 'doing with' older adults and is assumed to benefit the health and quality of life of older adults and reduce healthcare utilization and associated costs. This study evaluated the cost-effectiveness and cost-utility of the staff reablement training program 'Stay Active at Home' from a societal perspective.

Participants and methods: An economic evaluation was embedded in a 12-month cluster randomized controlled trial. Ten Dutch homecare nursing teams participated (*n* = 313 staff members), of which five teams were trained in reablement and the other five provided usual care. Cost and effect data were collected from 264 older adults at baseline, six and twelve months. Costs included 'intervention', 'healthcare', and 'patient and family' costs (collectively, societal costs) and were assessed using questionnaires and client records or estimated by bottom-up micro-costing. Effects included sedentary behavior and quality-adjusted life years (QALYs). Multiple imputed bootstrapped data were used to generate cost-effectiveness planes and acceptability curves.

Results: No statistically significant differences were observed between the intervention and control group in terms of sedentary time (adjusted mean difference: β 4.8 minutes [95% CI -26.4, 36.0]), QALYs (β 0.01 [95% CI -0.03, 0.04]), and societal costs (β €2,216 [95% CI -459, 4,895]), except lower costs for domestic support in the intervention group (β €-173 [95% CI -299, -50]). The probability that 'Stay Active at Home' was cost-effective compared to usual care ranged from 7.1% to 19.9%, depending on the willingness-to-pay (WTP) (€0–€50,000)/minute of sedentary time averted and was 5.9% at a WTP of €20,000/QALY gained.

Conclusion: 'Stay Active at Home' did not improve outcomes or reduce costs and was not cost-effective from a societal perspective compared to usual care in Dutch older adults receiving homecare. Consequently, there is insufficient evidence to justify widespread implementation of the training program in its current form.

Trial registration: ClinicalTrials.gov: #NCT03293303.

Introduction

Older adults are among the most sedentary age group of society. They spend approximately 9.4 h per day sedentary, representing 65–80% of their waking day.[1] with even higher sedentary times reported in older adults receiving long-term care.[2] This can lead to numerous health problems, including functional limitations, loss of independence, and lower health-related quality of life (HRQoL), as well as economic problems due to higher healthcare utilization and associated costs.[3-6] Interventions to reduce sedentary behavior in older adults have primarily focused on promoting physical activity (i.e., structured exercise programs). Although participation in such programs may be beneficial,[7] the positive effects of being active a few times a week for a limited time may be small when older adults spend the rest of the day sedentary.[8, 9]

Recent studies highlight older adults' preference for integrating activity into daily routines and tasks.[10] For older adults receiving long-term care (most of whom live at home), embedding such interventions into daily homecare practice may hold promise.[7, 11] For example, homecare staff can motivate and encourage older adults to perform daily and physical activities as independently as possible.[12] Nevertheless, staff often view their role as task-oriented and have a well-intentioned tendency to take over activities,[13] even when older adults could perform these activities at least partly themselves.[14, 15] This can lead to a downward spiral in older adults, with more sedentary behavior, greater loss of function and independence, and higher care consumption.[15, 16]

A promising approach that can help homecare staff in this regard is reablement. Reablement is a person-centered and holistic approach that aims to enhance individual's (physical) functioning, increase or maintain their independence in meaningful activities of daily living, and reduce their need for long-term care.[17] It is a 'doing with' approach, as opposed to traditional homecare, which tends to be a 'doing for' approach. An interdisciplinary team supports older adults (temporarily) to regain, regain or gain skills so that they can live their daily lives as independently as possible. According to several systematic reviews, there is no unequivocal evidence on the effects of reablement on health and quality of life outcomes or costs,[18, 19] although there is growing support that reablement can lead to improved performance of daily activities,[19-22] lower healthcare utilization, and similar or lower costs for home, health or social care compared with usual care.[23-28] These inconsistent findings are expected to be caused by variation in population and intervention characteristics of reablement approaches and by the often highly tailored and personalized nature of reablement.[18]

To date, only two studies have conducted a cost-effectiveness or cost-utility analysis comparing the relative costs and effects of reablement to those of usual care. These are a prospective longitudinal study that evaluated different reablement services as practiced targeting different populations (i.e., those discharged from the hospital or recently referred to homecare) and a small-scale trial among older adults who applied for or were recently referred to homecare after hospitalization or gradual functional decline.[26, 27] Both studies concluded that reablement was cost-effective compared to usual care. Economic evaluations of trials integrating a reablement approach into usual homecare, targeting a general population of older adults with an indication for long-term care at home (which may involve a more vulnerable group), are not yet available.

To contribute to the integration of reablement in Dutch long-term homecare for older adults, the 'Stay Active at Home' reablement training program was developed for homecare staff (i.e., nurses, nurse assistants, nurse aides, and domestic workers). 'Stay Active at Home' aims to equip staff with knowledge, attitude, and skills on reablement, and to provide social and organizational support. In doing so, it aims to change the behavior of staff from 'doing for' older adults to 'doing with' them, so that older adults participate more in daily and physical activities and exhibit less sedentary behavior.[29] A previous pilot study and an early trial showed that it was feasible to implement 'Stay Active at Home' in Dutch homecare.[29, 30] Subsequently, a cluster randomized controlled trial (c-RCT) was conducted, consisting of a process, effect and economic evaluation, in which 'Stay Active at Home' was compared to traditional homecare (hereafter referred to as usual care).[31] The process evaluation found that 'Stay Active at Home' was largely implemented as intended and that homecare staff experienced positive changes in their knowledge, attitude, skills, and social and organizational support to implement reablement in practice.[32] However, the effect evaluation found no differences between the study groups for sedentary behavior in older adults (primary outcome), implying that 'Stay Active at Home' was as effective as usual care.[33] 'Stay Active at Home' may still be cost-effective, as no effect difference can be justified by lower costs.[34] The current paper therefore describes the findings of the economic evaluation comparing 'Stay Active at Home' with usual care in Dutch older adults from a societal perspective.

Material and methods

Study design

This economic evaluation was embedded in the c-RCT and conducted in a Dutch healthcare organization in the Netherlands between September 2017 and July 2019.

The study was approved by the Dutch Medical Research Committee Zuyderland (METC #17N110), registered at clinicaltrials.gov (#NCT03293303), and conducted in accordance with the Declaration of Helsinki. Details of the study design and the sample size calculation have been published elsewhere.[31] Reporting follows the Consolidated Health Economic Evaluation Reporting Standards (CHEERS) guidelines.[35]

Setting

Dutch homecare includes personal care (i.e., assistance with activities of daily living such as washing and dressing), nursing care (i.e., medical assistance such as tending to wounds or administering injections), and domestic support (assistance with instrumental activities of daily living such as doing laundry and vacuuming). Personal and nursing care needs are assessed and coordinated by district nurses and reimbursed by health insurers. Domestic support needs are assessed by municipalities and funded from general tax revenues, although clients pay a small income-dependent contribution.[36] Homecare organizations typically provide personal care, nursing care, and domestic support. The organization involved in the current study has divided its region into seven working areas, with an average of eleven small-scale self-directed nursing teams per area (range 3–28). Each team consists of about ten nursing team members (i.e., baccalaureate-educated and vocationally trained registered nurses, (certified) nurse assistants, and nurse aides) who provide personal and nursing care. Each area further includes a group of domestic workers who provide domestic support.

Participants

Ten nursing teams from five working areas (two teams per area) participated in the trial. These were pre-stratified by area and randomized into the intervention or control group, along with their clients and, if applicable, clients' domestic staff. The current study focused only on clients. Clients were eligible to participate if they were ≥65 years old, not terminally ill or bedbound, had no serious cognitive or psychological problems, and were able to communicate in Dutch. Eligible clients were informed about the study through an information letter and flyer, a brief telephone call, and, if clients were willing to participate, a home visit by one of the researchers. Clients, who agreed to participate, provided written informed consent before the study began. They could withdraw from the study at any time and for any reason.[31]

Study perspective and time horizon

This study was conducted from a societal perspective, meaning that all relevant costs (i.e., intervention costs, healthcare costs, and patient and family costs) and effects to

society as a whole were included.[37] Costs related to productivity losses were not taken into account because all participants were past the retirement age of 65 years. Cost and effect data were collected over a 12-month time horizon and were therefore not discounted.[37]

Intervention

'Stay Active at Home' is a 9-month reablement training for nursing and domestic staff, consisting of program meetings, practical assignments between meetings, and 20 weekly newsletters. The program meetings consisted of a joint kick-off meeting for nursing and domestic staff from the same working area (120 min), followed by five and three team meetings (60 min each) for nursing staff and domestic staff, respectively, over a 6-month period, and a joint booster session months after the start (120 min). The kick-off meeting described why a reorientation of homecare is needed. During the team meetings, staff learned skills to: (1) motivate clients; (2) increase clients' engagement in daily and physical activities; (3) apply goal-setting and action-planning; (4) involve clients' social network; and (5) assess clients' capabilities. In the booster session, staff practiced conversational skills and situations that were still perceived as challenging in role-plays with professional actors. Staff received ongoing motivation and mentoring during the training, focused on staff knowledge, attitude and skills, and received social and organizational support from colleagues and team managers to implement reablement, with the goal of changing their practice behaviors from 'doing for' to 'doing with' older adults. Intervention details have been published elsewhere.[29]

The control group received no training and delivered care as usual.

Implementation

All program meetings (50 across five working areas) were organized by a group of four program trainers (two trainers from the healthcare organization and two researchers (authors THR and SFM)). One trainer from the organization and one researcher were present at each meeting. On average, homecare staff attended 73.4% of the program meetings, conducted 56.7% of the practical assignments, and consulted 56.6% of the weekly newsletters. Details of implementation, potential mechanisms of impact (i.e., knowledge, attitude, skills and support), and context can be found elsewhere.[32]

Data collection

Baseline characteristics

Data on sociodemographic characteristics were collected with a baseline questionnaire: age (years), sex, country of origin, educational level (low vocational or advanced elementary education, intermediate vocational or higher secondary education, higher vocational education or university), marital status (single, married, divorced, widowed), and living situation (living alone; living together). Disability in (instrumental) activities of daily living was assessed with the Groningen Activity Restriction Scale (score range 18–72).[38] Duration of homecare received (years) was extracted from client records of the healthcare organization.

Cost outcomes

Intervention costs were estimated using bottom-up micro-costing and included labor costs of the program trainers, staff training costs, material costs, travel costs (home–work), and accommodation costs.[36] Labor costs were based on an average time investment of two hours per program meeting per program trainer (200 hours in total). Training costs were based on full staff compliance with the program (i.e., twenty hours for nursing staff and sixteen hours for domestic staff). Labor costs, training costs, and travel costs were valued using gross hourly wages. For each discipline, the average number of years of work experience was used to determine the gross hourly wage. Material and accommodation costs were estimated from invoices. Costs were allocated to intervention group participants only by dividing the total cost of the intervention by the number of participants in the intervention group.

Healthcare costs and patient and family costs were derived from healthcare and informal care data assessed with an adapted version of the iMTA Medical Consumption Questionnaire at baseline, six and twelve months, and from client records.[39] Healthcare costs included primary care costs (i.e., visits to general practitioner and physiotherapist), hospital care costs (i.e., emergency room visits, ambulance transportation, outpatient hospital visits, and hospitalization), and long-term care costs (i.e., nursing care, personal care, domestic support, day care, and inpatient care use). Patient and family costs included informal care costs and were based on the amount of time the participant received care from family and/or friends. Cost prices from the Dutch Manual for Costing in Economic Evaluations were used to value healthcare and informal care use (Appendix 1).[40] Costs were expressed in 2018 euros (€), and, if needed, prices were indexed to the reference year using a consumer price index.[40]

Effect outcomes

Sedentary behavior was assessed with tri-axial wrist-worn accelerometers (ActiGraph GT9X Link, ActiGraph Inc., Pensacola, FL, USA) worn for seven consecutive days, at baseline and twelve months. Raw acceleration data were collected at 30 Hertz and aggregated to 60-second epochs using ActiLife software version 6.13.4. Activity counts per daily minute were derived for each axis and for their composite score (i.e., vector magnitude). Subsequently, sleep time and non-wear time were identified using algorithms of Cole-Kripke and Choi,[41, 42] respectively, and removed. Remaining minutes were labeled wake/wear time. Sedentary time during wake/wear time was determined using vector magnitude cut-points of Koster et al.[43] Sedentary time was defined in two ways: first, as the average number of daily minutes, and second, as the average proportion of wake/wear time (in both cases averaging across days within each participant). Details of the data treatment have been published elsewhere.[33]

Quality-adjusted life years (QALYs) were derived from HRQoL data assessed with the EQ-5D-5L questionnaire at baseline, six, and twelve months.[44] Participants were asked to rate five quality of life domains (i.e., mobility, self-care, usual activities, pain/discomfort, and anxiety/depression) with five response levels.[45] This resulted in an overall health state. Health states were first converted into utilities using the Dutch tariff.[46] Utilities ranged from -0.446 to 1, with negative values indicating 'worse than death' and 1 indicating 'perfect health'. Utilities were then used to calculate QALYs over the full trial period by means of the area under the curve method (i.e., multiplying the duration of a health state by the utility value related to that health state).[37] In addition, participants were asked to rate their self-perceived health on a visual analogue scale (EQ-VAS, range 0–100).[45]

Data analysis

All analyses were performed in R version 4.0.3 (R Core team, 2020).[47] The base-case analyses were conducted according to the intention-to-treat principle, provided that participants had ≥1 accelerometer wear day of ≥10h of wake/wear time.[31] Multiple imputation by chained equations was used to impute missing data, assuming data to be missing at random.[48, 49] Prior to fitting the imputation model, the association between observed variables and missing outcome data was examined via logistic regression to identify those variables that were substantially associated with missingness. These variables were included as predictors in the imputation model (i.e., living situation), along with the stratification factor (i.e., working area) and variables that were deemed a priori relevant to the outcomes (i.e., age, sex, education, disability, and duration of

homecare received).[31] Baseline values for the outcomes were also included to control for possible baseline differences between the groups. We chose this subset of variables because they were the most relevant from a statistical and clinical perspective, while also achieving a balance in terms of model complexity. Imputation was performed separately for each treatment arm. A multilevel normal approach was used for the imputed outcome data, taking into account cluster effects (i.e., participants), while predictive mean matching was used for all predictor variables not imputed via clustering (for which the proportion of missing variables was small (<1%)). Although the assumption of normality for cost data may not always be met, using non-parametric bootstrapping to derive mean incremental cost-effectiveness can yield robust estimates against parametric assumptions, even in small samples with skewed data.[50] For each analysis, twenty imputed datasets were generated, and pooled estimates for the key parameters of interest for each fitted model were derived using Rubin's rules.[49]

Cost analysis

The mean incremental difference in societal costs and costs by cost category were calculated using mixed-effects linear regression via restricted maximum likelihood estimation and linear contrasts. By design, the hierarchical structure of our data consists of three levels (repeated measures nested in participants nested in nursing teams). However, two-level models with adjustment for working area were presented, as the small sample size of the third level led to instability of the random effect parameters. Treatment, time, their interaction, and working area were specified as fixed factors, and participants as random factors. Models were adjusted for age, sex, education, disability, duration of homecare received, and baseline costs. Since we assumed a non-normal distribution of cost data, 95% bias-corrected and accelerated bootstrap confidence intervals (CIs) were derived, using 1000 bootstrap replications.[51] A thousand replicates were justified, as changing the seed number in the models resulted in reasonably similar results. We additionally calculated the mean incremental difference in healthcare and informal care utilization.

Effect analysis

The mean incremental difference in sedentary time and QALYs was calculated similarly to the mean incremental difference in costs, using mixed-effect models with linear contrast and the same predictors and interactions, but with adjustment for baseline sedentary time and baseline EQ-5D-5L values, respectively, instead of baseline costs. Parameter estimates were derived based on multiple imputation methods and mixed

effects linear regression for sedentary time and QALYs. For the latter, 95% CIs were derived using bootstrap methods assuming a non-normal distribution.

Cost-effectiveness and cost-utility analysis

A cost-effectiveness analysis, based on sedentary time and costs, and a cost-utility analysis, based on QALYs and costs, were conducted. Incremental cost-effectiveness ratios (ICERs) were calculated by dividing incremental costs by incremental effects between the study groups. The ICERs were considered as the incremental cost per unit of additional effect. Therefore, values for sedentary time were averted so that higher times reflected better effects. Non-parametric bootstraps with 1,000 replications were used to estimate the uncertainty surrounding the ICERs, taking into account the correlation between costs and effects by fitting both models within the same bootstrap function. The bootstrapped cost-effect pairs were then plotted on cost-effectiveness planes (CE-planes), in which the vertical line represented the incremental costs and the horizontal line the incremental effects.[52, 53] Cost-effectiveness acceptability curves (CEACs) were also generated, reflecting the probability that the intervention was cost-effective compared to control for a range of willingness-to-pay (WTP) thresholds (i.e., the amount of money society is willing to pay for a unit of effect gained).[54, 55] We report the probability that the intervention is cost-effective compared to control at a WTP of €20,000 per QALY gained, which is a conservative estimate for the burden of disease for a relatively healthy population of older adults, according to the Dutch National Health Care Institute.[56, 57] Because the WTP for sedentary behavior is unknown, maximum probabilities were provided.

Sensitivity analysis

Three sensitivity analyses were performed to assess the robustness of results: one from the healthcare perspective (including only healthcare costs); one using only complete cases (i.e., participants with complete data for total societal costs, sedentary time, and QALYs); and one without participants with extreme cost outliers. Outliers were defined by a boxplot in which a point beyond the upper outer fence was considered an extreme outlier.[58]

Results

Participant flow and baseline characteristics

Of the 742 potential participants screened for eligibility, 290 were not eligible, 156 declined to participate, and 32 dropped out before baseline measurements, leaving 264 participants who agreed to participate and were measured at baseline (*n* = 131 control, *n* = 133 intervention). Table 1 shows their baseline characteristics. Participants' mean age was 82.1 (SD 6.9) years, 67.8% were female, and 67.4% had a low level of education. During the full trial period, 23.9% (*n* = 63; 32 control, 31 intervention) of all participants dropped out, mainly due to institutionalization or death. The characteristics of dropouts were comparable between the study groups; however, at baseline, dropouts were significantly more sedentary, had worse daily, physical, and psychological functioning, and fell more often than study completers.[33]

Table 1. Baseline characteristics of participants in the control and intervention groups (*N* = 264).

	Control group (*n* = 131)	Intervention group (*n* = 133)
Age (years), mean (SD)	81.5 (7.0)	82.7 (6.8)
Sex (male), *n* (%)	38 (29.0)	47 (35.3)
Country of origin (Netherlands), *n* (%)	128 (97.7)	128 (96.2)
Educational level, *n* (%)[a]		
Low	85 (64.9)	93 (69.9)
Intermediate	33 (25.2)	31 (23.3)
High	13 (9.9)	9 (6.8)
Marital status, *n* (%)		
Single	7 (5.3)	8 (6.0)
Married	41 (31.3)	29 (21.8)
Divorced	13 (9.9)	8(6.0)
Widowed	70 (53.4)	88 (66.2)
Living situation (living alone), *n* (%)	86 (65.6)	97 (72.9)
Disability (18–72), mean (SD)[b]	41.6 (10.6)	41.7 (10.6)
Duration of homecare received (years)	5.4 (5.4)	5.8 (5.4)

Note. n: sample size; SD: standard deviation.

[a] Low: Low vocational or advanced elementary education; Intermediate: Intermediate vocational or higher secondary education; High: Higher vocational education or university.

[b] Underlined score indicates the most favorable score.

Of all participants, 92.8% (*n* = 245; 120 control, 125 intervention) had ≥1 valid accelerometer wear day and were included in the base-case analyses (on average, participants had 7.0 ± 1.7 valid wear days, with an average daily wake/wear time of 1,056.4 ± 191.0 minutes (17.6 ± 3.2 hours)). Complete data for societal costs and QALYs were obtained from 78.4% (*n* = 192; 95 control, 97 intervention); complete data for sedentary time were obtained from 70.6% (*n* = 173; 87 control, 86 intervention).

Costs

The cost of the intervention was estimated at €625/participant in the intervention group (Appendix 2). Total societal costs were €22,469 per participant in the intervention (intervention costs included) compared to €20,254 per participant in the control group (Table 2). There were no statistically significant differences between the study groups for total societal costs and most cost categories, except for lower for domestic support costs in the intervention group adjusted mean difference: β € -173 [95% CI -299, -50]).

Table 2. Mean (95% CI) costs (€) of healthcare utilization per participant in the control and intervention group, and adjusted mean cost differences between study groups for the within-trial period (12 months) (estimates obtained after imputation).

Cost category	Control group (*n* = 120)	Intervention group (*n* = 125)	Adjusted mean difference
	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)[a]
Intervention costs	0 (0)	625 (0)	625 (0)
Healthcare costs	15,369 (12,724, 18,035)	16,779 (14,191, 19,607)	1,442 (-878, 3,918)
Primary care			
General practitioner	279 (211, 349)	300 (232, 371)	21 (-45, 81)
Physiotherapist	1,178 (895, 1,491)	1,261 (966, 1,533)	84 (-109, 271)
Hospital care			
Emergency room	114 (59, 168)	124 (85, 167)	9 (-47, 71)
Ambulance	239 (121, 341)	260 (164, 369)	21 (-94, 145)
Outpatient hospital care	413 (271, 578)	521 (288, 739)	108 (-47, 242)
Inpatient hospital care	2,084 (898, 3,208)	2,851 (1,594, 4,119)	766 (-452, 2,069)
Long-term care			
Nursing care at home	1,404 (999, 1,857)	1,616 (1,180, 2,082)	213 (-95, 506)
Personal care at home	5,699 (4,893, 6,516)	5,638 (4,875, 6,417)	-62 (-547, 399)
Domestic support at home	1,623 (1,408, 1,866)	1,449 (1,255, 1,673)	**-173 (-299, -50)**[*]
Day care	1,536 (621, 2,467)	1,586 (695, 2,691)	50 (-684, 795)
Inpatient care	949 (30, 2,023)	1,101 (0, 3,021)[b]	152 (-1,467, 1,771)
Patient and family costs	5,224 (4,260, 6,224)	6,064 (4,996, 7,133)	840 (-136, 1,795)
Total societal costs	20,254 (17,358, 23,306)	22,469 (19,390, 25,494)	2,216 (-459, 4,895)

Note. Costs are expressed in 2018 euros.

[a] Bootstrapped 95% confidence intervals (CIs).

[b] The lower 95% CI bound was below 0, and was therefore cut to 0.

[*] Significant difference between study groups ($P \leq 0.05$).

Volumes

Volumes of healthcare and informal care use were also comparable between groups, except for lower domestic support utilization in the intervention group (β: -7.8 h [95% CI -13.3, -2.3]) (Table 3). Observed estimates for costs and volumes (rather than imputed estimates) are tabulated in Appendix 3 and 4, respectively.

Table 3. Mean (95% CI) volumes of healthcare utilization per participant in the control and intervention group, and adjusted mean volume differences between study groups for the within-trial period (12 months) (estimates obtained after imputation).

Healthcare category (volume)	Control group (n = 120)	Intervention group (n = 125)	Adjusted mean difference
	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)[a]
Primary care			
General practitioner (visit)	8.2 (6.1, 10.2)	8.8 (6.8, 10.9)	0.6 (-1.3, 2.5)
Physiotherapist (visit)	34.3 (26.5, 42.8)	37.0 (28.1, 45.1)	2.6 (-3.3, 8.5)
Hospital care			
Emergency room (visit)	0.4 (0.0, 1.0)[b]	0.5 (0.0, 0.9)	0.0 (-0.5, 0.5)
Ambulance (transport)	0.4 (0.0, 0.9)[b]	0.5 (0.0, 1.0)[b]	0.0 (-0.4, 0.5)
Outpatient hospital care (visit)	4.3 (2.7, 6.2)	5.6 (3.0, 8.0)	1.2 (-0.5, 2.8)
Inpatient hospital care (day)	4.2 (1.6, 6.5)	5.7 (3.3, 8.3)	1.5 (-1.2, 4.2)
Long-term care			
Nursing care at home (hour)	18.5 (13.5, 24.2)	21.5 (15.9, 27.2)	3.0 (-0.9, 6.3)
Personal care at home (hour)	109.9 (95.5, 126.4)	109.1 (94.0, 125.7)	-0.7 (-9.7, 8.2)
Domestic support at home (hour)	71.9 (61.6, 82.2)	64.1 (53.8, 73.4)	**-7.8 (-13.3, -2.3)***
Day care (day)	11.8 (5.1, 18.9)	12.2 (5.6, 20.1)	0.4 (-4.5, 5.6)
Inpatient care (day)	6.1 (0.0, 11.3)[b]	6.2 (1.2, 11.7)	0.0 (-7.4, 8.0)
Informal care (hour)	357.9 (283.9, 427.9)	413.8 (332.3, 493.4)	55.8 (-14.0, 122.1)

[a] Bootstrapped 95% confidence intervals (CIs).

[b] The lower 95% CI bound was below 0, and was therefore cut to 0.

* Significant difference between study groups ($P \leq 0.05$).

Effects

Table 4 reports the effect outcomes in both study groups at baseline and twelve months, and the difference in effect outcomes between the groups over time. No differences were found for sedentary time and QALYs. More information on the effectiveness of 'Stay Active at Home' compared to usual care has been published elsewhere.[33]

Table 4. Mean (95% CI) effects for sedentary time, EQ-5D-5L values, and QALYs per participant in the control and intervention group at baseline, 6, and 12 months, and adjusted mean differences between study groups during the 12-month follow-up period (estimates obtained after imputation).

Effects	Time	Control group (*n* = 120)	Intervention group (*n* = 125)	Adjusted mean difference
	T	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
Sedentary behavior				
Sedentary time (daily minutes)	T0	803.1 (780.6, 825.6)	797.1 (775.9, 818.4)	4.8 (-26.4, 36.0)
	T2	798.4 (773.2, 823.5)	803.2 (778.1, 828.3)	
Sedentary time (% of wake/wear time)	T0	75.2 (74.1, 76.4)	75.3 (74.2, 76.4)	0.3 (-1.3, 2.0)
	T2	76.8 (75.6, 78.0)	77.1 (75.8, 78.4)	
Health-related quality of life				
EQ-5D-5L (Dutch tariff[46])	T0	0.58 (0.53, 0.63)	0.58 (0.53, 0.62)	
	T1	0.52 (0.47, 0.57)	0.54 (0.49, 0.60)	
	T2	0.57 (0.52, 0.62)	0.55 (0.49, 0.61)	
EQ-VAS	T0	63.7 (61.1, 66.3)	63.4 (60.8, 66.1)	
	T2	60.7 (57.5, 63.9)	63.7 (60.5, 66.9)	
QALY (EQ-5D-5L, Dutch tariff[46])	T2	0.55 (0.51, 0.59)	0.55 (0.51, 0.60)	0.01 (-0.03, 0.04)[a]

Note. Mean differences are adjusted for baseline age, sex, educational level, disability, and duration of homecare received (covariance structure: unstructured). Treatment: control group is reference. Time: baseline is reference. T0: Baseline; T1: 6 months; T2: 12 months; 95 CI: 95% confidence interval; QALY: quality-adjusted life years.

[a] Bootstrapped 95% confidence intervals (CIs).

Cost-effectiveness and cost-utility

For sedentary time expressed as daily minutes averted, most bootstrapped cost-effect pairs (74.2%) were situated in the northwest (NW) quadrant of the CE-plane (Table 5, Figure 1A). This suggests that the intervention was less effective and more costly than the control. The CEAC shows that the probability that the intervention was cost-effective compared to control ranged from 7.1 to 19.9%, depending on the (WTP) (€0–€50,000)/minute of sedentary time averted (Figure 1B). Similar findings were observed for sedentary time as proportion of wake/wear time averted (Figure 1C and 1D). For QALYs, most cost-effect pairs (95.6%) were in the northern quadrants of the CE-plane, roughly evenly distributed around the y-axis, indicating higher costs for the intervention compared to the control, but no clear difference in QALYs between groups (Figure 1E). The cost-utility was 5.9% at a WTP of €20,000/QALY gained (Figure 1F).

Sensitivity analysis

Sensitivity analyses were conducted for the healthcare perspective, complete cases, and participants without extreme cost outliers, respectively. Overall, the results of the sensitivity analyses did not differ substantially from those of the base-case analyses, although the probability of cost-effectiveness seemed to increase slightly (Table 5). Nevertheless, most cost-effect pairs still fell in the NW quadrant of the CE-planes (range 34.0–68.8%), and CEACs barely exceeded 30% regardless of the WTP and effect outcome chosen, indicating that the intervention was still dominated by control (Appendix 5).

Table 5. Differences in pooled mean incremental costs and effects (95% CIs), incremental cost-effectiveness ratios, and the distribution of incremental cost-effect pairs around the quadrant of the cost-effectiveness planes for the base-case and sensitivity analyses.

Outcome	*N*	Δ Costs, € (95% CI)[a]	Δ Effects (95% CI)	ICER	Distribution CE-plane (%)			
				€/effect gained	NE[b]	SE[c]	SW[d]	NW[e]
Base-case analysis (ITT – societal perspective)								
Sedentary time (daily minutes)	245	2,070 (-706, 4,633)	4.8 (-26.4, 36.0)	-189.4	18.7	1.2	5.9	74.2
Sedentary time (% of wake/wear time)	245	2,070 (-706, 4,633)	0.3 (-1.3, 2.0)	-4,383.9	20.9	1.7	5.4	72.0
QALY (EQ-5D-5L, Dutch tariff[46])	245	2,229 (-310, 5,008)	0.01 (-0.03, 0.04)[a]	589,415	40.5	1.5	2.9	55.1
Unadjusted analysis (ITT – societal perspective)								
Sedentary time (daily minutes)	245	3,067 (-17, 6,149)	-21.0 (-69.4, 27.4)	206.6	76.9	2.1	0.5	20.5
Sedentary time (% of wake/wear time)	245	3,067 (-17, 6,149)	-1.1 (-4.1, 1.9)	3,252.7	75.5	2.4	0.2	21.9
QALY (EQ-5D-5L, Dutch tariff[46])	245	3,049 (-69, 6,146)	-0.00 (-0.05, 0.05)[a]	-1,499,096	43.5	2.2	0.5	53.8
Sensitivity analysis 1 (ITT – healthcare perspective)								
Sedentary time (daily minutes)	245	1,334 (-1085, 3,616)	4.8 (-26.4, 36.0)	-122.1	17.3	2.6	11.7	68.4
Sedentary time (% of wake/wear time)	245	1,334 (-1085, 3,616)	0.3 (-1.3, 2.0)	-2,825.2	19.1	10.8	3.5	66.6
QALY (EQ-5D-5L, Dutch tariff[46])	245	1,494 (-934, 3,894)	0.01 (-0.03, 0.04)[a]	317,826	54.8	7.9	3.3	34.0
Sensitivity analysis 2 (CC – societal perspective)								
Sedentary time (daily minutes)	165	2,590 (-342, 5,560)	11.1 (-17.3, 39.5)	-272.2	28.6	3.5	1.7	66.2
Sedentary time (% of wake/wear time)	165	2,590 (-342, 5,560)	0.5 (-1.0, 2.0)	-5,290.7	28.1	1.9	3.3	66.7
QALY (EQ-5D-5L, Dutch tariff[46])	185	3,140 (522, 5,817)	0.01 (-0.04, 0.04)[a]	2,259,268	52.5	0.6	0.1	46.8
Sensitivity analysis 3 (no cost outliers – societal perspective)								
Sedentary time (daily minutes)	237	1,243 (-1,090, 3,762)	7.19 (-26.8, 41.2)	-101.4	16.6	12.0	3.3	68.1
Sedentary time (% of wake/wear time)	237	1,243 (-1,090, 3,762)	0.6 (-1.2, 2.4)	-2056.5	14.7	12.2	4.3	68.8
QALY (EQ-5D-5L, Dutch tariff[46])	237	1248 (-1,222, 3,551)	0.01 (-0.03, 0.04)	542,359	44.1	10.0	6.1	39.8

Note. Costs are expressed in 2018 euros. 95 CI: 95% confidence interval; ICER: Incremental cost-effectiveness ratio; CE-plane: Cost-effectiveness plane; NE: Northeast; SE: Southeast; NW: Northwest; SW: Southwest; ITT: Intention-to-treat; CC: Complete cases; QALY: Quality-adjusted life years.

[a] Bootstrapped 95% confidence intervals (CIs).

[b] NE refers to the northeast quadrant of the CE-plane, indicating that the intervention is more effective and more costly than control.

[c] SE refers to the southeast quadrant of the CE-plane, indicating that the intervention is more effective and less costly than control.

[d] SW refers to the southwest quadrant of the CE-plane, indicating that the intervention is less effective and less costly than control.

[e] NW refers to the northwest quadrant of the CE-plane, indicating that the intervention is less effective and more costly than control.

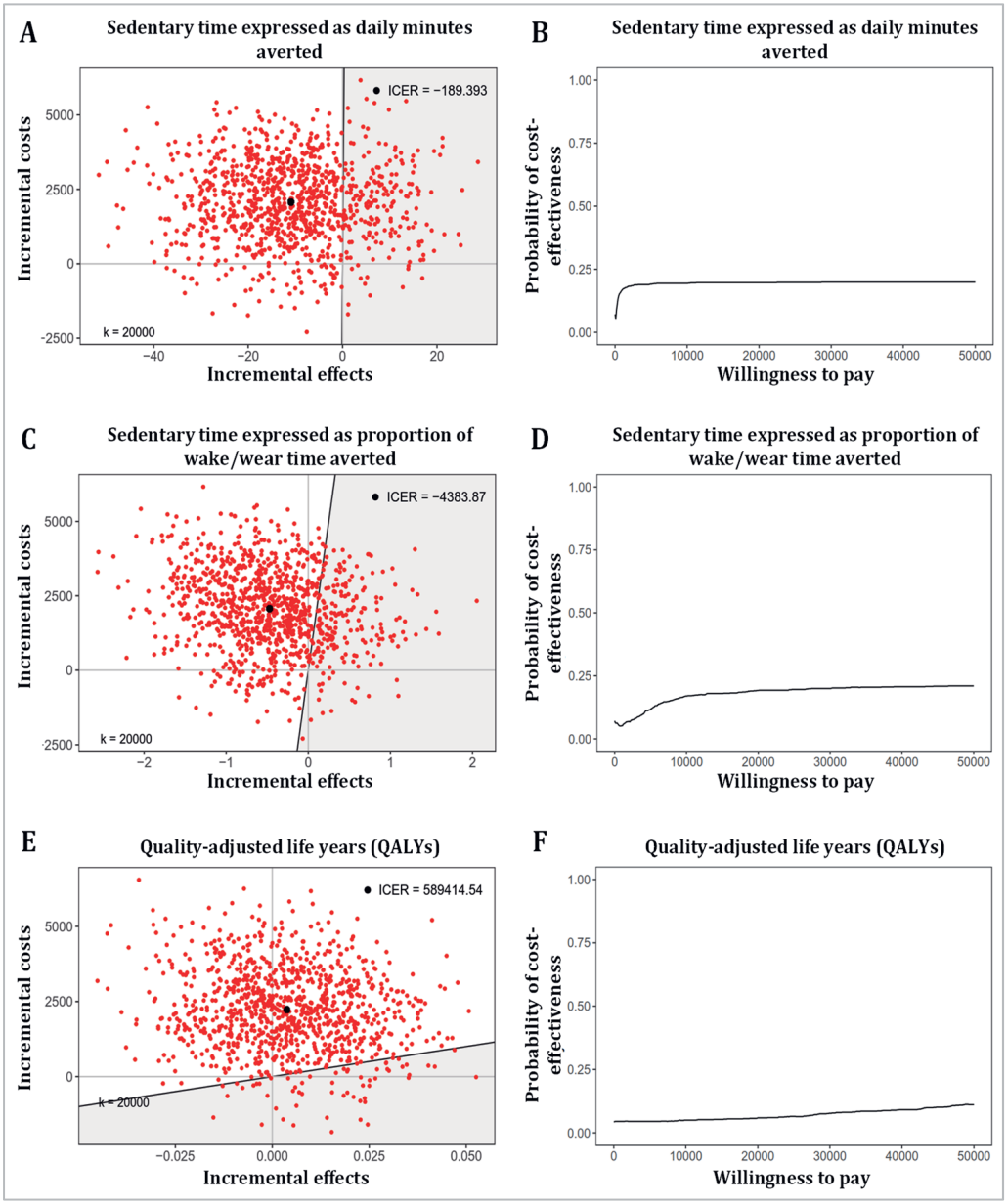

Figure 1. Cost-effectiveness planes (CE-planes) and cost-effectiveness acceptability curves (CEACs) for total societal costs and sedentary time expressed as daily minutes averted (Figure 1A and 1B), sedentary time expressed as proportion of wake/wear time averted (Figure 1C and 1D), and quality-adjusted life years (QALYs) (Figure 1E and 1F), respectively. The shaded area in the CE-planes correspond to the area such that points lying there indicate that the intervention is cost-effective compared to control based on a willingness to pay of €20,000/unit of effect gained. ● ICER point estimate; ● ICER bootstrapped estimate.

Discussion

The current study evaluated the cost-effectiveness and cost-utility of the 'Stay Active at Home' reablement training program for homecare staff compared to usual care in Dutch older adults receiving homecare from a societal perspective. The average societal cost per participant was €20,254 in the control group and €22,469 in the intervention group, including €625 for the intervention. No differences were observed between the study groups for societal costs, sedentary time, and QALYs. The probability that the intervention was cost-effective compared to the control ranged from 7.1% to 19.9%, depending on the WTP/minute of sedentary time averted. The cost-utility was 5.9% at a WTP of €20,000/QALY gained. In the sensitivity analyses from the healthcare perspective, for complete cases, and for participants without extreme cost outliers, the probability of cost-effectiveness and cost-utility increased slightly, but still did not exceed 30%. Therefore, 'Stay Active at Home' cannot be considered cost-effective compared to usual care in both the base-case and sensitivity analyses.

Interestingly, a statistically significant decrease in the use and cost of domestic support was observed in the intervention group compared to the control group but not in the other two categories directly targeted by the intervention (i.e., personal and nursing care). This may be explained by differences in the level of education and experience of domestic and nursing staff. In the Netherlands, domestic staff typically do not require a formal domestic qualification, are generally low educated, and receive little training.[30, 59, 60] Nursing staff, on the other hand, are generally higher educated and receive more training, with an increasing emphasis in recent years on promoting client activation and independence. The standard of Dutch personal and nursing care is therefore already at a relatively high level,[30, 59, 60] so there may be more to gain from domestic staff. Another interesting finding was that more than a quarter of all costs came from informal care. This is in line with previous research on reablement indicating that informal care was a large cost driver.[61] Since informal caregivers in general play a large role in the lives of, and care and support for, older adults, they may also fulfill a significant role in promoting the independence of older adults. This could argue for supplementing 'Stay Active at Home' with an intervention component for informal caregivers.[62]

In terms of costs, previous research on reablement often reported lower care use for reablement compared to usual care (e.g., less personal care use,[25] shorter homecare visits or episodes,[23, 24, 26] fewer emergency department visits,[23, 24] and fewer hospitalizations[24]). In addition, similar or lower home, health or social care costs were

often reported for reablement,[23-28] in contrast to the findings in the current study. This may be related to differences in intervention and population characteristics. While 'Stay Active at Home' was integrated into usual care, targeting older adults who had been receiving homecare for at least some time, previous research often focused on time-limited (usually up to 12 weeks) interventions for older adults who had recently experienced a health loss, had been discharged from hospital, or had recently been referred to homecare.[23-28] These latter groups may have greater potential for improvement and thus may benefit more from reablement, particularly in terms of care use and costs, as they generally require temporary rather than long-term support.[63]

In terms of effects, previous research on reablement has not yet examined sedentary behavior,[64] and uncertainty has often been reported about the effect on HRQoL.[18, 19] This may be explained by the use of generic outcome measures, such as the EQ-5D-5L, which do not account for benefits beyond health, such as well-being and independence, whereas these are important factors in older age.[65, 66] Although such outcome measures are often used in economic evaluations to compare the effects of different interventions for different health outcomes on a comparable scale, they may not be insensitive enough to capturing subtle changes in quality of life in older adults.[67, 68]

In terms of cost-effectiveness, a prospective longitudinal study evaluating different reablement services,[27] a small-scale trial,[26] and a systematic review on economic evaluations of social care interventions including reablement,[69] concluded that reablement was cost-effective compared to usual care for different WTP values and outcomes. Nevertheless, clear comparisons of economic evaluations is difficult for several reasons. First, studies differ in terms of interventions (e.g., content, intensity, duration, and delivery mode), participant groups (e.g., those receiving long-term versus acute care), and settings (e.g., homecare versus hospital care). Second, the type of economic evaluation, time horizon, analytic approach, and costs included differ across studies.[69] Third, the results must be interpreted in light of the national context, as healthcare systems and available resources vary across countries.[37]

This study has a several strengths. First, it was conducted alongside a c-RCT, reflecting a real-world situation and allowing for prospective data collection. Second, the study was conducted from a societal perspective, which is the broadest perspective and often advocated for use in evaluating publicly funded programs.[70] Third, it is one of the few full economic evaluations in the aged care sector conducted according to standard guidelines.[40, 70] Some limitations should also be noted. First, the cost data included retrospective questions over a 6-month period, which may have led to recall bias.

However, we assume that this bias is equally distributed across groups and thus will not affect differences between groups. Second, because some participants considered the baseline measurement too time-consuming, we shortened the follow-up measurements by removing the questions on visits to allied health professionals, except for visits to the physical therapist, which is the most commonly used allied health service among Dutch older adults.[71] We therefore expect that this led to only a small underestimation of healthcare costs. Third, a substantial amount of data was imputed due to dropout. Nonetheless, the results of the sensitivity analyses for participants with complete data yielded similar results to the base-case analyses. Fourth, we assumed in the imputation that data were missing at random and did not explore missing not at random departures. Fifth, the results cannot be generalized to other populations due to the use of two-level multivariable models in which working area was treated as fixed effect instead of nursing team as random effect. Lastly, the study period of one year is relatively short for an economic evaluation and for changing the behavior of both homecare staff and clients. Therefore, the long-term costs and effects are still unclear.

The current findings show that 'Stay Active at Home' was not cost-effective compared to usual care. Based on these and previous findings,[33] wider implementation of the training program in its current form cannot be recommended. Future studies should investigate how the training program could be improved. Possible suggestions for this are a stronger emphasis on the role of domestic staff and the addition of a component for informal caregivers. However, reablement is a relatively new approach and there is still debate about its conceptualization, operationalization, and measurement.[20, 72] This may explain the inconsistent findings across studies. To avoid suboptimal use of public investment, more high-quality research is needed to support or refute whether reablement is (cost-) effective.[69] First, research should provide more insight into how reablement is configured and operates in practice[20], and why it works, for whom, and under which conditions.[28] Second, research should provide recommendations for conducting and reporting economic evaluations in the field of reablement, and for standardized outcome measures that represent quality of life domains that are most important to older people.[66, 69, 70, 73]

Conclusion

The 'Stay Active at Home' reablement training program, which aimed to change the behavior of homecare staff from 'doing for' to 'doing with' older adults so that older adults would exhibit less sedentary behavior, did not improve outcomes or reduce costs

compared to usual care in a population of Dutch community-dwelling older adults who received homecare. Moreover, 'Stay Active at Home' was not cost-effective compared to usual care from a societal perspective after twelve months. Consequently, there is insufficient evidence to justify widespread implementation of the training program in its current form.

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Appendix 1: Healthcare utilization: Cost prices used (€).

Cost category	Volume	Cost price (€, 2018)[a]
Primary care		
General practitioner	Visit	34.00
Physiotherapist	Visit	34.00
Hospital care		
Emergency room	Visit	269.00
Ambulance	Transport	536.00
Outpatient medical services	Visit	91.00
Inpatient hospital care	Day	495.00
Long-term care		
Nursing care at home	Hour	76.00
Personal care at home	Hour	52.00
Domestic support at home	Hour	22.50
Daycare	Day	134.00[b]
Inpatient care	Day	168.00[c]
Informal care	Hour	14.57

[a] Dutch standard cost prices were used to value healthcare utilization.[41] All prices were presented in 2018 Euros, and if necessary indexed to the reference year using a consumer price index.

[b] Cost price for elderly daycare.

[c] Cost price for inpatient elderly care.

Appendix 2: Estimated intervention costs (€).

Cost category	*N*	Volume	Price/ Volume[a]	Costs		
				Subtotal	Total	Per Participant[b]
Labor costs	2	100 h	33.97	–	6,794	51.08
Training costs						
Nurse	23	20 h[c]	30.95	14,237		
Nurse assistant	34	20 h[c]	22.18	15,082		
Nurse aide	8	20 h[c]	19.76	3,162		
Domestic worker	89	16 h[d]	19.14	27,255		
Total				–	59,736	449.14
Material costs						
Program materials						
Program trainer	2	320 prints	0.25	160		
Nurse	23	120 prints	0.25	690		
Nurse assistant	34	120 prints	0.25	1,020		
Nurse aide	8	120 prints	0.25	240		
Domestic worker	89	40 prints	0.25	890		
Total				–	3,000	22.56
Use of role models	2	5 h	20.66	–	207	1.56
Use of professional actors	3	10 h	168.90	–	5,067	38.09
Travel costs						
Program trainer	2	12.5 h	33.97	849		
Nurse	23	1.75 h	30.95	1,246		
Nurse assistant	34	1.75 h	22.18	1,320		
Nurse aide	8	1.75 h	19.76	277		
Domestic worker	89	1.25 h	19.14	2,129		
Total				–	5,821	43.77
Accommodation costs	N/A	50 meetings	50.00[e]	–	2,500	18.80
Total intervention costs				**–**	83,125	625.00

[a] Gross hourly wages are requested from the healthcare organization.

[b] Costs only relate to intervention group participants (n = 133).

[c] Nurse, nurse assistants and nurse aides received 7 meetings, 6 practical assignments, and 20 weekly newsletters, with an average time investment of 9h, 6h, and 5h, respectively.

[d] Domestic workers received 5 meetings, 4 assignments, and 20 newsletters, with an average time investment of 7h, 4h and 5h, respectively.

[e] Only a small price was charged for accommodation assuming meetings take place at the care site itself with little or no costs.

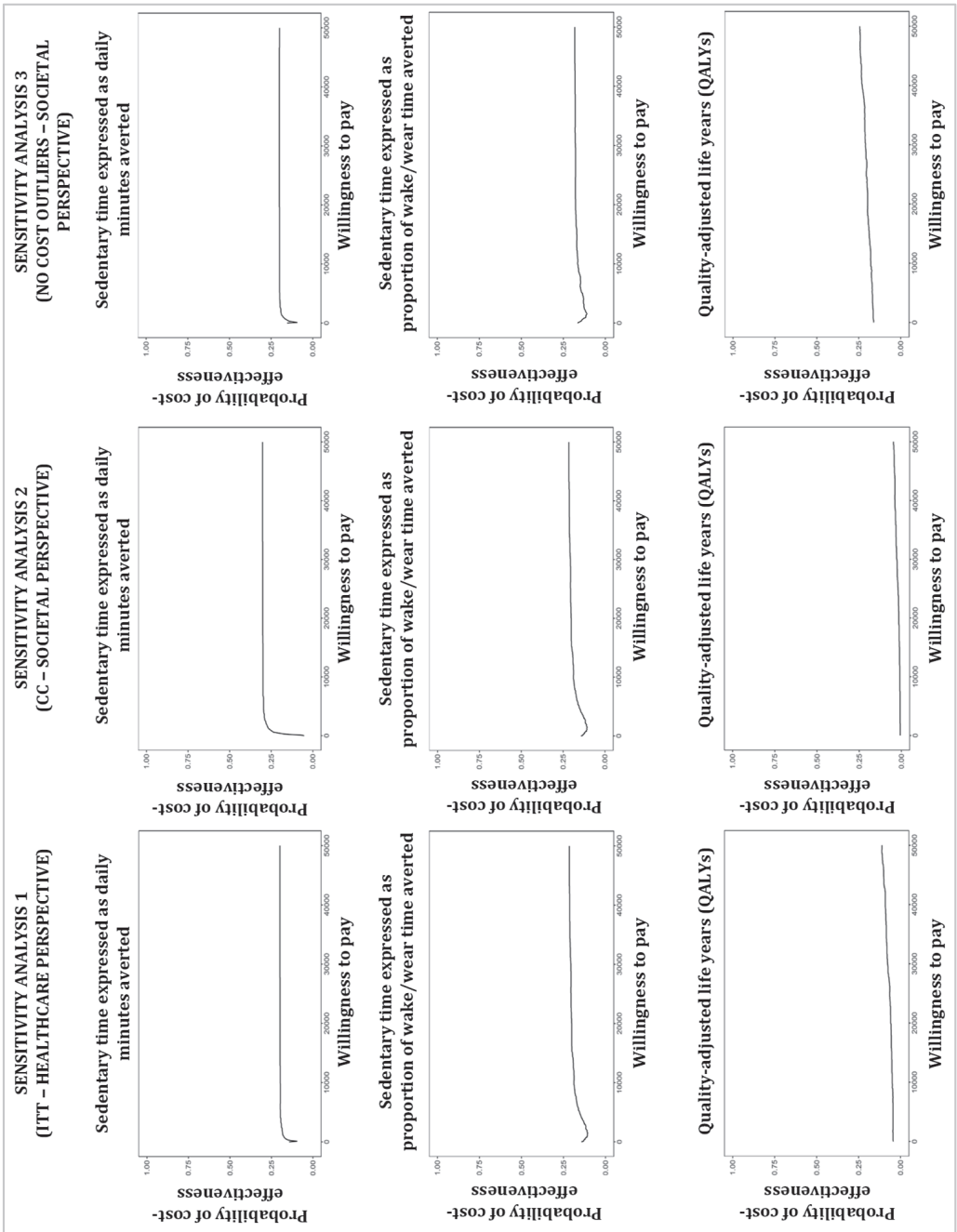
Appendix 3: Mean (SD) costs (€) of healthcare utilization per participant in the control and intervention group for the within-trial period (12 months) (observed estimates).

Cost category	Control group (*n* = 99)					Intervention group (*n* = 101)				
	Mean	(SD)	Median	Min	Max	Mean	(SD)	Median	Min	Max
Intervention costs	0	(0)	0	0	0	625	(0)	625	625	625
Healthcare costs	13,090	(10,779)	10,629	641	31,410	14,369	(11,579)	10,364	1,264	55,154
Primary care										
General practitioner	257	(296)	170	0	1,870	305	(466)	170	0	3,638
Physiotherapist	834	(1,162)	68	0	5,304	1,002	(1,221)	629	0	5,168
Hospital care										
Emergency room	92	(237)	0	0	1,614	117	(233)	0	0	1,345
Ambulance	168	(388)	0	0	2,144	191	(483)	0	0	3,216
Outpatient hospital care	278	(320)	182	0	1,456	425	(885)	182	0	8,281
Inpatient hospital care	1,370	(3,821)	0	0	23,265	2,318	(5,652)	0	0	38,115
Long-term care										
Nursing care at home	854	(1,616)	293	0	10,527	1,559	(3,340)	208	0	16,662
Personal care at home	5,465	(5,149)	3,976	0	28,933	4,629	(4,278)	3,285	0	21,535
Domestic support at home	1,488	(1,597)	1,350	0	5,940	1,780	(1,672)	1,575	0	7,003
Daycare	1,671	(4,908)	0	0	20,904	1,449	(4,414)	0	0	20,904
Inpatient care	630	(2,453)	0	0	15,120	595	(2,835)	0	0	26,040
Patient and family costs	4,651	(5,506)	2,683	0	31,410	4,696	(6,946)	1,705	0	30,621
Total costs	17,741	(12,180)	13,688	2189	63,953	19,691	(14,778)	14,703	1,889	67,598

Note. Costs are expressed in 2018 Euros.

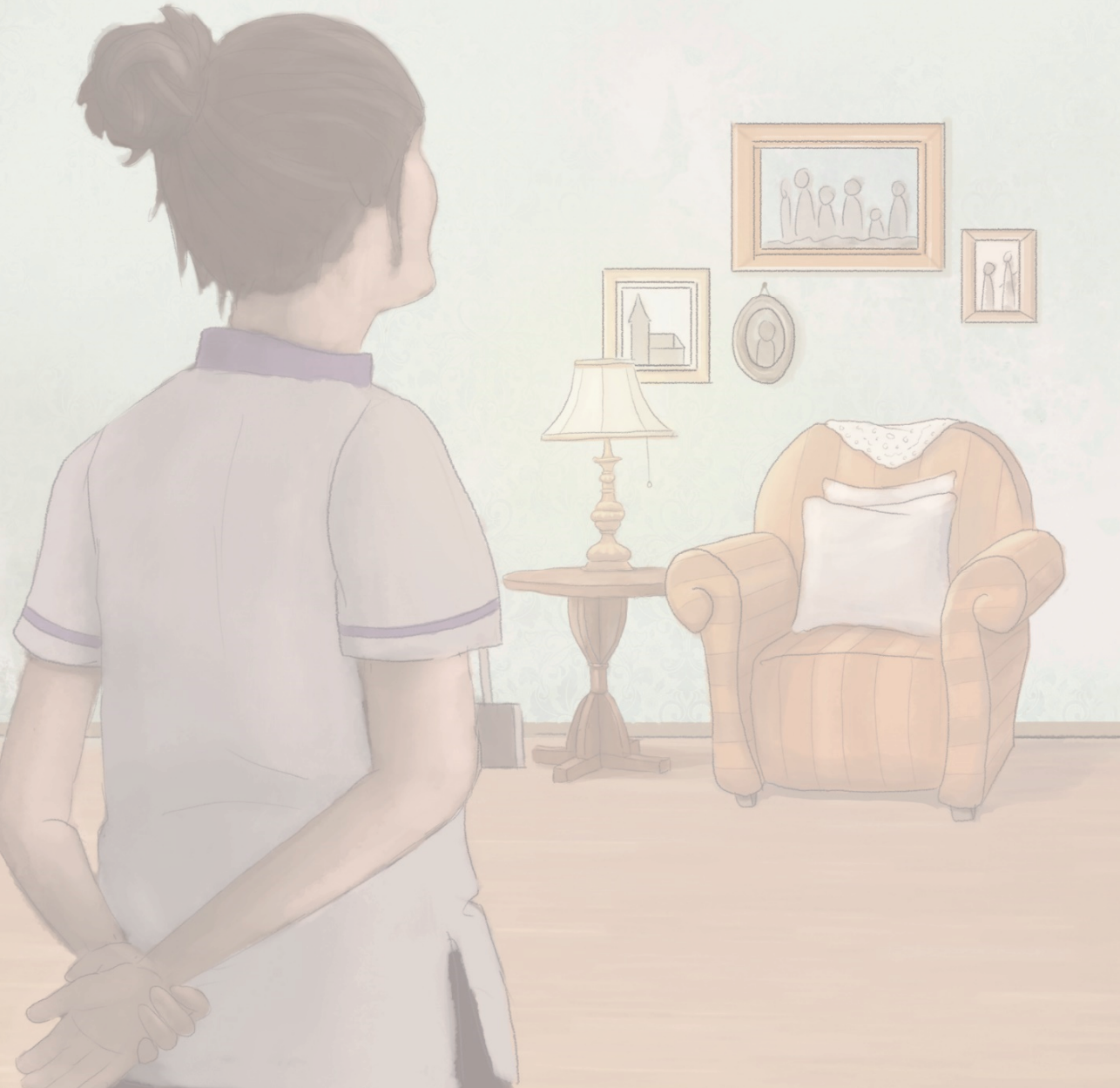
Appendix 4: Mean (SD) volumes of healthcare utilization per participant in the control and intervention group for the within-trial period (12 months) (observed estimates).

Healthcare category (volume)	Control group (*n* = 99)					Intervention group (*n* = 101)				
	Mean	(SD)	Median	Min	Max	Mean	(SD)	Median	Min	Max
Primary care										
General practitioner (visit)	7.6	(8.7)	5.0	0.0	55.0	9.0	(13.7)	5.0	0.0	107.0
Physiotherapist (visit)	24.5	(34.2)	2.0	0.0	156.0	29.5	(35.9)	18.5	0.0	152.0
Hospital care										
Emergency room (visit)	0.3	(0.9)	0.0	0.0	6.0	0.4	(0.9)	0.0	0.0	5.0
Ambulance (transport)	0.3	(0.7)	0.0	0.0	4.0	0.4	(0.9)	0.0	0.0	6.0
Outpatient hospital care (visit)	3.1	(3.5)	2.0	0.0	16.0	4.7	(9.7)	2.0	0.0	91.0
Inpatient hospital care (day)	2.8	(7.7)	0.0	0.0	47.0	4.7	(11.4)	0.0	0.0	77.0
Long-term care										
Nursing care at home (hour)	11.2	(21.3)	3.9	0.0	138.5	20.5	(43.9)	2.7	0.0	219.2
Personal care at home (hour)	105.1	(99.0)	76.5	0.0	556.4	89.0	(82.3)	63.2	0.0	414.1
Domestic support at home (hour)	66.2	(71.0)	60.0	0.0	264.0	79.1	(74.3)	70.0	0.0	311.3
Daycare (day)	12.5	(36.6)	0.0	0.0	156.0	10.8	(32.9)	0.0	0.0	156.0
Inpatient care (day)	3.7	(14.6)	0.0	0.0	90.0	3.5	(16.9)	0.0	0.0	155.0
Informal care (hour)	319.2	(377.9)	184.2	0.0	2155.8	322.3	(476.8)	117.0	0.0	2101.7



Appendix 5: Cost-effectiveness acceptability curves for total costs and sedentary time expressed as daily minutes averted, sedentary time expressed as proportion of wake/wear time averted, and quality-adjusted life years (QALYs), respectively, for sensitivity analyses from the healthcare perspective, complete cases, and participants without extreme cost outliers. ITT: intention-to-treat; CC: complete cases.

CHAPTER 7



General discussion

Teuni H. Rooijackers

The aim of this thesis was to evaluate 'Stay Active at Home', a reablement training program for homecare staff. 'Stay Active at Home' aims to change the behavior of homecare staff towards increasing older adults' participation in daily and physical activities and reducing their sedentary behavior, in order to support older adults to continue living at home as independently as possible. The underlying principle is that by equipping staff with knowledge, attitude, and skills on reablement and by providing social and organizational support, staff will be guided to implement reablement in the daily practice of Dutch homecare. The objectives were:

- to evaluate the implementation, potential mechanisms of impact, and context of 'Stay Active at Home' (*process evaluation*);
- to evaluate the effectiveness of 'Stay Active at Home' with respect to client outcomes (*effect evaluation at client level*);
- to evaluate the effectiveness of 'Stay Active at Home' with respect to staff outcomes (*effect evaluation at staff level*);
- to evaluate the cost-effectiveness and cost-utility of 'Stay Active at Home' (*economic evaluation*).

Several studies have been conducted with respect to these objectives, as presented in Chapters 2 through 6. The current chapter provides an overview and discussion of these studies. First, the main findings are described. Next, some methodological and theoretical considerations are discussed. Lastly, implications for practice and future research are presented, as well as some general conclusions.

Main findings

To evaluate the 'Stay Active at Home' reablement training program, a 1-year cluster randomized controlled trial was conducted among ten Dutch homecare nursing teams from five working areas in the south of the Netherlands. A total of 264 older adults and 313 staff participated. Staff in the intervention group received the 9-month reablement training program, consisting of program meetings, practical assignments, and periodic newsletters. Staff in the control group received no training and delivered care as usual.

First, a process evaluation was conducted among intervention group staff and program trainers (Chapter 3). The intervention was implemented largely as planned. On average, staff attended 73.4% of the program meetings, conducted 56.7% of the practical assignments, and consulted 56.6% of the weekly newsletters. Staff were generally satisfied with the training program, particularly appreciating the practical elements

and team approach. They experienced positive changes in their knowledge of and attitude toward reablement, learned new skills or further developed existing skills, and perceived social and organizational support from colleagues and team managers. However, the extent to which they implemented reablement in practice varied. Perceived contextual facilitators (e.g., digital care plans) and barriers (e.g., resistance to change from older adults or their social network) seemed to play a role in this.

Second, a client-level effect evaluation was conducted (Chapter 4). Mixed-effects linear and logistic regression showed no statistically significant differences between the intervention group and control group for the primary outcome (sedentary behavior) and most secondary outcomes (daily functioning, psychological functioning, and falls). Only a small effect to the detriment of the intervention group was found for physical functioning. A subgroup analysis by working area identified an effect in favor of the intervention group for daily functioning in instrumental activities of daily living in one working area. The was the working area that was most adherent to attending program meetings and consulting weekly newsletters. A subgroup analysis by median disability showed no differences between the study groups for vector magnitude activity counts. No three-way interactions were observed for treatment, time and the other a-priori defined covariates (i.e., age, sex, education, and duration of homecare received), and therefore no subgroup analyses based on these covariates were conducted.

Third, an effect evaluation was conducted at the staff level (Chapter 5). There were no statistically significant differences between the study groups in staff self-efficacy and outcome expectations regarding client activation as potential precursors to staff behavior change. A sensitivity analysis that compared intervention group staff with ≥50% compliance to the program meetings with the control group showed an effect in favor of the intervention group for self-efficacy, but not for outcome expectations.

Fourth, an economic evaluation showed no statistically significant differences between the study groups for quality-adjusted life years (QALYs), healthcare utilization, societal costs, and most cost categories. However, lower domestic support use and costs were observed in the intervention group (Chapter 6). The average societal costs over the trial period (12 months) were €22,469 in the intervention group (including intervention costs) compared with €20,254 in the control group. The probability that 'Stay Active at Home' was cost-effective compared to usual care did not exceed 20%, regardless of the willingness to pay (€0–€50,000) and the effect outcome chosen.

Methodological considerations

Since all studies may be prone to bias, reflection on their methodological considerations is warranted to facilitate interpretation and comparison of findings. The specific methodological considerations of all studies in this thesis have been discussed in the previous chapters. This section focuses on some general considerations regarding the study population, the evaluation of complex interventions, and the primary outcome.

Study population

'Stay Active at Home' was inspired by international reablement research,[1-5] but adapted to the Dutch homecare context.[6] To fit this context, 'Stay Active at Home' was integrated into usual long-term care and offered to a fairly general population of older adults who received homecare services and met the inclusion criteria.[7] Accordingly, the study population included a variety of older adults in terms of: disability, homecare needs (i.e., personal care, nursing care, and/ or domestic support), and duration of homecare received prior to the trial period (Chapter 4).[8] Nonetheless, all were already receiving care and support for a period of time at the start of the study.

It is possible that the chosen study population explains the lack of effectiveness of 'Stay Active at Home' at the client level.[8] First, older adults were included who had been accustomed to traditional homecare for at least some time. Since changing habitual patterns of physical inactivity is quite difficult,[9] habituation to staff practices in which activities were often taken over may have deterred older adults from changing their behavior. This was also felt to be the case by homecare staff, who found it easier to encourage newly referred clients to homecare, since they had no experience with the old system of service delivery (Chapter 3).[10] Second, the demand for care and support is increasing and needs have become increasingly complex in recent years. As a result, in the current system, care and support is provided primarily to older adults with needs that cannot be met in any other way, such as through support from the older adults' social network. This may mean that older adults with relatively high levels of dependency were included in the study, for whom it is unknown to what extent their activity, functioning, and independence can still substantially improve.

Although reablement is considered an inclusive approach irrespective of age, capacity, diagnosis, or setting,[11] most reablement studies so far have focused primarily on older adults at the beginning of their homecare journey, often after an acute illness, temporary functional decline, or hospitalization.[12, 13] Their condition may be more likely to be reversible, i.e., to return to previous levels of functioning, compared with

older adults receiving long-term care.[12] In addition, according to Cochrane et al. (2016), people with chronic illnesses, terminal diseases or dementia are predominantly excluded from reablement approaches because, in their view, these people have no potential to benefit from reablement.[14] Nevertheless, to date, there is no convincing evidence regarding the most promising target groups of reablement.[14] The data in this thesis also provided insufficient insight into this.[8] Thus, more research among different target groups would be valuable to determine whether certain groups are more likely to benefit from reablement than others. This would also require further research or a critical evaluation of the intervention to fit the needs and wishes of the target groups.

Evaluating the implementation of complex home-based interventions

Behavior change interventions, such as 'Stay Active at Home', are generally complex in nature and therefore difficult to evaluate.[15, 16] The evaluation of 'Stay Active at Home' was further complicated by the homecare context in which the training program was implemented. Homecare staff mainly visit clients individually at home, which makes it particularly difficult to evaluate implementation, i.e., the extent to which the intervention was implemented in practice as planned. Recognizing this complexity, considerable effort was put into a comprehensive process evaluation, using a mixed-methods design and collecting data from different sources. Although staff were generally satisfied with 'Stay Active at Home' and considered it useful in daily practice (Chapter 3),[10] no differences were observed between the study groups in staff self-efficacy and outcome expectations regarding client activation, as precursors to staff behavior change (Chapter 5).[17] Given the lack of effects on outcomes for both staff and clients,[8, 17] no substantial behavior change may have occurred among staff. However, since it remained unclear to some extent what happened in practice, i.e., during the delivery of the intervention in the clients' homes, this cannot be said with certainty.

To further unravel the black box of the intervention, we discussed and/ or explored other methodologies, but these were not feasible in clients' homes (i.e., video or audio observations), lacked consistency in reporting making systematic analysis difficult (i.e., clients' care plans) or provided few new insights during the earlier pilot study and early trial (i.e., interviews with clients).[6, 18] Nonetheless, a process evaluation of a nurse-led in-home cognitive behavioral program to manage fear of falling in frail older adults used audio recordings to compare self-reported adherence with actual adherence.[19] Substantial differences were found, with self-reported adherence being much higher.[19] In this regard, it is possible that staff who participated in 'Stay Active at Home' adhered less to the protocol than they reported in the focus group interviews.

Quality assessment tools, such as the tracer methodology,[20] can potentially provide deeper insight into the implementation of this type of intervention. This methodology uses information from the healthcare organization to 'trace' the experience of care or support for a set of clients through the organization's entire service delivery process.[20] Objective information is gathered mainly by walking with staff as they provide care or support from assessing clients' needs to setting and evaluating goals and action plans with clients. Through observation, discussion, interaction and questioning, tracers allow for evaluation of how working practices are implemented and how they relate to guidelines or protocols.[20, 21] Tracers could therefore form a valuable complement to process evaluations of complex home-based interventions. In addition, tracers can help to ensure continuous learning in the workplace because identified deviations from guidelines or protocols can be discussed with staff on site, creating an action-reflection-action method of learning.[20, 21] This could also add value to the training program.

Suitability of the primary outcome

For the client-level evaluation of 'Stay Active at Home', generic outcomes were used: sedentary behavior, daily, physical, and psychological functioning, and falls. All outcomes were measured with valid and reliable outcome measures.[22-25] Sedentary behavior was chosen as the primary outcome because it was assumed that client activation by staff would lead to an increase in older adults' daily and physical activities, and thus a decrease in sedentary behavior, before change in functioning would occur. Accelerometers allowed us to objectively capture the full range of activities of older adults throughout the day and to detect small differences in activity levels, and were therefore considered appropriate as an outcome measure. Nevertheless, reablement is primarily aimed at maintaining or improving the (functional) independence of older adults.[26] This can also be achieved sedentarily, for example, by having older adults put on compression stockings themselves while sitting on a chair or doing the dishes while sitting on a walker. While this would improve their activity level, it may not be demonstrable with an instrument that measures sedentary behavior.

In retrospect, the focus on sedentary behavior may have been too one-sided, although the evaluation did not find convincing evidence for the secondary outcomes either. Reablement is characterized by person-centered, holistic and goal-oriented services. The clients' goals are central to the service delivery,[14, 27] and therefore may go beyond the physical realm, i.e., sedentary behavior. Furthermore, because the goals set may be diverse in nature anyway, this generally complicates the assessment of the effects of reablement approaches, especially with standardized outcomes measures. An

alternative is to use goal-setting instruments to identify and monitor outcomes that older adults themselves have prioritized,[28] such as the Canadian Occupational Performance Measure used in a Norwegian RCT.[29] This approach fits well with the ethos of reablement and is common in the field of rehabilitation.[30] Moreover, it can be considered a more proximal outcome measure that can help provide greater insight into intervention change processes. However, the use of such an outcome measure is only possible if services have the capacity to integrate it into their routine practice or if evaluations are sufficiently resourced to incorporate it.

Theoretical considerations

This section presents some theoretical considerations of this thesis regarding the rationale and content of 'Stay Active at Home' in comparison to other reablement approaches, the complexity of changing the behavior of homecare staff, and the possible need for system changes in healthcare to implement reablement.

'Stay Active at Home': Rationale and content

'Stay Active at Home' was systematically developed based on international research on reablement in co-creation with international experts in the field of reablement and function-focused care and a Dutch group of relevant stakeholders (i.e., older adults, homecare staff, allied health professionals, training officers, managers and board of directors, and policy makers).[1-5] Subsequently, 'Stay Active at Home' was tested in a pilot study and an early trial,[6, 18] after which minor adjustments were made to the training program, before conducting the cluster randomized controlled trial evaluated in this thesis.[7] Despite its careful development and the mostly positive outcomes of both the pilot studies and the process evaluation alongside the c-RCT,[6, 10, 18] the training program was not effective at the level of clients and staff and not cost-effective.[8, 17, 31]

Possible explanations for the lack of beneficial effects may have to do with the rationale and content of 'Stay Active at Home'. Homecare according to the principals of 'Stay Active at Home' consists of multiple visits (intensive), is tailored to older adults' capabilities (person-centered), takes into account the different needs of older adults (holistic), and includes nursing and domestic staff (interdisciplinary). This is largely consistent with the characteristics agreed upon in a recent Delphi study on reablement, namely that services should be intensive, person-centered, holistic, interdisciplinary, and coordinated.[11] However, interdisciplinarity in 'Stay Active at Home' was limited compared to other reablement approaches that often also involve occupational

therapists, physical therapists or social workers.[32, 33] Despite the current lack of evidence on the optimal composition of reablement teams, a comprehensive review on reablement suggests that an interdisciplinary approach in which different professional groups work closely together across roles is essential to the success of future research efforts in reablement.[34] Thus, incorporating interdisciplinarity to a greater extent in the 'Stay Active at Home' program could potentially improve its effectiveness.

Furthermore, with respect to coordination, district nurses were expected to assess older adults' needs, develop care plans with SMART goals, and coordinate and supervise service delivery. However, they were not given explicit coordinating roles or specific assessment forms and goal-setting instruments to guide them in the implementation. Establishing clear roles and responsibilities and working with structured implementation plans that describe what needs to be done and by whom, are key principles in change management,[35] and could potentially benefit the implementation of 'Stay Active at Home'. To date, however, there is little scientific knowledge about the roles and responsibilities of different professionals in the context of reablement[32] and how planning and goal setting should be applied and can affect outcomes.[36]

Moreover, the social network can play an important role in promoting independence in older adults,[37] and has also been shown to be vital to the success of reablement.[38] Older adults receiving reablement services need to be motivated to achieve agreed-upon goals in order to increase their independence. If older adults live with or have frequent contact with their social network, such as family and friends, these people can help to motivate and stimulate older adults.[38] Although the training program focused on the involvement of the social network, the process evaluation showed that this needs further attention. For instance, it was found that the social network itself may also exhibit resistance to change, and therefore needs to be motivated as well (Chapter 3). This, along with the large role that informal caregivers play in the care and support of older adults, as shown in the economic evaluation (Chapter 6),[31] would argue for a systems approach to training that involves multiple levels of influence.[39, 40]

Changing staff behavior: One size does NOT fit all

'Stay Active at Home' has incorporated sources of the self-efficacy theory to facilitate behavior change among staff.[41, 42] The self-efficacy theory is widely used in function-focused care research, which is largely similar to the approach of reablement, but has its origins in institutionalized care.[43-46] This theory explains behavior as the result of one's perceived self-efficacy and outcome expectations.[41, 42] Four underlying sources

are believed to influence these expectations: enactive attainment, vicarious experience, verbal persuasion, and psychological feedback.[47] Strategies related to these sources can be recognized in 'Stay Active at Home' such as performing skills during interactive teaching methods (enactive attainment) and observing appropriate role models perform skills (vicarious experience). Yet the individual sources may not have been embedded strongly or systematically enough to facilitate change, as the training program was not built from theory. It is possible that developing the training program from a theoretical framework could increase its effectiveness.[48-50] To date, however, little is known about the theories by which reablement might achieve its intended outcomes[51-53] and little use is made of theories in reablement interventions.[51, 53]

Complementary to the importance of using theory-informed behavior change interventions, individual differences may also play a key role in facilitating the desired behavior change. The process evaluation found that there was variation among staff in the extent to which they actively participated in the program meetings and were motivated to implement reablement in practice (Chapter 3).[10] Viewed from the transtheoretical model of change (stages of change model),[54, 55] this may imply that staff were likely in different stages of behavior change. This model states that individuals go through different stages when changing behavior. For each stage, different intervention strategies are most effective in moving the individual to the next stage of behavior change.[56] A simplified version of the transtheoretical model of behavior change was incorporated in 'Stay Active at Home', in which two behavior change phases for clients were distinguished, each with its own staff strategies to active clients. Yet, 'Stay Active at Home' did not account for variation among staff themselves and did not consider their stage of behavior change. As a result, the training strategies may not always have been tailored to the needs and wishes of staff to successfully go to the next stage.[56, 57]

In order to plan learning experiences tailored to individual needs, it seems essential to understand what people already know about the topic and to assess what stage of change they are at prior to training.[56, 58] This so-called 'prior learning assessment' determines what should be taught and whether easier or more challenging learning opportunities are needed. When training homecare staff, this may mean offering differentiated training strategies to meet staff entry levels and providing them with challenging, appropriate opportunities to achieve success in changing and sustaining their new behavior.[57] In this regard, the process evaluation found that staff preferred practice-oriented strategies during training and coaching on the job.[10] This is consistent

with research on effective training strategies.[59, 60] Thus, the inclusion of these strategies would likely improve the implementation and outcomes of 'Stay Active at Home'.

Systems change for the implementation of reablement

'Stay Active at Home' aimed to integrate reablement into the current Dutch homecare system. Accordingly, the training program was developed in close collaboration with practice to fit into existing structures and processes, to maximize acceptability, feasibility and usability in practice and minimize disruption. Although this may have facilitated implementation, the contrast between 'Stay Active at Home' and usual care may have been too small to bring about substantial change. In addition, care and support in the Netherlands is of a relatively high standard,[61, 62] which is likely to lead to smaller changes in outcomes when efforts are made to improve services. These explanations also applied to, for example, a nurse-led self-management program that has been evaluated in many different healthcare settings worldwide: effects had been found in numerous studies in different countries, but were lacking in a Dutch study.[63]

To bring about the necessary change given the challenges in healthcare and to maximize the potential of reablement interventions, a shift is needed from a healthcare paradigm focused on illness and disease to one based on health defined in terms of resilience and the ability to adapt and self-manage.[38, 64] This is likely to require disruption rather than adaptation to the system.[65, 66] In other words, a cultural and behavioral change in care, not only of homecare staff, but of the entire health system.[67-69] Potentially valuable examples in this regard include developing structures and practices toward prevention and integrated care and support,[70] innovative forms of funding that provide the right incentives to promote client activation and independence (e.g., case-mix based prospective payment rather than fee-for-service payment),[71] and collaboration of health and social care professionals.[72] Such system changes align with the philosophy of reablement and could potentially facilitate the development and implementation of reablement interventions (e.g., strengthening interdisciplinarity). Consequently, it can be expected that the implementation of 'Stay Active at Home' or other reablement interventions in the current system could lead to only minor changes, but that in combination with other system changes, greater changes could be achieved. National and regional experiments aimed at testing such system changes and evaluating reablement interventions in a context of system changes would therefore be valuable in providing insight into their potential added value for the Dutch healthcare system.

Future directions

This thesis resulted in several implications for practice and research, as discussed in this section.

Practice

'Stay Active at Home' aims to change the behavior of homecare staff from 'doing for' older adults to 'doing with' them, in order to support older adults to continue living at home as independently as possible. This line of thinking is consistent with recent Dutch policy initiatives aimed at empowering older adults to take control of their own health and actively participate in their own care and support. Although the process evaluation showed a mostly positive picture,[10] 'Stay Active at Home' was neither effective at the level of clients and staff nor cost effective.[8, 17, 31] As a result, there is insufficient evidence to justify widespread implementation of the training program in its current form. Nevertheless, 'Stay Active at Home' is one of the first reablement initiatives in the Netherlands and one of the few reablement training programs that has been extensively evaluated worldwide. In this respect, the findings of this research and the suggested potential improvements are valuable for the further development of the practice field.

This thesis has suggested potential improvements in several areas. Examples include changes in the target population (i.e., focus on those with greater improvement potential); intervention (e.g., adding interactive teaching methods and coaching on the job); implementation (e.g., more interdisciplinarity, clarifying staff roles and responsibilities, use of goal setting instruments); mechanisms of impact (e.g., better understanding of staff behavior change needs); and context (e.g., active involvement of multiple levels of influence in the training program). These suggestions may optimize 'Stay Active at Home' and inform the development of new training programs and interventions in the field of reablement. Since existing initiatives within long-term care for older adults suggest that close, intensive collaboration is key to the success of implementing innovations,[73, 74] developments ideally take place in co-creation with relevant stakeholders at various levels (e.g., practice, research, education, and policy).

Given the challenges in healthcare, it remains of general interest for healthcare organizations to promote the activity, functioning, and independence of older adults whenever possible. Among other things, this practice requires various staff skills, including conversational skills and goal-setting. Healthcare organizations can support staff in this effort by promoting a stimulating working environment. This may include, for example, opportunities to learn skills, ideally through interactive teaching methods

and possibly coaching on the job, and time to collaborate and share practice experiences (including with other professions). Given this paradigm shift in culture and behavior in homecare, it would be beneficial to support homecare staff and allied health professionals in this change as early as possible, ideally starting in education.

Research

Although reablement may just seem the right thing to do[26] and has been introduced and promoted internationally,[75] there is still considerable variation in its conceptualization and operationalization.[11] Moreover, little is still known about the implementation of promising characteristics and components of reablement due to a lack of descriptions of reablement interventions and staff training programs.[75,76] This, together with the fact that many intervention studies today are of insufficient methodological quality, affects the ability to systematically evaluate reablement approaches, compare and synthesize findings from different studies, and develop robust evidence.[11] Therefore, the potential added value of reablement cannot be supported or refuted until more robust evidence becomes available.[14] Several specific areas would benefit from further research.

First, it is currently unclear for which target groups reablement may be potentially beneficial.[11] More research among different target groups would therefore be valuable to determine whether certain groups are more likely to benefit from reablement than others. 'Stay Active at Home' focused on a fairly general population of older adults receiving homecare. It is possible that the lack of client-level effects can be explained by the relatively high levels of dependency of this group. It would therefore be interesting to explore the potential for reablement in other target groups, including newly referred clients to homecare and clients receiving short-term care, as their condition may be more likely to be reversible. This would also fit well with the shift that reablement aims at from a reactive to a more preventive and proactive model of care and support.

Second, the lack of information on reablement interventions and training programs makes it is complex to determine how promising characteristics and components of reablement can best be implemented in practice.[76] Intervention protocols and process evaluations can provide deeper insights into the implementation of promising features of reablement (e.g., assessment, goal-setting, and action-planning, professional collaboration, and involvement of social network). These insights will lead to a better understanding of change processes, help explain the potential (cost-) effectiveness of reablement studies, improve the comparability of findings across studies, and inform the development of new reablement training programs and interventions.

Third, to date there is no uniform set of outcome measures for reablement. Systematic reviews on reablement show some consistency in the most commonly used outcomes: daily functioning, physical functioning, and quality of life, although assessed using a variety of measures, not all of which are standardized.[4, 12, 14, 74, 76-79] There is a need to further explore which outcome measures and assessment tools are most appropriate for measuring meaningful changes in staff and older adults as a result of reablement, including alternative approaches such as goal-setting instruments.

Conclusions

The studies in this thesis evaluated 'Stay Active at Home', a reablement training program for homecare staff. 'Stay Active at Home' aimed to change the behavior of homecare staff from 'doing for' older adults to 'doing with' them in the Dutch homecare context. This intended staff behavioral change was expected to increase older adults' participation in daily and physical activities and reduce their sedentary behavior. In the longer term, this could lead to beneficial effects on daily, physical and psychological functioning, falls, quality of life, and healthcare utilization and associated costs. The process evaluation showed predominantly positive findings, but also provided suggestions for improvement. No unequivocal evidence was found for the effectiveness of 'Stay Active at Home' compared to usual care in terms of client and staff outcomes, nor for its costs and cost-effectiveness in a 1-year cluster randomized controlled trial. Therefore, large-scale implementation of the training program in its current form is not recommended. Suggestions for improvement from the studies in this thesis can provide a starting point for optimizing 'Stay Active at Home' and developing new training programs and interventions in the field of reablement. This (further) development ideally takes place in co-creation with relevant stakeholders from practice, research, education and policy.

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ADDENDA

Living Lab in Ageing and Long-Term Care

Teuni H. Rooijackers

Summary

To address the challenges of an aging population, many countries, including the Netherlands, are now pursuing the concept of 'aging in place'. Aging in place is defined as '*remaining living in the community, with some level of independence, rather than in residential care*'. Homecare staff can play an important role in supporting older adults to remain living at home for as long and as independently as possible. However, this requires new ways of working and delivering care and support.

From their former role, homecare staff often tend to take over activities and provide care and support by 'doing for' older adults. This way of working hardly activates older adults. Older adults therefore become (often unconsciously and unintentionally) less active and run the risk of deteriorating further in terms of independence and health. In their new role with independence as a starting point, homecare staff are required to focus on what older adults can still do and want, and how this can best be supported (a 'doing with' approach). Although promoting independence is receiving increasing attention in Dutch homecare, it requires a complex change in culture and behavior.

An innovative approach aimed at this change is reablement. Reablement, freely translated as 'helping people help themselves', is a person-centered, holistic approach that aims to enhance an individual's physical and/or other functioning, increase or maintain their independence in meaningful activities of daily living, and reduce their need for long-term services. Reablement services are often provided by an interdisciplinary team who support the individual (temporarily) to achieve his/her goals, if applicable through participation in daily activities, home modifications and assistive devices. The goal is to help clients, primarily older adults, retain, regain or gain skills so that they can manage their daily lives as independently as possible.

The Dutch reablement training program 'Stay Active at Home' (in Dutch: 'Blijf Actief Thuis') was developed to change the behavior of homecare staff in line with the above ideals. 'Stay Active at Home' was systematically developed based on international research on reablement, in co-creation with international researchers in the field of reablement and function-focused care and a group of relevant Dutch stakeholders. The underlying principle is that by equipping staff with knowledge, attitude, and skills on reablement and by providing social and organizational support, they will be guided to implement reablement in practice. At the client level, this may benefit older adults' participation in daily and meaningful activities and reduce their sedentary behavior. In the longer term, this could lead to beneficial effects on daily, physical and psychological functioning, falls, quality of life, and healthcare utilization and associated costs.

'Stay Active at Home' has been positively evaluated in two pilot studies in 2016 and 2017. Prior to possible national implementation, the training program should first be evaluated on a larger scale. This dissertation describes the process, effect and economic evaluation of the 'Stay Active Home' in a cluster randomized trial.

Introduction

Chapter 1 provides information on aging in the Netherlands, the importance of staying active and independent in later life, and the role that homecare staff can play in this regard. For homecare staff, promoting independence requires a different way of thinking and working. Reablement is introduced as an approach to change the behavior of homecare staff. The studies in this thesis are part of the evaluation of 'Stay Active at Home', a reablement training program for homecare staff (i.e., nursing and domestic staff). Accordingly, the first chapter provides a brief description of 'Stay Active at Home'. It concludes with the overall aim, objectives, and outline of the research in this thesis.

Study protocol

Chapter 2 describes the study protocol of the 1-year cluster randomized controlled trial (c-RCT) to evaluate 'Stay Active at Home'. Ten Dutch homecare nursing teams from five working areas in the south of the Netherlands participated. Teams were pre-stratified by working area and equally randomized to the intervention group or control group, along with their clients and, if applicable, clients' domestic workers. All nursing staff from the selected nursing teams were eligible to participate in the study. Clients were eligible if they met the inclusion and exclusion criteria: ≥65 years old, not terminally ill or bedbound, no serious cognitive or psychological problems, and able to communicate in Dutch. Finally, the domestic workers of clients who met the criteria were also eligible to participate. A total of 264 clients and 313 staff members participated in the study.

Staff in the intervention group received the 9-month reablement training program, consisting of program meetings, practical assignments, and weekly newsletters. The program meetings were divided into a kick-off meeting, bi-(monthly) team meetings over a 6-month period, and a booster session at nine months. During the kick-off meeting, information was provided on why a reorientation of homecare is needed. Each team meeting then addressed a skill to facilitate the implementation of reablement in practice: 1) motivating clients, 2) increasing clients' engagement in daily and physical activities, 3) implementing goal setting and action planning, 4) involving the social network of clients, and 5) assessing clients' capabilities. In the booster session, staff

practiced conversational skills in role-plays with professional actors. Team managers were also invited to the program meetings; they also received the weekly newsletters. Staff in the control group received no training and provided care as usual.

Four related sub-studies were conducted to evaluate 'Stay Active at Home': (1) a process evaluation, (2) a client-level effect evaluation, (3) a staff-level effect evaluation, and (4) an economic evaluation. Each sub-study is summarized below.

Objective 1: Evaluation of the implementation, potential mechanisms of impact and context of 'Stay Active at Home'

Chapter 3 describes the results of the process evaluation alongside the c-RCT that was conducted using an embedded mixed-methods design. Data on the implementation (reach, dose, fidelity, adaptations, and acceptability), potential mechanisms of impact (staff knowledge, attitude, skills, and support), and context were collected from all staff in the intervention group (N = 154) using logbooks, registration forms, checklists, and log data. In addition, focus group interviews were conducted with a subset of staff (n = 23) and program trainers (n = 4). 'Stay Active at Home' was largely implemented as planned. On average, staff attended 73% of the program meetings, conducted 57% of the practical assignments, and consulted 57% of the weekly newsletters. Staff were generally satisfied with the training program, particularly appreciating its practical elements (i.e., role-plays, booklet with practice exercises, and weekly newsletters) and the team approach. They experienced positive changes in their knowledge of and attitude toward reablement, learned new skills or further developed existing skills, and perceived social and organizational support from colleagues and team managers. The extent to which staff implemented reablement varied. Perceived contextual facilitators (e.g., digital care plans) and barriers (e.g., resistance to change from clients or their social network) seemed to play a role in this. Suggestions for improvement included more interactive teaching methods, coaching on the job, and providing information about reablement to clients, their social network, and other relevant stakeholders.

Objective 2: Evaluation the effectiveness of 'Stay Active at Home' with respect to client outcomes

Chapter 4 presents the results of the effect evaluation at the client level. A total of 264 older adults participated in the c-RCT (n = 133 intervention group; n = 131 control group). Data on sedentary behavior (primary outcome), daily, physical and psychological functioning, and falls were collected at baseline, six months (fall data

only) and twelve months, using accelerometers (Actigraph GT9X Link), questionnaires (GARS and PHQ-9), and physical performance tests (SPPB). Data were analyzed according to the intention-to-treat principle, with the primary outcome condition being that clients had ≥1 valid accelerometer wear day of ≥10h of wake/wear time. This was the case for 245 clients (n = 125 intervention group; n = 120 control group). At baseline, clients were on average 82.1 (SD 6.9) years old, 67.8% were women, and 67.4% had a low educational level. Mixed effects linear and logistic regression showed no statistically significant differences between the intervention group and control group for most outcomes. However, a small effect to the detriment of the intervention group was found for physical functioning (β -0.6 [95% CI -1.1, -0.1]). A subgroup analysis by working area identified an effect in favor of the intervention group for daily functioning in instrumental activities of daily living in one working area (β -3.7 [95% CI -7.4, -0.0]). The was the working area that adhered most closely to the training program. In conclusion, no convincing evidence was found for the effectiveness of 'Stay Active at Home' compared to usual care on the selected client-level outcomes.

Objective 3: Evaluation the effectiveness of 'Stay Active at Home' with respect to staff outcomes

Chapter 5 presents the results of the effect evaluation at the staff level. A total of 313 staff members participated (n = 154 intervention group; n = 159 control group). Data were collected on self-efficacy and outcome expectations regarding client activation at baseline, six and twelve months, using scales developed for the current study. At baseline, staff were on average 47.7 (SD 11.2) years old, predominantly female (98.4%), had a low level of education (52.0%), an average work experience of 13.5 (SD 10.0) years, and an average workweek of 19.4 (SD 6.5) hours. Mixed effects linear regression showed no statistically significant differences between the study groups for either outcome between baseline and six months or between baseline and twelve months. A sensitivity analysis that compared intervention group staff with ≥50% compliance to the program meetings (n = 125) with all staff in the control group showed an effect in favor of the intervention group for self-efficacy between baseline and twelve months (β 1.9 [95% CI 0.1, 3.7]), but not for outcome expectations. In conclusion, no convincing evidence was found for the effectiveness of 'Stay Active at Home' compared to usual care in terms of staff self-efficacy and outcome expectations regarding client activation.

Objective 4: Evaluation the cost-effectiveness and cost-utility of 'Stay Active at Home' at the client level

Chapter 6 describes the results of the economic evaluation. A cost-effectiveness and cost-utility analysis were conducted from a societal perspective over a 12-month time horizon. Cost and effect data were collected from 264 older adults at baseline, six and twelve months. Cost data included 'intervention', 'healthcare', and 'patient and family' costs (collectively, societal costs) and were assessed using an adapted version of the iMTA Medical Consumption Questionnaire and client records or estimated using bottom-up micro-costing. Effect data included sedentary behavior and quality-adjusted life years (QALYs) assessed using accelerometers and the EQ-5D-5L, respectively. Data were analyzed according to the intention-to-treat principle, provided clients had ≥1 valid accelerometer wear day (n = 245). Mixed effects linear regression with multiple imputation and bootstrapping found no statistically significant differences between the study groups for all cost and effect outcomes, with the exception of lower domestic support costs in the intervention group (€-173 [95% CI -299, -50]). The average total societal costs per client over the study period (12 months) were €20,254 in the control group and €22,469 in the intervention group (including €625 for the intervention). From a societal perspective, the cost-effectiveness of 'Stay Active at Home' did not exceed 20%, regardless of the willingness to pay (€0–€50,000) and the effect outcome chosen. This indicates that overall a low probability was observed that 'Stay Active at Home' was cost-effective compared to usual care. These findings were confirmed by sensitivity analyses from the healthcare perspective (n = 245), for complete cases (n = 165 for sedentary behavior; n = 185 for QALYs), and for clients without extreme cost outliers (n = 237).

Discussion and Conclusion

Chapter 7 summarizes the main findings of all studies included in this thesis, followed by methodological and theoretical considerations. It further describes implications for practice and research that follow from the findings of this thesis. In summary, the process evaluation showed mostly positive findings, but also suggestions for improvement. No unequivocal evidence was found for the effectiveness of 'Stay Active at Home' compared to usual care in terms of client and staff outcomes, nor for its costs and cost-effectiveness. Methodological aspects made it difficult to unravel why the intervention was not effective (e.g., no insight into actual staff behavior) or possibly explain the lack of beneficial effects (e.g., chosen target group or outcome measures).

Theoretical aspects may also have played a role, including the rationale and content of 'Stay Active at Home' in relation to other reablement approaches, the complexity of changing staff behavior where a 'one size fits all' approach may not be appropriate, and the possible need for system changes in healthcare to better implement reablement.

In conclusion, there is insufficient evidence to justify widespread implementation of the 'Stay Active at Home' reablement training program in its current form. The studies in this thesis have led to several suggestions for improvement of the training program and can provide a starting point for optimizing 'Stay Active at Home' and developing new training programs and interventions in the field of reablement. This ideally takes place in co-creation with relevant stakeholders from practice, research, education and policy.

Samenvatting

De houdbaarheid van het zorgsysteem staat onder druk, onder meer door een toename in het aantal zorgbehoevende ouderen, een groeiende schaarste aan zorgmedewerkers en stijgende zorgkosten. Om deze uitdagingen het hoofd te bieden, streven veel landen, waaronder Nederland, 'aging in place' na. Het doel van 'aging in place' is mensen in staat te stellen langer zelfstandig in hun eigen woning of buurt te blijven wonen, zo nodig ondersteund door zorg- en welzijnsvoorzieningen. Dit sluit aan bij de wens van de meeste ouderen om zo lang mogelijk thuis te blijven wonen.

Thuiszorgmedewerkers kunnen een belangrijke rol spelen bij het ondersteunen van ouderen om zo lang en zo zelfstandig mogelijk thuis te blijven wonen, maar dit vraagt om een andere manier van denken en werken. Vanuit hun oude rol zijn thuiszorgmedewerkers geneigd om uit te gaan van wat ouderen niet meer kunnen en om zorgtaken over te nemen. Daardoor worden ouderen niet of nauwelijks geactiveerd. Ouderen worden daardoor (vaak onbewust en onbedoeld) minder actief en lopen het risico minder zelfredzaam te worden. In hun nieuwe rol met eigen regie en eigen kracht als uitgangspunt richten thuiszorgmedewerkers zich op wat ouderen nog wel willen en kunnen en hoe dit het beste ondersteund kan worden ('zorgen dat' in plaats van 'zorgen voor'). Hoewel het bevorderen van zelfredzaamheid steeds meer aandacht krijgt in de Nederlandse thuiszorg, vergt dit een complexe verandering in cultuur en gedrag.

Een innovatieve benadering gericht op deze verandering is reablement. Reablement, vrij vertaald als 'mensen helpen zichzelf te helpen', is een persoonsgerichte, holistische benadering met als doel iemands (fysiek) functioneren te verbeteren, hun onafhankelijkheid in het uitvoeren van betekenisvolle activiteiten te vergroten, en hun behoefte aan langdurige zorg te verminderen. Volgens reablement worden cliënten door een interdisciplinair team (tijdelijk) ondersteund bij het bereiken van hun persoonlijke doelen. De zorg en ondersteuning worden zoveel mogelijk afgestemd op de mogelijkheden die cliënten hebben om dagelijkse en betekenisvolle activiteiten zélf of samen met hun sociaal netwerk uit te voeren op een manier die past bij wat ze kunnen en willen. Op deze manier worden cliënten gestimuleerd om de eigen regie over hun leven te behouden en tegelijkertijd gebruik te maken van hun eigen kracht.

Om het gedrag van thuiszorgmedewerkers in lijn met de bovengenoemde idealen te veranderen, is het Nederlandse reablement trainingsprogramma 'Blijf Actief Thuis' ontwikkeld. 'Blijf Actief Thuis' is systematisch ontwikkeld op basis van internationaal onderzoek naar reablement in co-creatie met onderzoekers, zorgprofessionals,

beleidsmedewerkers en ouderen. Het trainingsprogramma richt zich op verpleegkundigen, verzorgenden en thuishulpen. Zij worden toegerust met kennis, attitude en vaardigheden over reablement en voorzien van sociale en organisatorische ondersteuning om reablement in de praktijk toe te passen. De verwachting is dat dit zal leiden tot gedragsverandering bij medewerkers. Op cliëntniveau zou dit de deelname van ouderen aan dagelijkse en betekenisvolle activiteiten ten goede komen en hun sedentair (zittend) gedrag kunnen verminderen. Op langere termijn zou dit gunstige effecten kunnen hebben op het dagelijks, fysiek en psychisch functioneren van ouderen, alsmede op het aantal valincidenten, de kwaliteit van leven, het zorggebruik en de daarmee gepaard gaande zorgkosten.

'Blijf Actief Thuis' is positief geëvalueerd in twee pilotstudies in 2016 en 2017. Voorafgaand aan mogelijke landelijke implementatie van 'Blijf Actief Thuis' dient het trainingsprogramma eerst op grotere schaal geëvalueerd te worden. Dit proefschrift beschrijft de proces-, effect- en economische evaluatie van 'Blijf Actief Thuis' in een cluster gerandomiseerd onderzoek.

Introductie

Hoofdstuk 1 geeft informatie over ouder worden in Nederland, het belang van actief en zelfredzaam blijven op latere leeftijd, en de rol die thuiszorgmedewerkers daarbij kunnen spelen. Het bevorderen van activiteit en zelfredzaamheid bij ouderen vraagt van thuiszorgmedewerkers een andere manier van denken en werken: een 'zorgen dat' in plaats van 'zorgen voor' benadering. Reablement wordt geïntroduceerd als een innovatieve aanpak gericht op deze gedragsverandering. De studies in dit proefschrift maken deel uit van een reablement trainingsprogramma voor thuiszorgmedewerkers genaamd: 'Blijf Actief Thuis'. Hoofdstuk 1 introduceert 'Blijf Actief Thuis' en sluit af met het algemene doel, de doelstellingen en de opzet van dit promotieonderzoek.

Studieprotocol

Om de uitvoerbaarheid, effectiviteit en kosteneffectiviteit van 'Blijf Actief Thuis' te evalueren, is een 1-jarig cluster gerandomiseerd onderzoek uitgevoerd. Tien thuiszorgteams van MeanderGroep Zuid-Limburg, verspreid over vijf werkgebieden (Heerlen, Brunssum, Kerkrade, Simpelveld, Beekdaelen/Voerendaal), namen deel aan het onderzoek. Deze teams, bestaande uit verpleegkundigen en verzorgenden, werden gestratificeerd naar werkgebied en vervolgens willekeurig toegewezen aan de

interventiegroep (vijf teams, één uit elk werkgebied) of controlegroep (vijf teams, tevens één uit elk werkgebied). Hun cliënten en, indien van toepassing, de thuishulpen van cliënten, werden ook toegewezen aan de interventiegroep of controlegroep, op basis van de toewijzing van de thuiszorgteams. Alle verpleegkundigen en verzorgenden van de geselecteerde teams kwamen in aanmerking voor deelname aan het onderzoek. Cliënten kwamen in aanmerking als zij voldeden aan de inclusie- en exclusiecriteria: ≥65 jaar of ouder, niet terminaal of bedgebonden, geen ernstige cognitieve of psychologische problemen, en Nederlandssprekend. Tenslotte kwamen ook de thuishulpen van cliënten die aan de criteria voldeden in aanmerking voor deelname. In totaal namen 264 cliënten en 313 thuiszorgmedewerkers deel aan het onderzoek.

Thuiszorgmedewerkers in de interventiegroep volgden het negen maanden durende reablement trainingsprogramma 'Blijf Actief Thuis'. Het trainingsprogramma bestond uit een kick-off bijeenkomst en een aantal intervisiebijeenkomsten gedurende een periode van zes maanden. Naast kennisdeling over het belang van zelfredzaamheid en de gevolgen van het overnemen van activiteiten, stond het aanleren van nieuwe vaardigheden en het toepassen daarvan in de praktijk centraal. Door middel van presentaties, interactieve leermethoden, en het uitwisselen van ervaringen werd aandacht besteed aan: het in kaart brengen van het niveau van functioneren van de cliënt, het motiveren van cliënten, het vergroten van de betrokkenheid van cliënten bij dagelijkse en fysieke activiteiten, het werken met doelen en actieplannen, en het betrekken van het sociaal netwerk. Daarnaast zorgden wekelijkse nieuwsbrieven, praktijkopdrachten, en een boostersessie negen maanden na de start ervoor dat de nieuwe werkwijze onder de aandacht bleef. Thuiszorgmedewerkers in de controlegroep ontvingen geen training en verleenden zorg zoals gebruikelijk.

Er zijn vier gerelateerde deelonderzoeken uitgevoerd om 'Blijf Thuis Actief' te evalueren: (1) een procesevaluatie, (2) een effectevaluatie op cliëntniveau, (3) een effectevaluatie op medewerkersniveau en (4) een economische evaluatie. Elk deelonderzoek is hieronder samengevat.

Doelstelling 1: Evaluatie van de implementatie, potentiële werkingsmechanismen en context van 'Blijf Actief Thuis'

Om inzicht te krijgen in de uitvoerbaarheid van 'Blijf Actief Thuis' is parallel aan het cluster gerandomiseerde onderzoek een uitgebreide procesevaluatie uitgevoerd (Hoofdstuk 3). Er werden zowel kwalitatieve als kwantitatieve gegevens verzameld

(mixed-methods design) over de implementatie (bereik, dosis, getrouwheid en tevredenheid), potentiële werkingsmechanismen (kennis, attitude, vaardigheden en sociale en organisatorische ondersteuning) en context (bevorderende en belemmerende factoren) van 'Blijf Actief Thuis'. Gegevens werden verzameld bij alle thuismedewerkers in de interventiegroep (N = 154) via logboeken, registratielijsten en checklists. Daarnaast werden focusgroep-interviews gehouden met een subgroep van thuiszorgmedewerkers (n = 23) en de trainers van het programma (n = 4). 'Blijf Actief Thuis' werd grotendeels uitgevoerd zoals gepland. Gemiddeld woonden medewerkers 73% van de programmabijeenkomsten bij, maakten ze 57% van de praktijkopdrachten, en lazen ze 57% van de nieuwsbrieven. Medewerkers waren over het algemeen tevreden over het trainingsprogramma. Zij waardeerden vooral de praktische elementen (rollenspellen, oefenboekje en nieuwsbrieven) en de teambenadering. Medewerkers ervoeren positieve veranderingen in hun kennis over en attitude ten aanzien van reablement, leerden nieuwe vaardigheden of ontwikkelden bestaande vaardigheden verder, en ervoeren sociale en organisatorische steun van collega's en teammanagers om reablement toe te passen. De mate waarin medewerkers reablement daadwerkelijk in de praktijk toepasten, varieerde echter. Waargenomen contextuele bevorderende (bijv. digitale zorgdossiers) en belemmerende factoren (bijv. weerstand van cliënten of hun sociaal netwerk) leken hierin een rol te spelen. Suggesties voor verbetering van het trainingsprogramma volgens medewerkers en programmatrainers waren onder andere het gebruik van meer interactieve leermethoden, het toevoegen van coaching on the job, en het verstrekken van informatie over reablement aan cliënten, hun sociaal netwerk, en andere relevante stakeholders.

Doelstelling 2: Evaluatie van de effectiviteit van 'Blijf Actief Thuis' op cliëntniveau

Hoofdstuk 4 presenteert de bevindingen van de effectevaluatie van 'Blijf Actief Thuis' op cliëntniveau. In totaal namen 264 cliënten deel aan deze deelstudie (n = 133 interventiegroep; n = 131 controlegroep). Er werden gegevens verzameld over sedentair gedrag (primaire uitkomst), dagelijks, fysiek en psychologisch functioneren, en vallen. Dit werd gedaan bij aanvang van het onderzoek, na zes maanden (alleen vallen) en na twaalf maanden met behulp van beweegmeters, vragenlijsten (GARS, PHQ-9) en fysieke testen (SPPB). Gegevens werden geanalyseerd volgens het intention-to-treat principe. Dit betekent dat de uitkomsten van alle cliënten werden geanalyseerd op basis van de hun toegewezen interventie, ongeacht of zij de interventie volgden of het onderzoek afmaakten. De voorwaarde voor de analyse van de primaire uitkomst

was dat cliënten ten minste één valide draagdag van de beweegmeter hadden (≥10 uur waaktijd/draagtijd). Dit was het geval voor 245 cliënten (*n* = 125 interventiegroep; *n* = 120 controlegroep). Bij aanvang van het onderzoek waren cliënten gemiddeld 82,1 (SD 6,9) jaar oud, 68% was vrouw, en 67% had een laag opleidingsniveau. Mixed effects lineaire en logistische regressieanalyses toonden geen statistisch significante verschillen tussen de interventiegroep en controlegroep voor de meeste uitkomsten, met uitzondering van een klein effect in het nadeel van de interventiegroep voor fysiek functioneren (*β* -0,6 [95% CI -1,1, -0,1]). Een subgroepanalyse naar werkgebied identificeerde een effect in het voordeel van de interventiegroep voor dagelijks functioneren in één werkgebied (*β* -3,7 [95% CI -7,4, -0,0]). Dit betrof het werkgebied dat het meest trouw was aan het trainingsprogramma. Samenvattend werd er geen overtuigend bewijs gevonden voor de effectiviteit van 'Blijf Actief Thuis' in vergelijking met reguliere zorg op de gekozen uitkomsten op cliëntniveau.

Doelstelling 3: Evaluatie van de effectiviteit van 'Blijf Actief Thuis' op medewerkersniveau

Hoofdstuk 5 presenteert de bevindingen van de effectevaluatie van ‘Blijf Actief Thuis’ op medewerkersniveau. In totaal namen 313 thuiszorgmedewerkers deel aan deze deelstudie (*n* = 154 interventiegroep; *n* = 159 controlegroep). Er werden gegevens verzameld over de eigen-effectiviteit en uitkomstverwachtingen van medewerkers met betrekking tot het activeren van cliënten om activiteiten zo zelfstandig mogelijk uit te voeren. Eigen-effectiviteit verwijst naar de mate waarin men zich in staat acht om het gewenste gedrag uit te voeren. Uitkomstverachtingen verwijst naar de overtuiging die men heeft dat het aanpassen van het gedrag voordelen zal opleveren. Gegevens werden verzameld bij aanvang van het onderzoek, na zes en na twaalf maanden via vragenlijsten ontwikkeld voor het huidige onderzoek. Bij aanvang van het onderzoek waren medewerkers gemiddeld 47,7 (SD 11,2) jaar oud, 98% was vrouw, en 52% had een laag opleidingsniveau. De gemiddelde werkervaring was 13,5 (SD 10,0) jaar en een gemiddelde werkweek 19,4 (SD 6,5) uur. Mixed effects lineaire regressieanalyses toonden geen statistisch significante verschillen tussen de interventiegroep en controlegroep na zes en na twaalf maanden. Een sensitiviteitsanalyse waarin medewerkers in de interventiegroep met ten minste ≥50% getrouwheid aan de programmabijeenkomsten (*n* = 125) werden vergeleken met de controlegroep toonde een effect in eigen-effectiviteit in het voordeel van de interventiegroep na twaalf maanden (*β* 1,9 [95% CI 0,1, 3,7]), maar niet voor uitkomstverwachtingen. Concluderend kan worden gesteld dat ‘Blijf Actief Thuis’ in vergelijking met reguliere

zorg niet leidt tot een eenduidige verbetering van eigen-effectiviteit en uitkomstverwachtingen ten aanzien van het activeren van cliënten bij medewerkers.

Doelstelling 4: Evaluatie van de kosteneffectiviteit van 'Blijf Actief Thuis' op cliëntniveau

Hoofdstuk 6 beschrijft de bevindingen van de economische evaluatie van 'Blijf Actief Thuis'. Vanuit een maatschappelijk perspectief met een tijdshorizon van 12 maanden werden de kosteneffectiviteit en kostenutiliteit van 'Blijf Actief Thuis' ten opzichte van reguliere zorg geëvalueerd. Gegevens over zorggebruik (kosten), sedentair gedrag en kwaliteit van leven (effecten) werden verzameld bij 264 cliënten. Het zorggebruik werd verzameld over een periode van twaalf maanden via een vragenlijst en cliëntdossiers, en gewaardeerd via referentieprijzen voor economische evaluaties. Vervolgens zijn de kosten berekend. De kostengegevens omvatten 'gezondheidszorg', 'patiënt en familie' en 'interventie' kosten (samen vormden deze de maatschappelijke kosten). De kosten voor de interventie werden alleen toegekend aan cliënten in de interventiegroep. Sedentair gedrag en kwaliteit van leven werden verzameld bij aanvang van het onderzoek, na zes en na twaalf maanden met behulp van respectievelijk beweegmeters en de EQ-5D-5L vragenlijst. Kwaliteit van leven werd vervolgens omgerekend naar 'voor kwaliteit van leven gecorrigeerde levensjaren' (QALYs). Alle gegevens werden geanalyseerd volgens het intention-to-treat principe, op voorwaarde dat cliënten ten minste één valide draagdag van de beweegmeter hadden (n = 245). De gemiddelde maatschappelijke kosten per cliënt over de onderzoeksperiode (twaalf maanden) bedroeg €20.254 in de controlegroep en €22.469 in de interventiegroep (inclusief €625 interventiekosten). Mixed effects lineaire regressieanalyses met meervoudige imputatie en bootstrapping toonden geen statistisch significante verschillen tussen de interventiegroep en controlegroep voor de meeste kosten- en effectuitkomsten. Alleen voor het gebruik van huishoudelijke hulp werden lagere kosten gevonden in de interventiegroep (€-173 [95% CI -299, -50]). Vanuit een maatschappelijk perspectief was de kosteneffectiviteit van 'Blijf Actief Thuis' niet hoger dan 20%, ongeacht de betalingsbereidheid (€0–€50.000) en de gekozen effectuitkomst. Hieruit kan worden geconcludeerd dat over het algemeen een lage waarschijnlijkheid werd waargenomen dat 'Blijf Actief Thuis' kosteneffectief was in vergelijking met reguliere zorg. Dit werd bevestigd in verschillende sensitiviteitsanalyses.

Discussie en Conclusie

Hoofdstuk 7 geeft een samenvatting van de belangrijkste bevindingen van de studies in dit proefschrift, gevolgd door methodologische en theoretische overwegingen. Verder worden implicaties voor praktijk en onderzoek beschreven die volgen uit de bevindingen van dit proefschrift. Samenvattend kan worden gesteld dat de procesevaluatie overwegend positieve bevindingen liet zien, maar ook suggesties voor verbetering. Daarnaast werd er geen eenduidig bewijs gevonden voor de effectiviteit van 'Blijf Actief Thuis' ten opzichte van reguliere zorg op het niveau van cliënten en medewerkers, noch voor de kosten en de kosteneffectiviteit. De toegepaste methoden van onderzoek maakten het moeilijk te ontrafelen waarom de interventie niet effectief was (bijv. geen inzicht in het feitelijk gedrag van medewerkers) of kunnen mogelijk het uitblijven van gunstige effecten verklaren (bijv. gekozen doelgroep of uitkomstmaten). Ook theoretische aspecten kunnen ook een rol hebben gespeeld, waaronder de rationale en inhoud van 'Blijf Actief Thuis' in vergelijking met andere reablement benaderingen, de complexiteit van het veranderen van het gedrag van thuiszorgmedewerkers waarbij een ‘one size fits all’ aanpak mogelijk niet geschikt is, en de mogelijke noodzaak van systeemveranderingen in de gezondheidszorg om reablement beter te kunnen implementeren in de dagelijkse praktijk.

Concluderend kan worden gesteld dat er onvoldoende bewijs is om grootschalige implementatie van het reablement trainingsprogramma 'Blijf Actief Thuis' in zijn huidige vorm te rechtvaardigen. De studies in dit proefschrift hebben geleid tot diverse suggesties voor verbetering van het trainingsprogramma en kunnen een startpunt vormen voor het optimaliseren van ‘Blijf Actief Thuis’ en het ontwikkelen van nieuwe interventies op het gebied van reablement.

Impact

The studies in this thesis provide insight into a process, effect, and economic evaluation of 'Stay Active at Home', a reablement training program for homecare staff. 'Stay Active at Home' aims to change the behavior of homecare staff towards increasing older adults' participation in daily and physical activities and reducing their sedentary behavior, in order to support older adults to continue living at home as independently as possible. The current chapter reflects on the societal, scientific, practice and educational impact of this thesis, as well as the efforts made and needed to disseminate the results.

Societal impact

The increasing demand for long-term care among older adults, rising healthcare costs, and labor shortages require innovations in many societies to ensure the sustainability of healthcare systems. These pressures have increased rapidly in recent years, leading to many initiatives at the (inter-)national level to address them. As a potential solution, reablement has been developed and applied in homecare across Australia, New Zealand and the United Kingdom over the last 10–15 years, and is being applied more recently in other countries, notably Canada, Norway and Denmark. Reablement represents a reorientation of homecare from treating disease and creating dependency to focusing on capabilities and opportunities and maximizing independence. In other words, a shift from a reactive to a more preventive and proactive model of homecare. Reablement aims to help individuals, mostly older adults, retain, regain or gain skills so that they can lead their daily lives as independently as possible, it is not a 'downsizing strategy'.

In the Netherlands, reablement is still in its infancy, but curiosity about whether it could benefit Dutch healthcare is growing. This thesis evaluated a reablement training program for homecare staff ('Stay Active at Home') in the Dutch homecare context for older adults. The results of the studies in this thesis have societal impact on different levels and for different groups. On a *macro-level*, this thesis provides the government with information on the potential of reablement in Dutch homecare. Despite the training program not being (cost-) effective, suggestions for improvement have been formulated that may provide a starting point for optimizing 'Stay Active at Home' and developing new interventions in the field of reablement. This is valuable information in view of the inevitable changes to keep the healthcare system efficient, effective and sustainable in the long term. The Ministry of Health, Welfare and Sport was informed about 'Stay Active at Home' through presentations, and the training program was presented as a valuable initiative in the Dutch policy report 'The Right Care in the Right Place'. National awareness was created through conferences, symposia, workshops,

interviews, and a Dutch publication. As a result, we received several requests from healthcare providers and municipalities who aimed to set up similar initiatives in their region. Through digital meetings, we informed them about the rationale and content of 'Stay Active at Home', the research results, and the lessons learned.

On a *meso-level*, this thesis benefits those who finance and provide care, such as healthcare insurers, municipalities, and care providers. The need to change the system compels these parties to collaborate and develop initiatives to this end. 'Stay Active at Home' is one such an initiative primarily aimed at care providers and municipalities. Because the training program was implemented in an organization that uses a lump sum funding system (i.e., a fixed amount of money per client, regardless of the amount of care delivered), it also provides valuable information to health insurers about the role that financial structures can play in such initiatives. We informed these and other relevant parties in the study region about 'Stay Active at Home' and involved them in the research project. To this end, a steering group was formed with representatives from the collaborating parties (i.e., Maastricht University, Zuyd University of Applied Sciences, MeanderGroep Zuid-Limburg, Envida, General Practitioners Eastern South-Limburg, Citizen Power Limburg, the Dutch Nursing Association, and the health insurance company Centraal Ziekenfonds). These parties also contributed to the visibility and awareness of 'Stay Active at Home' through their communication channels, such as newsletters. For further regional awareness, we informed all general practitioners, practice nurse(s), and municipalities in the study region (Heerlen, Brunssum, Kerkrade, Simpelveld, Beekdaelen and Voerendaal).

On a *micro-level*, this thesis offers district nurses, training officers, managers and the board of directors of care organizations information on how to support staff in promoting the independence of older adults, and which preconditions are crucial. Nursing and domestic staff, as well as allied health professionals, can draw inspiration from the training program and program materials for implementing reablement in daily practice. Finally, this thesis can make older adults and their social networks more aware of the increasing focus on prevention, in which it has become a key pillar in recent years to enable older adults to remain active and independent at home for as long as possible.

Scientific impact

Currently, there is little rigorous evidence on the (cost-) effectiveness of reablement. This is due in part to differences between and within countries in the conceptual understanding of reablement, meaning that larger studies may not be comparing like

with like. Moreover, few trials have been conducted to date, and of those that have been conducted, it is often not entirely clear what happened in practice because intervention protocols are not shared or there are no or limited process evaluations. In addition, there is limited information on reablement training programs and the role that behavior change theories can play in such training. Furthermore, little is known about the most appropriate outcome measures and assessment tools to measure meaningful changes because of reablement, particularly at the staff level. This thesis therefore contributes to the scientific knowledge on reablement in multiple ways.

First, the comprehensive process evaluation provided detailed information about the 'Stay Active at Home' reablement training program in terms of implementation, potential mechanisms of impact, and contextual factors. This is valuable information for unravelling effective intervention components, explaining potential (cost-) effectiveness, and improving the training program. Moreover, it may inform the development of new initiatives in the field of reablement, especially in the Dutch homecare context, and help future research to better compare reablement initiatives.

Second, the training program is one of the few in the field of reablement that uses behavior change theories. Although 'Stay Active at Home' was not built from theory, it incorporated sources of the self-efficacy theory. Despite the lack of positive effects in staff self-efficacy and outcome expectations regarding client activation in this thesis, the self-efficacy theory has proven successful in activating clients toward independence in other research. Therefore, this theory, its underlying sources, and strategies related to these sources as included in 'Stay Active at Home' (e.g., performing skills during interactive teaching methods and observing appropriate role models perform skills) could potentially support future reablement training programs and interventions as well as inform the research field about the potential role of this theory in reablement.

Finally, to date, there are almost no generic outcome measures of reablement at the staff level. Because one of the goals of this thesis was to understand staff behavioral change because of reablement, four scales inspired by the work of Resnick et al. (2008) were developed as part of this research: the Client Activation Self-Efficacy Scale for nurses (CA–SE–n) and domestic workers (CA–SE-d), and the Client Activation Outcome Expectations Scale for nurses (CA–OE–n) and domestic workers (CA–OE–d). While further research is needed on the psychometric properties of these scales, they may provide a starting point for future research to better understand changes in staff behavior because of reablement, and how they relate to changes in client outcomes.

In general, policy and practice in this area is far ahead of formal evidence and waiting for research to catch up. In this context, evidence of what does not work is of great value because it prompts thinking through new ways of doing things and learning by doing and reflecting as we go along. The lessons learned and implications from the research in this thesis have been published.[1] Moreover, they have informed the development of two new reablement interventions within the department of Health Services Research of Maastricht University (i.e., the I-MANAGE and SELF intervention),[2, 3] thus contributing to the further development of the research field. Furthermore, all aspects of the research in this thesis (i.e., development, design, process, effect, and economic evaluation) have been presented and published (inter-) nationally. This may have influenced the awareness of reablement, motivated researchers to further explore the potential of reablement, and led to fruitful discussions with researchers in the field.

Practice impact

Despite the lack of beneficial effects for 'Stay Active at Home', the process evaluation provided suggestions for improvement to further improve the training program and facilitate its implementation in practice. For instance, this type of innovation requires a major paradigm shift, not only among homecare staff, but among all those involved in the care process, including older adults and their social networks. This requires sufficient information about the proposed change prior to the start of the intervention, (close) involvement of various stakeholders in the training program, and a stimulating working environment, taking into account the extra time and effort required to change. In this regard, participating homecare staff preferred active and practice-oriented training strategies, such as role-plays and practical tools. Furthermore, ongoing supervision and support, such as through coaching on the job can be a valuable addition. This also applies to clarifying staff roles and responsibilities and using goal-setting instruments to guide implementation. This knowledge can benefit not only 'Stay Active at Home', but also the development of new reablement training programs and interventions.

Several tools and scales developed as part of this research can be of value for practical use, such as the booklet with practice exercises and the weekly newsletters. These were developed in co-creation with various Dutch stakeholders (i.e., older adults, homecare staff, allied health staff, training officers, managers and the board of directors, policy makers), making them highly practice-oriented and responsive to the needs and demands of the field. Moreover, the client activation scales have potential for use in

practice after further investigation of their psychometric properties. They can provide care organizations with insight into staff self-efficacy and outcome expectations regarding client activation and thus into staff training needs. Training can even be tailored to specific (instrumental) activities of daily living or challenging circumstances by identifying scale items that staff score low on. Finally, upon completion of the study, an interest group was formed with researchers, nursing and domestic staff, team managers, and training officers to keep 'Stay Active at Home' a topic of interest within the organization. The interest group developed an activity calendar for older adults, along with older adults, a physiotherapist, the manager of strategic marketing and communications, and a creative director. The calendar includes different types of activities ranging from easy to medium and difficult, instructions on how to do activities in a safe and healthy manner, and weekly tips and tricks about activities in or around the homecare context. The calendar may therefore be suitable for use in practice.

Educational impact

Developing the knowledge and skills required to provide person-centered, holistic, and goal-oriented services, such as reablement, is an ongoing process that begins in early nursing education. Therefore, the rationale, content, and findings of this thesis were shared in student teaching. We gave a presentation about 'Stay Active at Home' to bachelor nursing students of Zuyd University of Applied Sciences. Moreover, a problem-based learning case on 'Stay Active at Home' was developed for the course 'Care in Context' of the bachelor Health Sciences at Maastricht University. Besides, several student groups completed assignments on 'Stay Active at Home' and fifteen students (from the bachelor Nursing, bachelor Health Sciences, and master Healthcare Policy, Innovation and Management) wrote their thesis on topics related to reablement and 'Stay Active at Home' between 2015 and 2021. Based on these theses, two articles were published: one on the early trial findings[4] and one on the psychometric properties of the client activation self-efficacy and outcome expectation scales for nurses and domestic workers.[5] Finally, we organized practice-oriented symposia and workshops for homecare staff and allied health professionals at conferences.

Dissemination of findings

The findings of this thesis were disseminated through multiple channels. All studies in this thesis were published in international, peer-reviewed, and high-impact open-assess journals, such as the Journal of the American Geriatrics Society. In addition, a

Dutch publication was published in the journal Gerõn. The findings of several studies of this thesis were also presented at various (inter-)national conferences, including the Transforming Care Conference (Denmark), Nordic Congress of Gerontology (Iceland), Gerontological Society of America Conference (USA), and National Gerontology Conference (the Netherlands). Moreover, the findings of the full thesis were discussed with the ReAble Network. This network, established in 2018 and currently consisting of approximately 50 reablement researchers from eleven countries, meets regularly to exchange the latest insights in the field of reablement. Finally, the findings were also shared with the first Long-Term Care Forum of the World Health Organization.

The aforementioned channels were mainly used to reach researchers. Other channels were used to reach society. Interviews with researchers, staff and older adults participating in 'Stay Active at Home' were published in 'Meander Magazine' (distributed in all Parkstad municipalities in the south of the Netherlands), 'Meander's' (distributed to over 5000 staff members), and 'Magazine Praktijk' of Maastricht UMC+. Moreover, this research was embedded in the Living Lab in Ageing and Long-Term Care, a structural multidisciplinary collaboration consisting of Maastricht University, nine long-term care organizations, Gilde Education, VISTA College, and Zuyd University of Applied Sciences. The Living Lab brought attention to the research through their communication channels. For instance, 'Stay Active at Home' was an item in one of the Living Lab's newsletters and in the '20-year Living Lab jubilee magazine'. Finally, the findings were also disseminated during the SANO Science Day 2021 (a collaboration between the six Living Labs in Ageing in the Netherlands).

An e-book of this thesis, as well as the program materials, a fact sheet, and a video developed as part of the research in this thesis, can be found on Living Lab website (awolimburg.nl). In addition, more information about 'Stay Active at Home' can be found on the website of the Netherlands Organization for Health Research and Development, which funded the research (zonmw.nl).

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Teuni Henrica Rooijackers, juli 2022.

About the author

Teuni Henrica Rooijackers was born on March 30, 1993 in Oirschot, the Netherlands. In 2011, she completed secondary education at Heerbeeck College in Best. She continued her education at Wageningen University & Research and Radboud University Nijmegen, where she completed a bachelor in Nutrition and Health including a minor in behavioral psychology in 2014, respectively. Following this, Teuni had a summer job shadowing experience at the Colchester East Hants Health Center in Truro, Canada. In January 2017, Teuni obtained a master in Nutrition and Health at Wageningen University & Research, specializing in Epidemiology and Public Health with a particular focus on older adults. She conducted her thesis at the department of Human Nutrition of this university and her internship at the National Institute for Public Health and the Environment. In parallel to her studies, Teuni was a student assistant for statistics and presentation skills and worked as a student research assistant on the evaluation of an intervention to improve nutritional status and physical activity in older adults. She also worked as a weekend assistant at a healthcare organization, held a board position at the Red Cross Student Desk Wageningen, and was president of the sorority Sic Resurrexit Gloria Mundi.

In February 2017, Teuni started her professional career as a research and education assistant at Wageningen University & Research. She coordinated several courses in the field of public health and was involved in the dissemination and implementation of an e-learning program for healthcare staff on malnutrition in older adults. Later that year, Teuni commenced her PhD at the department of Health Services Research at Maastricht University within the Living Lab of Ageing and Long-Term Care. Her research focused on the evaluation of a reablement training program for homecare staff to support older adults to 'Stay Active at Home'. During her PhD, Teuni attended national and international conferences and courses, supervised BSc and MSc students, chaired the junior departmental staff (2019–2020), and participated in the departmental working group on team dynamics (2020–2021). Since October 2021, Teuni is working as an advisor on quality of care at healthcare organization de Zorgboog. She supports the organization in the development, implementation, and evaluation of initiatives to improve the quality of care for older adults and advises on strategic, tactical and operational levels. She is also a member of the Netherlands Society for Gerontology: Knowledge Network Ageing and Society (NVG-KNOWS), where she chairs a working group on communication and (inter-)national profiling.

Publications

International publications

Rooijackers TH, van Rossum E, Zijlstra GAR, Kempen GIJM, Lima Passos V, Metzelthin SF. Effectiveness of a reablement training program on self-efficacy and outcome expectations regarding client activation in homecare staff: A cluster randomized controlled trial. Geriatric Nursing 2022; 43(1): 104–112.

Rooijackers TH, Metzelthin SF, van Rossum E, Kempen GIJM, Evers SMAA, Gabrio A, Zijlstra, GAR. Economic evaluation of a reablement training program for homecare staff targeting sedentary behavior in community-dwelling older adults compared to usual care: A cluster randomized controlled trial. Clinical Interventions in Aging 2021: 16(1): 2095–2109.

Rooijackers TH, Kempen GIJM, Zijlstra GAR, van Rossum E, Koster A, Lima Passos V, Metzelthin, SF. Effectiveness of a reablement training program for homecare staff on older adults' sedentary behavior: A cluster randomized controlled trial. Journal of the American Geriatrics Society 2021; 69(9): 2566–2578.

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Metzelthin SF, Claßen A, Zijlstra GAR, van Rossum E, de Man-van Ginkel JM, **Rooijackers TH**, Kempen, GIJM. Psychometric properties of the client activation self-efficacy and outcome expectation scales for nurses (CA-SE-n and CA-OE-n) and domestic support workers (CA-SE-d and CA-OE-d): A cross-sectional study. Geriatric Nursing 2021; 42(2): 309–316.

Vogel RGM, Bours GJJW, **Rooijackers TH**, Metzelthin SF, Erkens PMG, van Rossum E, Zwakhalen, SMG. Process evaluation of a programme to empower community nurse leadership. BMC Nursing 2021; 20(1): 1–10.

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National publications

Rooijackers TH, Wetzels MA, Metzelthin, SF. Blijf Actief Thuis: Van 'zorgen voor…' naar 'zorgen dat': Onderzoek naar een reablement scholingsprogramma voor thuiszorgmedewerkers. Gerõn 2019; 21(3): 1–4.

Conference contributions and published abstracts

Metzelthin SF, **Rooijackers TH**, Zijlstra GAR, van Rossum E, Koster A, Evers SMAA, Lima Passos V, Kempen GIJM. Effectiveness of a staff training program to stimulate physical activity in homecare: A cluster RCT. The 2021 Gerontological Society of America Annual Scientific Meeting, Phoenix, United States of America. Innovation in Aging 2021; 5(suppl. 1): 975. [Abstract only]

Rooijackers TH, Zijlstra GAR, Kempen GIJM, van Rossum E, Metzelthin SF. The Dutch 'Stay Active at Home' intervention. Results of a cluster randomized controlled trial. Webinar ReAble Network, 2021. [Oral presentation, digital]

Rooijackers TH, Zijlstra GAR, Kempen GIJM, van Rossum E, Metzelthin SF. A reablement training program for homecare staff to reduce older adults' sedentary behavior: Results of a process, effect, and economic evaluation alongside a c-RCT. 25th Nordic Congress of Gerontology, Reykjavik, Iceland 2021. [Oral presentation, digital]

Rooijackers TH, Metzelthin SF, Zijlstra GAR, van Rossum E, Kempen GIJM. 'Blijf Actief Thuis': Procesevaluatie van een reablement scholingsprogramma voor thuiszorgmedewerkers. SANO Wetenschapsdag, Tilburg, The Nederlands, 2021. [Oral presentation, digital]

Rooijackers TH, Metzelthin SF, Zijlstra GAR, Hennen M, Boosten-Renneberg MAM, Wetzels MA. Zelfredzaamheid stimuleren in de thuiszorg. Het 'Blijf Actief Thuis' scholingsprogramma voor thuiszorgmedewerkers vanuit verschillende perspectieven belicht. Geriatriedagen, Den Bosch, The Netherlands, 2021. [Oral presentation, digital]

Rooijackers TH, Zijlstra GAR, van Rossum E, Vogel RGM, Veenstra MY, Kempen GIJM, Metzelthin SF. A training program for professionals to encourage independence of home-living older adults: A process evaluation. The 2020 Gerontological Society of America Annual Scientific Meeting, Philadelphia, United States of America. Innovation in Aging 2020; 4(suppl. 1): 629–630. [Oral presentation, digital]

Rooijackers TH, Zijlstra GAR, van Rossum E, Veenstra MY, Kempen GIJM, Metzelthin SF. Reablement in de thuiszorg. Een procesevaluatie van een cluster gerandomiseerd onderzoek. Geriatriedagen, Den Bosch, The Netherlands, 2020. [Oral presentation]

Rooijackers TH, Metzelthin SF, Zijlstra GAR, van Rossum E, Kempen GIJM. Promoting independence among older adults: Feasibility of a reablement programme for homecare professionals. CAPHRI Research Day, Valkenburg, The Netherlands, 2019. [Poster presentation, winner Jury Poster Pitch Award]

Rooijackers TH, Metzelthin SF, Zijlstra GAR, van Rossum E, Kempen GIJM. Haalbaarheidsstudie van een scholingsprogramma voor thuiszorgmedewerkers naar het bevorderen van bewegen en zelfredzaamheid in de thuiszorg. 15e Nationaal Gerontologiecongres, Ede, The Netherlands. Tijdschrift voor Gerontologie en Geriatrie 2019; 50(3): 16. [Oral presentation]

Metzelthin SF, **Rooijackers TH**. Van 'Zorgen voor…' naar 'Zorgen dat…'- Het werken aan zelfredzaamheid. Congres Werken met Thuiswonende Kwetsbare Ouderen (NURSING), Ede, The Netherlands, 2019. [Workshop]

Rooijackers TH, Metzelthin SF, Zijlstra GAR, van Rossum E, Kempen GIJM. Reablement in Dutch community-living older adults. A process evaluation of the 'Stay Active at Home' programme for homecare professionals. 4th Transforming Care Conference, Copenhagen, Denmark, 2019. [Oral presentation]

Rooijackers TH, Metzelthin SF, Zijlstra GAR, van Rossum E, Veenstra MY, Kempen GIJM. Het bevorderen van bewegen en zelfredzaamheid in de thuiszorg: Inhoud en ervaringen van thuiszorgmedewerkers met het programma 'Blijf Actief Thuis'. Geriatriedagen, Den Bosch, The Netherlands, 2019. [Oral presentation]

Rooijackers TH, Metzelthin SF, Zijlstra GAR, van Rossum E, Kempen GIJM. Onderzoek naar 'Blijf Actief Thuis' – Van 'Zorgen voor…' naar 'Zorgen dat…'. ZonMw werkconferentie, Utrecht, The Netherlands, 2018. [Oral presentation]

Rooijackers TH, Metzelthin SF, Zijlstra GAR, van Rossum E, Kempen GIJM. A reablement training programme for home care professionals: Protocol of a cluster randomized controlled trial. CAPRHI Research Day, Valkenburg, The Netherlands, 2018. [Poster presentation]

Metzelthin SF, **Rooijackers TH**. Van 'Zorgen voor…' naar 'Zorgen dat…'- Het werken aan zelfredzaamheid. Congres Werken met Kwetsbare Ouderen (NURSING), Ede, The Netherlands, 2018. [Workshop]

Rooijackers TH, Metzelthin SF, Zijlstra GAR, van Rossum E, Kempen GIJM. Reablement in the Netherlands – The 'Stay Active at Home' study. 17th European Doctoral Conference in Nursing Science (EDCNS), Maastricht, The Netherlands, 2018. [Oral presentation]

Magazine contributions

Onderzoek naar 'Blijf Actief Thuis'. Meander's (personeelsblad MeaderGroep Zuid Limburg), 2021; 2.

'Blijf Actief Thuis'. Meander Magazine (huis-aan-huisblad MeaderGroep Zuid Limburg), 2021; 2.

Onderzoek naar 'Blijf Actief Thuis'. Magazine Praktijk Maastricht UMC+, Special Ouderenzorg, 2021; 1.

Zelf brood bakken op je 88ste. Jubileum Magazine Academische Werkplaats Ouderenzorg Limburg, 2018.

Overview of completed training activities

Training activities	Institute	Year
General research-related activities		
Research data management	Maastricht University	2017
Self-management for PhD candidates	Maastricht University	2018
Endnote introductory and advanced workshop	Maastricht University	2018
Increasing and measuring research impact	Maastricht University	2019
PhD research writing	Maastricht University	2019
Introduction to R	Maastricht University	2020
Discipline-specific activities		
Masterclass 'Evaluation and adaptation of public health interventions'	AGORA, Wageningen University & Research	2018
Actigraph training	ProCare	2020
Doelmatigheidsonderzoek: Methoden en principes (K72)	EpidM, Amsterdam UMC	2020
Teaching-related activities		
Teaching an online course	Wageningen University & Research	2017
Introduction to problem-based learning	Maastricht University	2019
Tutoring/ teaching skills	Maastricht University	2019
Supervisor (BSc and MSc theses)	Maastricht University	2019/21
Tutor (BSc course 'Improving Quality of Care')	Maastricht University	2021
Career-related activities		
Regiseer je eigen loopbaan	Maastricht University	2020
Career management (one-on-one coaching)	Maastricht University	2021

Living Lab in Ageing and Long-Term Care

Living Lab in Ageing and Long-Term Care

This thesis is part of the Living Lab in Ageing and Long-Term Care, a formal and structural multidisciplinary network consisting of Maastricht University, nine long-term care organizations (MeanderGroep Zuid-Limburg, Sevagram, Envida, Cicero Zorggroep, Zuyderland, Vivantes, De Zorggroep, Land van Horne & Proteion), Intermediate Vocational Training Institutes Gilde and VISTA college and Zuyd University of Applied Sciences, all located in the southern part of the Netherlands. In the Living Lab we aim to improve quality of care and life for older people and quality of work for staff employed in long-term care via a structural multidisciplinary collaboration between research, policy, education and practice. Practitioners (such as nurses, physicians, psychologists, physio- and occupational therapists), work together with managers, researchers, students, teachers and older people themselves to develop and test innovations in long-term care.

Academische Werkplaats Ouderenzorg Limburg

Dit proefschrift is onderdeel van de Academische Werkplaats Ouderenzorg Limburg, een structureel, multidisciplinair samenwerkingsverband tussen de Universiteit Maastricht, negen zorgorganisaties (MeanderGroep Zuid-Limburg, Sevagram, Envida, Cicero Zorggroep, Zuyderland, Vivantes, De Zorggroep, Land van Horne & Proteion), Gilde Zorgcollege, VISTA college en Zuyd Hogeschool. In de werkplaats draait het om het verbeteren van de kwaliteit van leven en zorg voor ouderen en de kwaliteit van werk voor iedereen die in de ouderenzorg werkt. Zorgverleners (zoals verpleegkundigen, verzorgenden, artsen, psychologen, fysio- en ergotherapeuten), beleidsmakers, onderzoekers, studenten en ouderen zelf wisselen kennis en ervaring uit. Daarnaast evalueren we vernieuwingen in de dagelijkse zorg. Praktijk, beleid, onderzoek en onderwijs gaan hierbij hand in hand.

PhD-theses Living Lab in Ageing and Long-Term Care/ Proefschriften Academische Werkplaats Ouderenzorg Limburg

Anne van den Bulck. Differences that matter: Understanding case-mix and quality for prospective payment of home care. 2022.

Marlot Kruisbrink. Towards enhanced management of fear of falling in older people. Unravelling interventions and measuring related avoidance of activity. 2022

Ruth Vogel. Nurses in the Lead: Empowering community nurse leaders to implement evidence into practice. 2022

Fabian Groven. The bed bath with or without water? It's a wash! Experiences with the washing without water intervention used for the bed bath. 2021

Roy Haex. Take a look through my eyes: The development of an experienced quality measure with clients, informal, and formal caregivers in Dutch home care. 2021

Sascha Bolt. The fundamentals of a DEDICATED palliative approach to care for people with dementia. 2021

Angela Mengelers. To risk or to restrain? Involuntary treatment use in people with dementia living at home. 2021

Katya Sion. Connecting Conversations. Experienced quality of care from the resident's perspective: A narrative method for nursing homes. 2021

Linda Hoek. Change begins with choice. Supporting the autonomy of nursing home residents with dementia through partnership. 2020

Mirre den Ouden. Every step counts. Daily activities of nursing home residents and the role of nursing staff. 2018

Theresa Thoma-Lürken. Innovating long-term care for older people. Development and evaluation of a decision support app for formal caregivers in community-based dementia care. 2018

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