

THE IMPACT OF OCCUPATIONAL THERAPY ON HOME-BASED PHYSICAL FRAIL OLDER PEOPLE

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Dissertation presented in partial fulfilment of the requirements for the degree of Doctor in biomedical sciences

January 2024

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Cover photo: Nancy La Grange

Print: Acco, Leuven

Dankwoord

Werken aan een doctoraatsstudie was een unieke ervaring. Het heeft me zowel professioneel diepgaand gevormd, als me laten reflecteren over wie ik ben en waar ik voor sta. Hiervoor ben ik heel wat mensen rond mij dankbaar.

Allereerst wil ik mij richten tot mijn promotor, professor dr. Bert Aertgeerts, die me de kans gaf deze doctoraatsstudie aan te vangen. Ik ben dankbaar voor zijn aanhoudende constructieve kritische feedback, voor het delen van zijn immense expertise, voor zijn coachende houding die me bij elk gesprek de energie gaf die ik op dat moment nodig had en voor zijn gezond advies met betrekking tot mijn professionele situatie.

Mijn copromotoren, professor dr. Anja Declercq en professor dr. Maud Graff, elk met hun jarenlang opgebouwde expertise ben ik heel dankbaar. De combinatie van zowel hun sociologische en ergotherapeutische, als uiteenlopende wetenschappelijke expertises waren de ontbrekende bouwstenen die ik nodig had. Naar de onlinegesprekken met professor dr. Maud Graff keek ik telkens uit omdat ze me liet reflecteren en inzichten bijbracht op ergotherapeutisch en methodologisch vlak. Professor Anja Declercq bracht me onvermoeibaar de inzichten bij in de finesses over kwalitatief onderzoek.

Ik heb, dank zijn mijn drie promotoren, enorm diverse aspecten bijgeleerd op wetenschappelijk vlak en de kans gekregen me te verdiepen op vakinhoudelijk vlak. Alle promotoren toonden in hun coaching ook respect voor mijn eigen visie en persoonlijke situatie. Ik had me geen betere omkadering kunnen voorstellen.

Een woord van dank aan mijn externe juryleden professor dr. Johan Flamaing en professor dr. Daphne Kos, die ik misschien niet overbelastte met vragen, maar bij wie ik steeds terecht kon en die me van het juiste antwoord op mijn vragen voorzagen.

Een woord van dank ook aan de voorzitter en alle juryleden van de doctoraatscommissie. Het is dankzij hun constructieve feedback dat het manuscript van deze doctoraatsstudie die accenten kreeg die ik vanuit mijn positie als uitvoerend onderzoeker zelf niet meer zag.

Tot slot een woord van dank aan mijn persoonlijke en professionele omgeving. Familie, vrienden en collega's beseffen vaak niet hoe groot hun bijdrage is aan het uitwerken van een doctoraatsstudie. Met uitzondering van één persoon zal ik geen namen noemen om niemand tekort te doen. Een welgemeende dankjewel aan jullie.

De persoon die ik in het bijzonder wil danken is mijn 88-jarige moeder. Ze gaf me dagelijks de kans om de theorie aan de praktijk te koppelen en dit door gewoon te zijn wie ze is. Dank je wel. Voor mij was je de constante tijdens het proces van mijn doctoraat en ik hoop dat je na het afsluiten van dit hoofdstuk nog lang de constante mag blijven.

Leen,

1 januari 2024

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1. Introduction

1.1. Frail older adult

Frailty is a complex age-related clinical condition characterized by reduced physiological reserve and reduced resistance to stressors, leading to greater vulnerability to adverse outcomes, including increased risk of falls, fractures, hospitalization, early admission to nursing home, and decrease in quality of life. (Fried et al., 2001; Dent at al., 2019; Kojima et al., 2016) Gobbens (2010) defines frailty as "*a dynamic state affecting an individual who experiences losses in one or more domains of human functioning (physical, psychological, social), which is caused by the influence of a range of variables, and which increases the risk of adverse outcomes*."

The concept 'Aging in place' is of great importance in current society. Older adults prefer to experience old age independently in their own homes and living environments. (Fernández-Carro et al., 2014) Aging in place has been described in several ways, among which "the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level' is one of the most comprehensive descriptions". (Centers for Disease Control and Prevention, 2009) Aging in place is a transaction between the person's capacities and the environmental pressure with the location as a constant factor. (Sánchez-González et al., 2020)

Aging in place is challenging for frail older adults. Physical decline complicates performing daily activities, such as bathing, dressing, cooking, cleaning, and shopping. Complex executive functioning skills, such as planning and problem solving may become a challenge. Even older adults who have not been diagnosed with a cognitive decline may experience problems. As older adults become less mobile, they may have less interaction with others in society or the community and become socially isolated.

Enhancement of social participation is a key goal of the World Health Organization (WHO) policy framework in response to concerns about population aging. (Clarke et al., 2013; Levasseur et al., 2010; WHO, 2017a) WHO (2001) defines social participation as involvement in life situation such as work, entertainment, civic life and religious practice. Participation patterns change across the life span. (Edward et al., 2005). As individuals age, there is a discernible decline in the range of activities they participate in, resulting in reduced engagement in both leisure and productive pursuits. Instead, there is an elevated emphasis on activities associated with daily living, posing a potential risk of diminishing one's sense of meaning and purpose in contributing to the community. (Sachs et al.,

2003; Desrosiers et al. 2004) The well-being of older adults is not solely influenced by the types of activities they are capable of doing. Participation holds a distinctive impact on the well-being of older adults, with a focus on satisfaction derived from participation itself rather than the mere accomplishment of activities. Moreover, social participation results in an increased ability to cope with age-related challenges, improved self-concept, and enhanced emotional adjustment to the aging process (Oh et al., 2019) Both continuing to carry out activities and social participation are therefore essential for physical frail older adults

1.2. The interprofessional primary care team

As indicated above, the loss of functional capacity and risk of adverse outcomes interfere with a person's ability to remain safe in their home.

Given the multidimensional and heterogeneous nature of frailty, as well as the complex care needs of frail older adults, a multidisciplinary collaborative approach is necessary to improve the health and well-being of this population. (Valderas et al., 2019; Holroyd-Leduc et al., 2016) Interprofessional care, informal care, and assistive technology are all desirable in managing the complexity of chronic health conditions in frail older adults. (World Health Organization, 2008, Wiles et al., 2012) Professions involved in the interprofessional care team include, among others, physicians, nurses, physiotherapists, occupational therapists, and social workers. Interprofessional collaboration can improve the quality of chronic care. (Sheffield et al., 2013; Adekpedjou et al., 2020; Duner et al., 2013)

Informal care can significantly help to improve the health behaviors of elderly people. (Wu et al., 2017) Assistive technology, such as walking aids, enables and promotes inclusion and participation (WHO, 2017b)

In addition to having to tackle the complex needs of frail older adults, the healthcare professional is often confronted with therapeutic non-adherence. Non-adherence to recommendations such as environmental changes, exercise and use of assistive devices is often a barrier to obtain better health outcomes. (Nyman et al., 2011; Taylor et al., 2017) Primary care programs involving an integrated interprofessional care team including the support of informal caregivers serve to promote healthy behavior and health outcomes of home-based frail older adults. (Stall et al., 2014)

Many older adults receive informal care. The fact that informal caregivers are often older adults themselves adds to the complexity of the situation. The gradual development of an increase in

limitations in frail older adults can cause habituation, making the person less inclined to change the situation. This can further increase the burden of the informal caregiver and potentially lead to the early admission of the frail older adult to a nursing home. (Béland et al., 2011; Potier et al., 2018)

1.3. Occupational therapy in primary elderly care

1.3.1. Occupational therapy

Occupational therapy originated at the beginning of the twentieth century in the United States of America. After the Second World War, occupational therapy was also developed in Europe. (Boyt Schell et al., 2019)

Already in ancient times there is mention of the beneficial effects of the occupations work, activities, play and rest. 'Doing' meaningful activities creates a sense of 'being'. It also gives a person the opportunity to develop (becoming) and build relations with others. Entering a relationship brings out a sense of 'belonging'. (Graff, 2019) 'Doing, being, becoming and belonging' are the four dimensions of meaningful daily behavior or occupation, which is the target of occupational therapy. (Hitch, 2014; van Hartingsveldt et al., 2022)

The World Federation of Occupational Therapy (2022) describes occupational therapy as "*a client-centered health profession concerned with promoting health and wellbeing through occupation. The primary goal of occupational therapy is to enable people to participate in the activities of everyday life."* (WFOT, 2022) Four foundations are characteristic of the practice of the occupational therapy profession, namely occupation-based, evidence-based, person centered and context-based. In recent times these characteristics were supplemented by the concept of 'technology based'.

The concept *'occupation based'* refers to everyday activities that a person does as an individual to occupy time and bring meaning and purpose to life. These activities are conducted in the persons' own environment or with communities. Occupational therapists support person's engagement in occupations and social participation. (WFOT, 2022)

Even before the term '*evidence-based*' was introduced by Sackett and colleagues (1996), the occupational therapist acted taking into consideration the four pillars of evidence-based practice. Occupational therapists rely on the best available scientific evidence, apply this evidence and adjust where appropriate based on their own expertise. Occupational therapists tailor their therapeutic interventions to the specific context in which these actions are situated.

Occupational therapists consider the wishes and needs of individual citizens who consult them, they inform the person and make decisions together based on shared decision-making (*person-centered*).

Finally, occupational therapists consider and involve the context *(context based).* This includes both the social context, the context of the healthcare setting, and the context of the individual client. (van Hartingsveldt et al., 2022)

Occupational therapists implement and coach the use of care technology (*technology based*) where relevant. Technology is applied in care and welfare with the aim of achieving better quality of care, making care cheaper, more effective, more efficient and more feasible. Technological developments can contribute to care being less tied to time and place, which promotes the independence of the person. (van Hartingsveldt et al., 2022)

Occupational therapy in Belgium is attainable through a comprehensive three-year bachelor's degree program. By pursuing an additional two years of interuniversity training, individuals can achieve a master's degree in occupational therapy. As of 2023, there are 14,433 occupational therapists in Belgium, with approximately 600 of them being self-employed. Belgium has 124 occupational therapists per 100,000 citizens, ranking as the second-highest in Europe, surpassed only by Denmark. (COTEC, 2023).

The predominant professional designation for Belgian occupational therapists is a bachelor in occupational therapy. Since the initiation of a Flemish interuniversity master's degree program in occupational therapy in 2011, there has been a consistent upward trend in the number of occupational therapists holding a dual degree combination of a bachelor's and a master's degree in occupational therapy.

1.3.2. Occupational therapy in primary care

Occupational therapy is primarily known as an allied health profession in hospitals, rehabilitation centres, and residential care settings. However, occupational therapy also delivers an important contribution to the primary health care workforce. (Donnelly et al., 2014) Occupational therapists in primary care work in the environments where the activities of the person take place, such as at home, school, work and/or social settings. (Bolt et al., 2019; Donnely et al., 2014)

Occupational therapists in primary care perform assessments, re-train skills and activities, improve health literacy, educate on symptom management and management of health conditions, adapt daily activities, advise and train in the use of assistive technology, adapt social and physical

environments, and support caregivers and families. In some European countries, occupational therapists also conduct more specialist interventions such as assessing fitness to drive or reintegration in the work field. (Bolt et al., 2019)

In Belgium, the employment situation of occupational therapists among older persons in primary health care is diverse, which complicates the accessibility of occupational therapy. There is also a difference between Flanders and Wallonia in terms of the presence of primary care occupational therapists. In Wallonia, primary care occupational therapists in primary care are hard to find. Primary care occupational therapists in Flanders work within different forms of financing. The financing of primary occupational therapy within welfare care is regulated by the Flemish Community. Occupational therapy in primary health care is federally regulated. In 2010, the modalities for home-based occupational therapy with reimbursement were set out in a Royel decree. The modalities concern such a specific target group that the entitled population is extremely small. The target group concerns two types of rehabilitation patients who can rely on occupational therapy interventions under specific conditions within 6 months after discharge from a rehabilitation centre. The occupational therapy intervention concerns an assessment, a maximum of 7 practice sessions of 180 min, a maximum of 2 information, advice and training sessions and a functional final report. Since the Covid pandemic, another target group has been added temporarily, namely post-COVID patients. The modalities remain the same, with the exception of the period within which the occupational therapy rehabilitation must be given. This was increased to 12 months.
For the entire population of home-based physically frail older adults, there is still no regulation for occupational therapy, which makes it difficult to access occupational therapy in primary care. However, the regions and communities provide limited resources for occupational therapy at home, but the accessibility and availability of occupational therapists varies by region.

1.3.3. Occupational therapy in primary care for home-based older adults

In the last decade, the older population has become a prominent target population in primary care. The challenges facing health care services include ageing populations and increasing numbers of clients with long-term conditions and multi-morbidities, and all the social and economic consequences that go with these. (De Maeseneer et al., 2015)

The prevalence of multimorbidity is high and increases with age. In Belgium, multimorbidity affects 27.2% of the adult population, and more than 60% of the population older than 65 years. (Sciensano,

2022; Paulus et al., 2012) Of the adult population, 17,1% has functional limitations. These functional limitations may result in reduced safety at home and an increased risk of falls (Sheffield et al., 2013). In future years, these numbers are likely to increase due to the projected growth of the older population. The population with multimorbid issues will benefit from an approach that is focused on possibilities and functioning, both of which are targets of occupational therapy. (Paulus et al., 2012; Graff et al., 2007; Graff, 2019) In addition, this population will also benefit from an approach that is focused on social participation. Older adults who participate in social activities remain more functional than those who have fewer social contacts (Sone et al., 2023)

Occupational therapy in primary care for older people supports improvements in living safely and independently at home. It also involves training and coaching the coping skills of the informal caregiver (Graff, 2007) With respect to home safety, occupational therapists focus on emergency response, removal of hazards, provision and training in the use of assistive devices, and addressing safety in daily activities. With respect to living independently, providing and training simple inhouse adaptations can help to keep older people self-reliant and result in significant cost savings. (Sheffield et al., 2013)

As indicated earlier, the majority of informal caregivers of frail older adults are elderly themselves. To prevent burden for the informal caregiver, the occupational therapists also considers the need of the caregiver. In shared decision making with both the older adult and his caregiver, the occupational therapist informs and trains the caregiver on ergonomics, and on a healthy and balanced lifestyle. (Bollinger et al., 2021; Chou et al., 2021; Bolt et al., 2019)

To delineate the state-of-the-art of studies on frailty and occupational therapy in primary care at the beginning of this doctoral study, a search on Pubmed was performed using the MeSH- and title/abstract-terms ‘occupational therapy’ and ‘frailty or elderly’. With filters on systematic review, meta-analysis and RCT’s we detected 161 articles for the last five years of which the scope was mostly on dementia and stroke, followed by osteoarthritis, cancer, low vision and Parkinson disease. Among studies on older populations without a diagnosed main disorder, Zingmark (2014) and Szanton (2014) studied the functional performance of well older people and older people with low income, respectively. The randomised controlled trial of Zingmark which focused on the effect of occupation-focused interventions showed small effect sizes when the interventions were delivered individually. A randomized controlled trial of the CAPABLE-intervention, an interprofessional intervention to reduce disability among low income older adults, showed a significant reduction of 30% in ADL disability scores. (Szanton et al., 2019) A systematic review by Orellano (2012) indicates that client-centered, occupation-based interventions can be effective in improving and maintaining

IADL performance. These researchers conclude that there is a need to develop evidence for occupation-based and client-centered occupational therapy interventions to improve IADL outcomes in older adults with different functional abilities.

In our study, we included the subgroup physically frail older adults in our study and not the whole frail older population for the reason that the frail older adults with cognitive decline already has been studied in depth by Graff and colleagues. (2006, 2007, 2008) We also did not include frail older adults with a specific disease such as Parkinson disease, because those populations often need a disease specific treatment in addition to the treatment of the age-related conditions. However, several outcomes of our study can be extrapolated to the whole population of frail older adults.

1.4. Rationale and research objectives

Life expectancy increased by more than 30 years in Western European countries during the 20th century, leading to rapid aging. Belgium is also experiencing a rapidly ageing society. The number of home-based frail older adults presenting a functional decline is increasing simultaneously. This growing population entails a major challenge considering the care needs and medical costs for older people. (Hajek et al., 2018; Lehnert et al., 2011)

The WHO framework for Healthy Aging focuses on maintaining intrinsic capacity and functional ability across the life course. WHO states that there is a pressing need for comprehensive community-based approaches and primary care interventions to prevent and tackle declines in the capacity of the older population. (WHO, 2017b)

The goal of occupational therapy is to enable people to participate in the activities of everyday life. The profession occupational therapy promotes health and wellbeing through occupation. (WFOT, 2012*)*

Therefore, the overall aim is to evaluate the impact of home-based occupational therapy on the functional performance and social participation of frail older adults.

The primary aim is to determine the specific effects of home-based occupational therapy on the activities of daily living, mobility, and social participation of physically frail older adults. Second, the aim is to determine the core components of an evidence-based occupational therapy intervention protocol in home-based physically frail older adults.

Third, we aim to get insight in the therapy adherence of frail older people and the collaboration of their healthcare professionals.

To achieve this, we defined sub-questions using an appropriate research design in six consecutive studies.

(1) *What is the effectiveness of occupational therapy interventions, whether mono-disciplinary or as part of a multidisciplinary approach, for community-dwelling physically frail older adults? (Chapter 2)*

We conducted a systematic review with meta-analysis to achieve evidence that proves the effectiveness of occupational therapy in home-based frail older adults and to explore the factors of success of these interventions.

(2) *What are the perspectives of home-dwelling older adults on their functioning, social participation and health, and the factors influencing these capacities and their health? (Chapter 3)*

Our first qualitative study investigated the perspectives of home dwelling older adults on their functioning, social participation and health, and on the factors influencing these capacities and their health. Having insight into these determinants might assist in improving therapy adherence.

(3) *What are the perspectives of primary care professionals, in particular general practitioners, registered nurses, physiotherapists, and occupational therapists, on interprofessional collaboration and the perceived barriers and facilitators in the care of the frail older adults? (Chapter 4)*

The level of interprofessional collaboration may significantly influence the quality of care. For this reason, our second qualitative research investigated the perspectives of primary care professionals, on interprofessional collaboration, and the barriers and facilitators they perceived in the care of the frail older population.

Subsequently, we developed an evidence-based occupational therapy intervention protocol based on the outcome of these three studies substantiated by theoretical frameworks.

(4) *How to develop a high-adherence-to-therapy and evidence-based occupational therapy (OT) intervention to optimize functional performance and social participation of home-based physically frail older adults and improve wellbeing of their informal caregiver? (Chapter 5)*

To be transparent, we described the development and feasibility of our high-adherence-to-therapy and evidence-based occupational therapy intervention to optimize functional performance and social participation of home-based physically frail older adults and wellbeing of their informal caregiver, the ProMOTE-intervention.

(5) *What are the components of a high-adherence-to-therapy and evidence-based OT intervention that aims to optimize functional performance and social participation of home-based physically frail older adults and wellbeing of their informal caregiver? (Chapter 6)*

We provided a detailed description of the ProMOTE-intervention addressing not only 'what', but also 'why', 'how' and 'when'.

Finally, we have developed a clinical guideline to assist occupational therapists in selecting evidence-based recommendations tailored to the unique needs of older adults.

(6) *How to develop an evidence-based occupational therapy clinical guideline to optimize functional performance and social participation of home-based physically frail older adults? (Chapter 7)*

We described the developmental process of a de novo clinical guideline for primary health care occupational therapists working with frail older adults.

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2. Home- and Community-Based Occupational Therapy Improves Functioning in Frail Older People: A Systematic Review

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DOI: 10.1111/jgs.14889

ABSTRACT

Objectives

The objective is to assess the effectiveness of occupational therapy to improve performance in daily living activities in community-dwelling physically frail older people.

Design

We conducted a systematic review and meta-analysis. We included randomized controlled trials reporting on occupational therapy as intervention, or as part of a multidisciplinary approach. This systematic review was carried out in accordance with the Cochrane methods of systematic reviews of interventions.

Measurements

Meta-analyses were performed to pool results across studies using the standardized mean difference. The primary outcome measures were mobility, functioning in daily living activities, and social participation. Secondary outcome measures were fear of falling, cognition, disability, and number of falling persons.

Results

Nine studies met the inclusion criteria. Overall, the studies were of reasonable quality with low risk of bias. There was a significant increase in all primary outcomes. The pooled result for functioning in daily living activities was a standardized mean difference of -30 (95% CI -0.50 to -0.11; P=.002),for social participation -0.44 (95% CI -0.69 to -0.19; P=.0007) and for mobility -0.45 (95% CI -0.78 to -0.12; P=.007). All secondary outcomes showed positive trends, with fear of falling being significant. No adverse effects of occupational therapy were found.

Conclusion

There is strong evidence that occupational therapy improves functioning in community-dwelling physically frail older people

Keywords

frail older people; primary care; occupational therapy; functionality; social participation

2.1. Introduction

Greater longevity has increased the demand for chronic care. Care needs of people receiving chronic care encompass the overall functioning of a person in his or her environment and hence surpass medical care. [1] A part of this population is vulnerable. Frailty means there is a precarious balance between the assets maintaining health and the deficits threatening it. This balance can be disrupted by minor stressor events. The state of vulnerability results in an age-related decline in many physiological systems and in an increase of chronic diseases. [2,3] Many older people with chronic diseases experience limitations in physical activity and lose functionality.[4] Despite their vulnerable condition, most of these people wish to live independently. Maintaining functionality is not only important for being able to live independently, it also reduces the burden of the caregiver and it influences the well-being of both. [5] Interventions with a focus on activity, independence and successful aging have been shown to be more successful than those based on a dependency service provision model.[6] Occupational therapy (OT), the health profession that focuses on enabling persons to engage in their daily occupations, is important in this respect. OT aims to enable people to perform the occupations that foster health and well-being. Occupation refers to everything that people do during the course of everyday life.

The possible benefit of OT compared to service-based care differs as to the way the occupational therapists work and in the goals they establish. Occupational therapists enable engagement in everyday living through occupation, which means they enable engagement in meaningful activities of everyday life. They empower the person and his environment. In order to achieve this, occupational therapists work in a client-centered way. [7–9] Hence, occupational therapists are part of the group of professionals that contribute to achieving the main goal of older people, living independently. Therefore, there is a need of strong evidence that proves the effectiveness of OT in community-dwelling frail older people.

2.2. Objective

The purpose of this systematic review is to assess the effectiveness of OT interventions as mono-disciplinary intervention or as part of a multidisciplinary approach, for community-dwelling physically frail older people.

2.3. Methods

2.3.1. Search strategy and selection criteria

The principles of the Cochrane manual were followed to conduct this systematic review. [10] Reporting is based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance. [11] Only completed randomized controlled trials were included. No review protocol has been preregistered.

Studies were excluded if: (1) the older people received any form of rehabilitation (institutionalized, day care or home-based rehabilitation); (2) the main diagnosis was an acute problem; (3) there was a diagnosis of dementia or other progressive neurological disorder; (4) the older people were in an irreversible stage of being bedridden; (5) the older people were identified as in need of palliative care; or (6) they belonged to a native African, Asian, or Latin American population, because of cultural differences.

The impact of OT on people with dementia was studied by Graff, [12–14] the impact of OT on people with Parkinson Disease by Dixon, [15] therefore we decided not to focus on people with cognitive deficits. We included investigations that studied community-dwelling physically frail older people,

living alone or together who received home- and community-based mono-disciplinary OT interventions or multidisciplinary interventions that included OT, compared with regular interventions or no interventions. We only included studies if the components of the intervention were presented. The primary outcome measures were mobility, functioning in activities of daily living (ADL), and social participation. The secondary outcome measures were fear of falling, cognition, disability, and number of falling persons.

The outcome measures of this study were based on the scope of OT, which is empowering people to participate and engaging them in their occupations of everyday life. The International Classification of Functioning, Disability, and Health (ICF) was used to frame the outcome measures. The ICF is a framework for measuring functioning and disability. It focuses on health condition, body structures and functions, activities, participation, environmental factors, and personal factors [16] (Figure S1).

Primary outcome measures were related to the ICF-components 'activity and participation'. These are operationalized in mobility, functioning in ADL, and social participation. ADL includes basic (e.g., personal care and eating) and instrumental (e.g., cooking and cleaning) activities of daily living. We included instrumental activities of daily living (IADL) in this study since these require a higher degree of performance. If no IADL data were available, we included basic activities of daily living (BADL) outcomes. Participation describes involvement in a life situation. [16]

Secondary outcome measures concerned the other ICF-components, fear of falling (component personal factor) and cognition (component body functions and structures). We considered that it could be worthwhile to study cognition in case of active aging. We also studied disability and the adverse outcome number of falling persons. Disability describes the extent to which one feels limited. [17]

To identify the studies of interest, a search from inception of the database to June 2015 was conducted in 6 electronic databases (MEDLINE, EMBASE, The Cochrane Library, CINAHL, PsycINFO, and OT seeker database). The selection of the search terms was based on the inclusion criteria and an exploratory search of relevant literature.

Subject indexing terms as well as free text words were combined as search terms. A hand-search in the reference lists of the included articles was conducted to identify possible additional studies of interest. No language or time restrictions were used (Appendix S1).

All references were downloaded in Reference Manager 12, and duplicates were removed.

Next, 2 review authors independently assessed titles and, where necessary, abstracts of the records identified from the electronic searches, and excluded obviously irrelevant studies. Subsequently,

the authors assessed the full text of all remaining studies and screened their eligibility based on the inclusion and exclusion criteria.

If information on population, intervention or outcomes was missing, a search was conducted to identify the study protocols. If there were still data missing, the authors were contacted. If the authors did not respond, the studies were excluded due to missing data. Disagreements were resolved at a consensus meeting.

The data were extracted from the included studies by one of the reviewers. In case of uncertainties another researcher was consulted.

2.3.2. Assessment of risk of bias

Two reviewers independently assessed the methodological quality of each individual study. Discrepancies were resolved through discussion. Risk of bias was assessed both on a study and an outcome level, based upon the Cochrane Collaboration's risk of bias assessment tool. [10] All 6 domains were assessed as having a high, low, or unclear risk of bias using the description as used in the Cochrane Handbook.

Results of the quality assessment were reported using Review Manager 5.3 Software of the Nordic Cochrane Centre, the Cochrane Collaboration, Copenhagen.

2.3.3. Data synthesis and statistical analysis

Results of multiple studies were pooled where studies were considered to be similar in population, intervention, and outcome measures. For continuous data, we combined the estimates for each study using the mean difference. For dichotomous data, we combined the estimates for each study using the risk ratio (RR). Binary and continuous outcomes were analyzed with a random-effects model.

No cross-over trials were included. Where a trial comprised more than one target group (e.g., Burton [18]), we only included the group that met the inclusion criterion of the intervention.

Because the outcome measures were based on various assessment tools, we analyzed the assessment tools and drew tables to compare them. Only assessment tools with a comparable outcome measure were used. If results were presented at several points in time, we used the time closest to the end of intervention to pursue maximum congruence.

As a result of the clinical diversity between the studies (intensity and duration of exercise programs, variety in measure instruments), we chose to use a random-effects model. The impact of the type of control intervention (regular intervention and no intervention) was assessed using sensitivity analysis.

For feedback on the content, the pre-final version of the introduction, conclusion and discussion has been presented to experienced experts. Their feedback has been incorporated in these sections.

2.4. Results

2.4.1. Description of studies

The results of the search in the 6 databases are outlined in a PRISMA diagram (Figure 1).

2.4.2. Results of the search

The electronic search resulted in 10,137 hits. Potentially eligible papers from the electronic search and papers retrieved by hand-searching resulted in 10,140 records, of which 73 were potentially relevant, based on title and abstract. Seventy-three full papers were screened for eligibility and explored on missing data. The main reason for excluding studies was absence of the components of the OT intervention or no OT included. Twelve articles were selected, of which 5 included all the required data. For 4 articles more data was found and explored in a separate study protocol. For 3 articles the required additional information was not found. For these, the authors were contacted. All authors responded. In 2 of these researches, OT was not included or the occupational therapist was only marginally involved. One researcher sent additional information, but this did not include the necessary data. Finally, 9 studies met all inclusion criteria (Appendix S2).

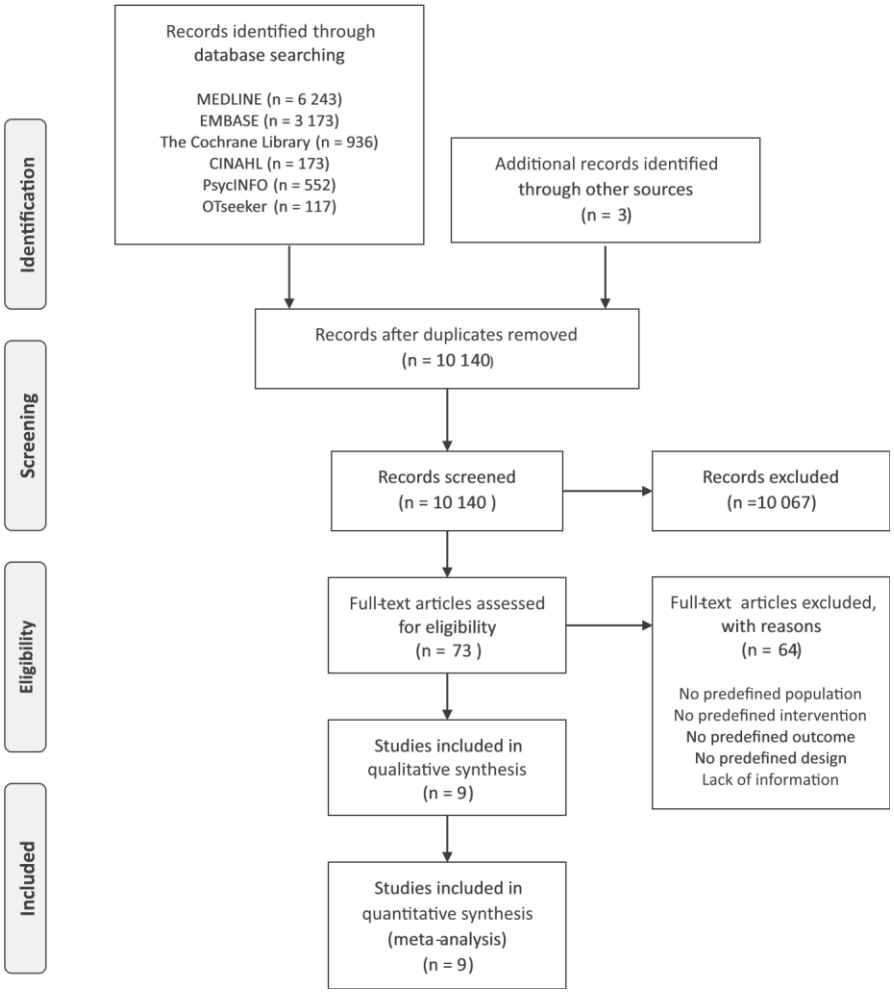


Figure 1: Flow chart of search for relevant Randomized Controlled Trials.

2.4.3. Risk of bias in included studies

The risk of bias for the individual studies is shown in the 'Characteristics of included studies' figure (Figure S2). Overall, the studies were of reasonable quality with low risk of bias, except for performance bias.

Random sequence generation and allocation concealment was done in all studies with good quality. Only one study received a moderate score on random sequence generation, because of limited information on how randomization was performed. [19] Blinding of outcome assessment was well performed in 7 of the 9 studies. In one study, the researcher who did the follow-up also opened the envelope containing the information regarding group allocation. [18] In another study, the follow-up was done by post survey. In this study, there was no description of blinding of the researchers who sent the questionnaire.[20] The reliability of outcome measures was adequate for 6 of the studies. [18,20-

[24] In 1 study, the cause of withdrawal was given, but not separately for the control and the intervention group. [19] In another study, the number of withdrawals was mentioned, but not the cause.[25] Reporting reliability was good in 8 of the studies. The study of Close [20] received a moderate score because of incomplete registration of the cause of falling. No other potential sources of bias were found.

2.4.4. Population

The included studies randomized a total of 3,163 participants. Study size in accordance with the included outcomes varied from 76 [18] to 741 [25] participants.

The included population consisted of community dwelling older people suffering from chronic disabilities. The lower age boundary was 60 years in 1 study, 65 in 4 studies, 70 in 3 studies and 75 in 1 study. One study limited the upper age boundary to 95 years. [21]

The studies clustered the limitations in functionality in "*having difficulties with ADL, having a fall risk or both"*. Gitlin [26] described the included population as older people in "*need for help or difficulties with two IADLs or one or more BADLs*." Markle-Reid[24] described the included population as "*eligible for home support services"*. Being an older person at risk for falls, was a criterion to be eligible for home support services.

2.4.5. Intervention

Seven of the included studies contained multidisciplinary interventions, OT among them. Apart from an occupational therapist, the multidisciplinary team in the primary health care setting included physiotherapists, registered nurses, registered dietitian, social workers, general practitioners, geriatricians, and/or case managers. One study contained a mono-disciplinary OT intervention. [21] In one study, the team only consisted of an occupational therapist and a general practitioner. [20]

The frequency of interventions differed. Four programs kept a predetermined number of sessions. The 'Stepping on' program consisted of 7 OT interventions of 2 hours, 1 follow-up and 1 booster session. [19] The 'Life' approach consisted of 5 OT home visits, 2 booster visits, and 2 follow-up phone calls. [22] The OT intervention of the PROFET-study was limited to one OT intervention within seven days after a fall.[20] The study of Gitlin [26] consisted of 5 OT visits of 90 minutes and 1 follow-up phone contact. Three other programs were tailored. [18,21,24] The median number of visits in the study of

Markle-Reid [24] was 4. The studies of Counsell [25] and Davison [23] did not specify the number of OT interventions.

All the OT interventions were individual interventions at home, whether or not supplemented with a group session. Individual OT interventions consisted of assessment, education and information, prevention strategies, exercises, use of assistive technology, home hazard modification, advice on aids and services, coaching, and/or follow up session (Table S1).

The OT approach was characterized by client-centeredness, empowerment, education/information, embedding within meaningful activities, and collaboration (Table S2).

2.4.6. Effects of interventions

The number of analyzed studies per predefined outcome depended on the availability of data for that specific outcome measure.

'Functioning in ADL' was reported in 6 studies. [18–20,22,25,26] If both BADL and IADL records were available, the IADL data were selected because IADL requires a higher level of performance. Functioning in ADL scores were available for 1841 participants.

The pooled Standardized Mean Difference (SMD) for functioning in ADL was -0.30 (95% CI -0.50 to -0.11). There was considerable heterogeneity in this analysis (I^2 = 74%).

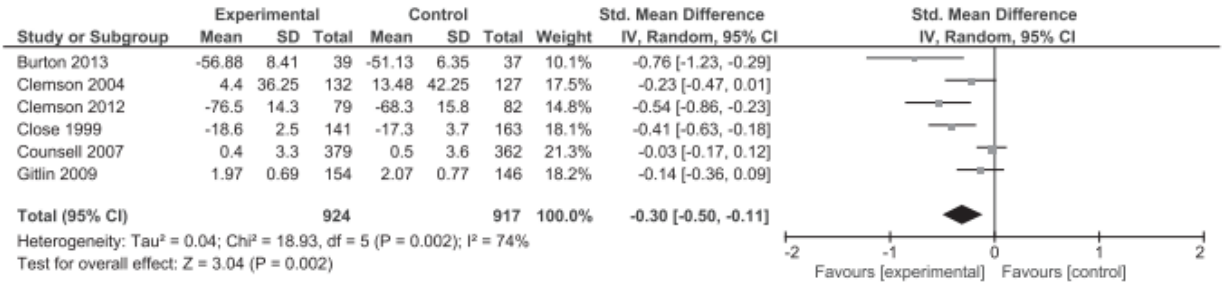


Figure 2: Forest plot of comparison 'funcioning in activities of daily living'

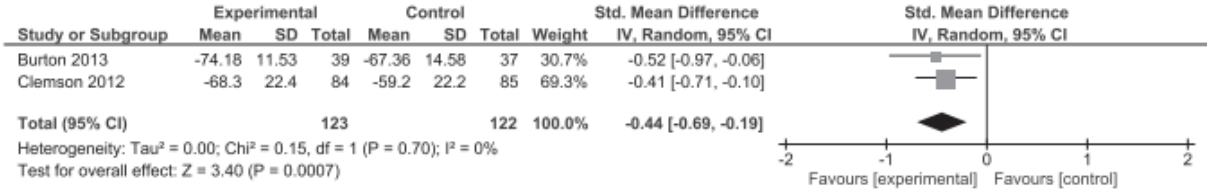


Figure 3: Forest plot of comparison 'social participation'

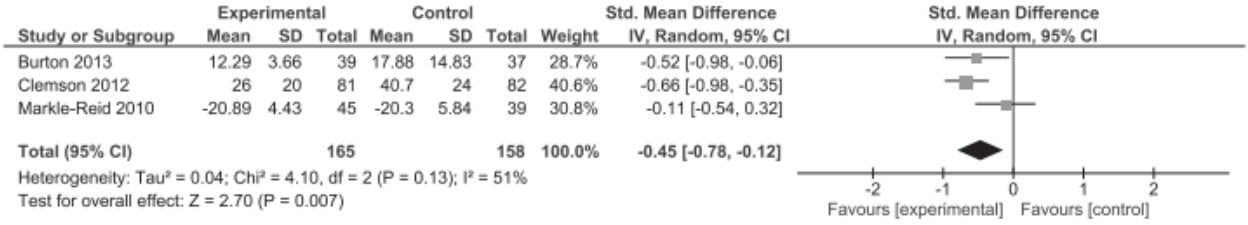


Figure 4: Forest plot of comparison 'mobility'

In the study of Counsell, [25] an occupational therapist was only included in case of reporting fall(s) at baseline. Excluding this study results in an improvement of the pooled SMD to -0.36 (95% CI -0.55 to -0.18). Heterogeneity decreased to 55% (Figure 2).

The outcome 'social participation' was present in two articles, resulting in 245 participants. [18,22] Records of the Long Life Disability Index–subtest limitation and of the Life Space Index were used.

The pooled SMD for 'social participation' was -0.44 (95% CI -0.69 to -0.19). There was no heterogeneity in this analysis (I^2 = 0%) (Figure 3).

Three studies reported on the primary outcome 'mobility,' resulting in 323 participants. [18,22,24] If trials recorded the Tinetti Performance Oriented Mobility Assessment (POMA), this was used for analysis. If this test was not available, an alternative scale that could be linked to the subtest 'gait' of the POMA was accepted.

For the outcome 'mobility' the pooled SMD was -0.45 (95% CI -0.78 to -0.12). There was moderate heterogeneity in this analysis (I^2 = 51%) (Figure 4).

The secondary outcome measures were fear of falling, cognition, disability and the number of falling persons.

'Fear of falling' was included in 5 studies, resulting in 1,008 participants. If trials recorded the (Modified) Falls Efficacy Scale (FES) for measuring fear of falling, this was used for analysis. [18,19,23,24,26] In one study, the Activities Specific Balance Confidence scale (ABC) was used. [23]

The pooled SMD for 'fear of falling' was- 0.17 (95% CI -0.29 to -0.05). There was no heterogeneity in this analysis (I^2 = 0%) (Figure S3).

Cognition was measured by 2 studies, with a total of 445 participants. To measure cognition the subpart 'delayed recall' of the Consortium to Establish a Registry of Alzheimer's Disease or the Standardized Mini Mental State Examination was used. [21,24]

The pooled SMD for cognition was -0.09 (95% CI -0.28 to -0.09). There was no heterogeneity in this analysis (I^2 = 0%) (Figure S4).

Disability scores were available for 235 participants from 2 trials. [18,22] The Late Life Disability Scale recorded the degree of disability.

The pooled SMD for disability was -0.19 (95% CI -0.45 to 0.06). There was no heterogeneity in this analysis (I^2 = 0%) (Figure S5).

It is not desirable to pool the outcome 'number of persons who fell at least once' because of substantial difference in interventions. Both Close[20] and Davison[23] report a reduction in the risk of falls, with a substantial risk reduction in falls of 38% and a risk reduction of 11% (Figure S6).

2.5. Discussion

2.5.1. Summary of main results

This review summarizes the evidence on effectiveness of a home- and community-based approach including OT for frail older people. It shows that OT contributes to the improvement of functioning in ADL, social participation and mobility. Fear of falling was decreased through an approach that included OT. Studies on OT interventions reported beneficial effects of empowerment and the use of meaningful activities. [21,22]

These results are tentative because the types of interventions reported in the studies varied considerably. However, this is inherent to OT because a high quality OT intervention takes into account a number of characteristics of which 'client centered' and 'tailored made' are two. For this

reason OT interventions will vary because they are tailored to the personal and environmental characteristics and will therefore rarely be rigidly prescribed.

Given that the older population increasingly prefers to remain in their home environment as long as possible it may be worthwhile investing more in home- and community-based OT. Besides the positive impact on autonomy and wellbeing of the older people, Beland showed that an integrated approach, with the occupational therapist as one of the actors, is also advantageous in that it reduces costs of hospitalization and residential care. [27]

The most effective outcomes were related to the ICF-components 'activity and participation.' Increased social participation and increased ADL are also clinically relevant. Social participation has been associated with a range of health and socio-economic factors, such as the number of peripheral joint pains, the number of health problems, cognitive impairment, anxiety, and depression. [28] Independency for preparing meals improved by more than 50% in the intervention group versus the control group and independency in bathing by nearly 50%. [26]

We found positive results for the secondary outcomes of cognition and disability, and on the number of falling persons. However, these differences did not reach statistical significance. This may be due to a lack of power as only two studies reported these outcomes. Also for the outcome cognition, the outcome measure may lack sensitivity for this population. A longitudinal study of the MMSE in normal aging concluded that the MMSE score declined very slightly in persons not suffering from dementia. The MMSE is also more prone to ceiling effects than, for instance, the Montreal Cognitive Assessment or Brief Cognitive Rating Scale. [12,13,29,30] Using the MMSE might not be the best choice to detect changes in cognition on short term or to determine changes in cognition at a younger age. It makes sense to select a more sensitive test to measure changes in cognition on short term and in young old.

2.5.2. Quality of the evidence

While the methodological quality of the included trials was generally good, trials of OT interventions are subject to several potential methodological limitations. A common problem in research on OT interventions is the inability to blind therapists and patients. OT interventions, such as home adaptations, are always visible to patients receiving the intervention. For this reason, blinded studies of this type of intervention are not available.

A second problem concerns the complexity of approaches to chronic diseases. Kopke and McCleery[31] have pointed out that there is complexity in the intervention components as well as in the

theoretical background of the intervention, the implementation context, and the targeted outcomes. For those reasons, it is a real challenge to accumulate the evidence for complex interventions. [32] Occupational therapists most often work in a complex chronic care context, such as treating frail older people.

This study included only high-quality trials and for this reason, some outcomes were underrepresented.

2.5.3. Potential biases in the review process

Lack of information in the studies was supplemented with information from the retrieved study protocols. If these were not available or if insufficient information was given, the author was contacted. If it was not possible to retrieve the missing data, the article was excluded.

2.6. Conclusion

This systematic review provides strong evidence that OT moderately improves functioning in community-dwelling physically frail older people.

2.6.1. Implications for practice

The issue of the physically frail older person mostly requires an interprofessional approach. In this review, interprofessional collaboration was embedded in 8 out of 9 interventions.

Client-centeredness was embedded in 7 out of 9 interventions. The frail older people and their caregivers should be consulted during the different phases of the intervention. To support frail older persons and their caregivers in making the right decision, they need to be informed and, if necessary, trained. Shared decision-making involves both goals and interventions. Objectives and treatment plan should be decided on together with the frail older person and his environment. Proposed activities should be meaningful. A shared decision-making process should ensure empowerment of the frail elderly and their environment, as well as increased compliance.

2.6.2. Implications for research

A large-scale trial on OT for complex chronic interventions is recommended. Further research is required to elucidate the barriers, facilitators and preconditions for implementing such a complex approach. To gain insight in this goal, the outcome of this research will be used to study the perception of older people on their functioning. Gaining this insight might help the occupational therapist in order to increase adherence, which is a big issue in the approach of complex chronic diseases.

2.7. Declarations

2.7.1. Acknowledgments

We thank Dr. Bert Vaes and Marleen Michels, all of the KU Leuven, for their support on the search strategy and literature search. We also thank AB, JF, JL and JP who were willing to share their expertise on becoming older, by giving feedback as empirical experts on the introduction, discussion and conclusion. Their feedback has been integrated in these sections. They were not compensated for their contributions.

2.7.2. Conflicts of Interest

All authors got no support from any organization for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

2.7.3. Author contributions

LDC was responsible for the study concept and design, wrote the review protocol, reviewed articles for inclusion, performed a critical appraisal of the included articles, carried out the data extraction, and drafted the manuscript under supervision of the other authors. GEB provided statistical support, contributed to the analysis, interpretation and presentation of data, and conducted a critical revision of the manuscript. LB reviewed the articles for inclusion as a second independent researcher. AD contributed to the critical revision of the manuscript. MJLG performed a critical appraisal of the included articles as second independent reviewer and contributed to the critical

revision of the manuscript. BA contributed to the study design, presentation of the data and performed a critical revision of the manuscript. All the people who contributed to the work have been listed.

2.7.4. Funding

This research was funded by the Flemish Policy Research Centre Welfare, Public Health and the Family, Belgium.

2.7.5. Sponsor's role

An advisory committee approved by the policy research center annually gave feedback on the research process. They had no influence on the content of this systematic review.

2.7.6. Transparency declaration

The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

2.8. Supporting information

Additional Supporting Information may be found in the online version of this article (DOI: 10.1111/jgs.14889):

Appendix S1. Search strategy.

Appendix S2. Excluded articles with reason for exclusion.

Table S1. Components of the intervention.

Table S2. Occupational therapy approach.

Figure S1. ICF-framework of WHO.

Figure S2. Qualitative appraisal of included articles.

Figure S3. Forest plot of comparison 'Fear of falling'

Figure S4. Forest plot of comparison 'Cognition'

Figure S5. Forest plot of comparison 'Disability'

Figure S6. Forest plot of comparison 'Number of persons who fell at least once'

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3. Perspectives of older adults with a chronic condition on functioning, social participation and health: a qualitative study

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DOI: 10.1186/s12877-021-02365-w

ABSTRACT

Background

Problems with mobility, functioning and social participation make living independently difficult for frail older adults. To continue living independently, therapy adherence is a prerequisite. The causes for non-adherence among older adults are multiple and complex, which is why insight into older adults' perspectives regarding their functioning is an essential factor to increase therapy adherence.

This study investigates the perspectives of older adults on their functioning, social participation and health, and the factors influencing these elements.

Methods

We conducted a qualitative study on the older adult's perceived functioning, social participation and health. Fourteen home-dwelling older adults suffering from chronic health issues were purposively selected.

Semi-structured interviews were conducted with open-ended questions.

Data were analysed following the Basic Logical Model of Abduction and Creswell's coding method.

Results

Assistive devices, the older adult's dwelling and living environment, professional and informal support, and medication are perceived as important determinants for retaining functioning and social participation.

Attitude, social influence and personal effectiveness were found to influence whether a person performs or participates in an activity. A person's attitude is related to the significance the activity has to that person, the activity's importance, personal wellbeing, the person's values, and their desire for autonomy. Peers and children have a social influence on the level of activity of the older person. Traditions, in particular religious activities, along with personal effectiveness are motivating factors determining whether a person performs or participates in an activity. Personal effectiveness is linked to the person's belief in their personal competencies and to the relationship between effort and result.

Finally, it appears that the type of coping strategy the older adult adopts, has an influence on their behavior. The participating older adults often used remarkable problem-focused strategies, which had a positive effect on their level of autonomy.

Conclusions

Older adults have identified barriers and facilitators that influence their level of functioning and social participation. These findings help to create a framework for maintaining and increasing therapy adherence, which may be helpful in facilitating occupational therapists and other healthcare professionals to detect determinants of therapy adherence.

Keywords

Older adults, Functioning, Social participation, Adherence, Person-centered care, Occupational therapy

3.1. Background

Physically frail older adults experience problems with mobility, functioning and social participation. Despite these problems, they want to live at home for as long as possible. [1-3] Participation in activities and in social life, as well as an adapted living space are important for people to be able to stay in their homes for as long as possible. [4-6] The use of home modifications results in improved function and decreased falls which can be achieved with the help of occupational therapists, whose contribution is often vital. [6] Therapy adherence, including adherence in performing home modifications and using assistive devices is a prerequisite for success.

However, lack of therapy adherence is a common problem among older adults with chronic conditions. [7-8] There are various, interplaying reasons for non-adherence. [9-10] Person-related factors play a role, such as the degree to which an activity is tailor-made. Interventions regarding age-related issues, such as the risk of falling, need to address the clients' attitudes and beliefs, as well as their physical capacity. Insight into older adults' perceptions regarding their functioning and social participation is a precondition for person-centered advice and for successful treatment that strives towards behavioral change. [11-14]

Therefore, healthcare professionals such as occupational therapists inform older adults on their health. They strengthen the older adult's motivation and competence to make health-related decisions by increasing health literacy. This extended knowledge increases the older adult's personal empowerment and autonomy when carrying out activities at home or partaking in social and cultural events. [15]

To pursue successful and sustainable treatment, behavioral change of the older adult is necessary. The Transtheoretical Model of Change (TTM) describes how a sustainable change in behavior can be obtained by following a well-structured procedure. TTM consists of five stages, i.e., pre-contemplation, contemplation, preparation, action and maintenance. The approach should be adapted to the level of function the patient is at. [16,17]

Occupational therapists' work is evidence- and occupation-based. Early pioneers in occupational therapy conceptualize 'occupation' as an active participation in self-maintenance, work, leisure, play and rest.[18] Performing occupation-based interventions means that the occupational therapist develops a holistic view of the client by looking at all the client's components as described in the International Classification of Functioning, disability and health framework (ICF-framework) and determining how they relate to each other. The components of the ICF-framework are as follows:

body functions and structures, activities, participation, as well as environmental and personal factors. [19,20] (Figure 1)

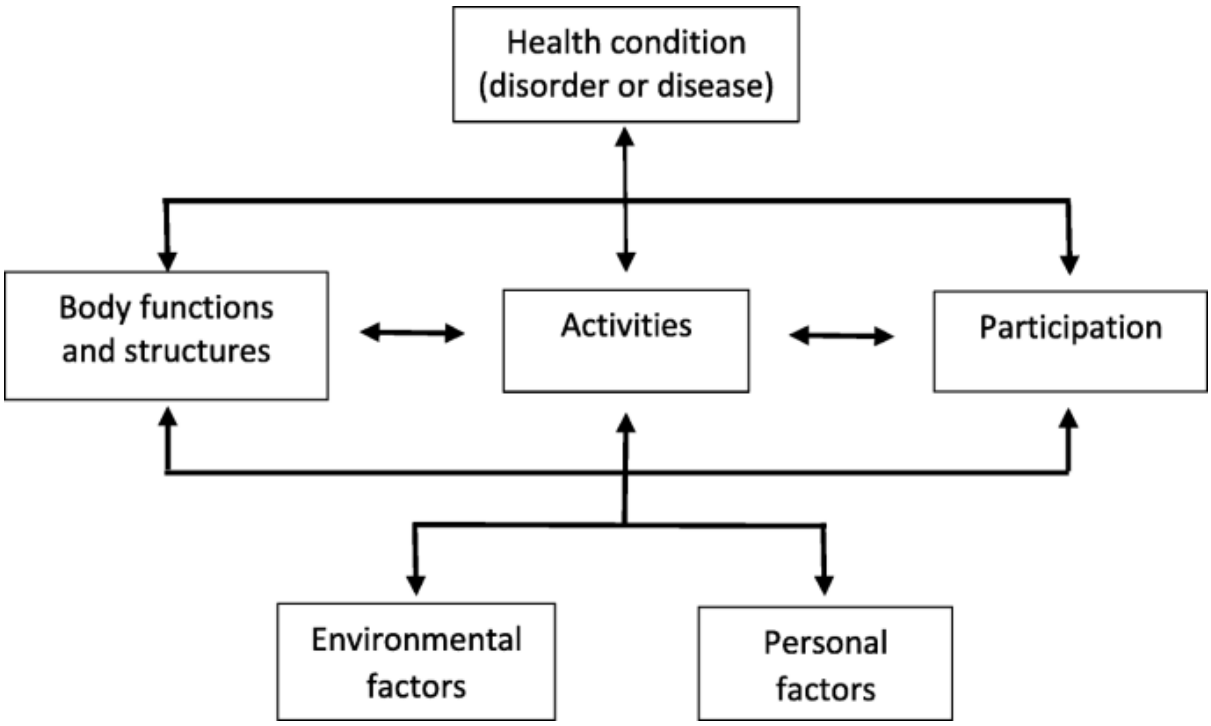


Figure 1: ICF-framework (WHO, 2009)

A step-by-step treatment plan to realize a high-quality occupational therapy intervention to modify the home consists of assessing a person's abilities and their home environment, developing occupational goals, drawing up and implementing an intervention plan to overcome barriers, and training the older person and/or their informal caregiver(s) to complete daily activities using environmental support. [6,21] Stark (2015) developed a list of sixteen personal factors and conditions that expert occupational therapists routinely assess and integrate in their home modification intervention plans, among which the housing type, the ability of the older adult to care for and maintain the home modifications, their personal assistance preferences, their physical assistance available, their readiness for change and the ability to manage their finances. [21] These factors are based on data from interviews with and observations of occupational therapists. However, Stark did not include views of the older adults themselves in her study. To increase the treatment effect, there is a need for complementary factors that considers the older adult's perspective regarding their functioning, social participation and health. The present study adds to Stark's model by also including the perspectives of older adults.

3.2. Objective

This study investigates the perspectives of home-dwelling older adults on their functioning, social participation and health, and on the factors influencing these capacities and their health.

3.3. Methods

3.3.1. Design

In-depth interviews with home-dwelling older adults were performed, using open-ended questions about their perceptions of their functioning, social participation and health, and the factors that have an influence on these elements. The theoretical framework underpinning this study is the Basic Logical Model of Abduction which uses abductive analysis as its qualitative data analysis approach. [22] Abductive analysis aims at generating novel theoretical insights through a dialogue between sensitivity for cultivated theory and methodological heuristics. [23] In this way, the Basic Logical Model of Abduction emphasizes that research can be both inductive and deductive. Abductive analysis allows researchers to let themes, patterns and categories emerge from data (inductive) and, on the other hand, rely on existing analytical categories obtained from previous theories (deductive). Insightfully abducting during analysis consists of developing themes, codes and categories that structure data. When organizing and structuring the analyzed information, it might turn out that it fits within existing models. These existing models provide insights which, in turn, lead to further analysis, so that broader and more extensive knowledge is gained. Abduction challenges researchers to develop their theoretical repertoires throughout the research process rather than setting all preconceived theoretical ideas aside during the research project. [23-25]

3.3.2. Sample selection and participants

Older adults suffering from chronic health issues were identified using the networks of the primary healthcare professionals involved in this study. Respondents were informed by phone about the project and what would be expected from them. If they agreed to participate, an appointment was made for a face-to-face interview in their home. All participants gave their informed consent.

The sample consisted of people aged 65 or older who were suffering from chronic health issues, home-dwelling (alone or otherwise), and able to communicate in Dutch.

People diagnosed with dementia, irreversibly bedridden, or requiring palliative care were excluded.

Convenience sampling was used, as we opted to strive for the greatest possible diversity and not for saturation. We did, however, set a minimum of 12 interviews. To capture major variations, we varied extremes in terms of age, level of mobility, residential situation and living situation. Because the initial selection did not provide sufficient information, we included two extra respondents. One of the additional respondents lived in an assisted environment and the other one had to deal with an external inhibiting factor, the burden of a disabled child. (Table 1)

3.3.3. Data collection

An interview guide was developed based on the components of the Canadian Model of Occupational Performance and Engagement and on the Canadian Occupational Performance Measure. [26,27] (Appendix 1: Interview Guide).

The interviews lasted 30 minutes on average, were audiotaped and transcribed verbatim.

The questionnaire was pilot-tested. Based on these pilot interviews, adjustments were made to seek more meaningful answers. For instance, the question 'What facilitates you in doing these activities/in participating in these activities?' was supplemented with in-depth questions that inquired about facilitating attitudinal aspects, mental capacities, physical capacities and environmental influences.

3.3.4. Data analysis

The researcher performing the interviews also transcribed the audiotapes. The interviews were then analyzed by two people independently of one another, without using any software.

Data were analyzed following Cresswell's methodology [28]. Creswell describes a systematic process for data encoding, during which statements are analyzed and categorized into meaningful clusters representing the investigated phenomenon. The different steps in the analysis process are data management, reading and taking notes, describing, classifying and interpreting, reporting, and visualizing.

Two researchers independently analyzed the text, made notes (short sentences, ideas or core concepts) and attributed initial codes to two of the interviews. The findings were discussed in detail to reach agreement on how to further analyze the other interviews. The researchers divided the

data into themes and text was grouped under meaningful categories. One researcher analyzed the remaining twelve interviews based on the agreement that emerged from the discussion. The second researcher reviewed this analysis and discussed alternatives with the first researcher. If discussions did not end in consensus, a third researcher was consulted. In the final phase of the cycle, the essence was captured in writing.

During the analysis process, subthemes were derived from the data using abductive reasoning. In the course of subsequent analysis, we gradually discovered theoretical frameworks to operationalize concepts from the ICF, the Canadian Model of Occupational Performance (CMOP-e) of the Canadian Association of Occupational Therapists [29,30], de Vries's Attitude-Social Influence - Self-Efficacy Model (ASE-model)[31] and Moos's coping strategies. [32] (Figure 2)

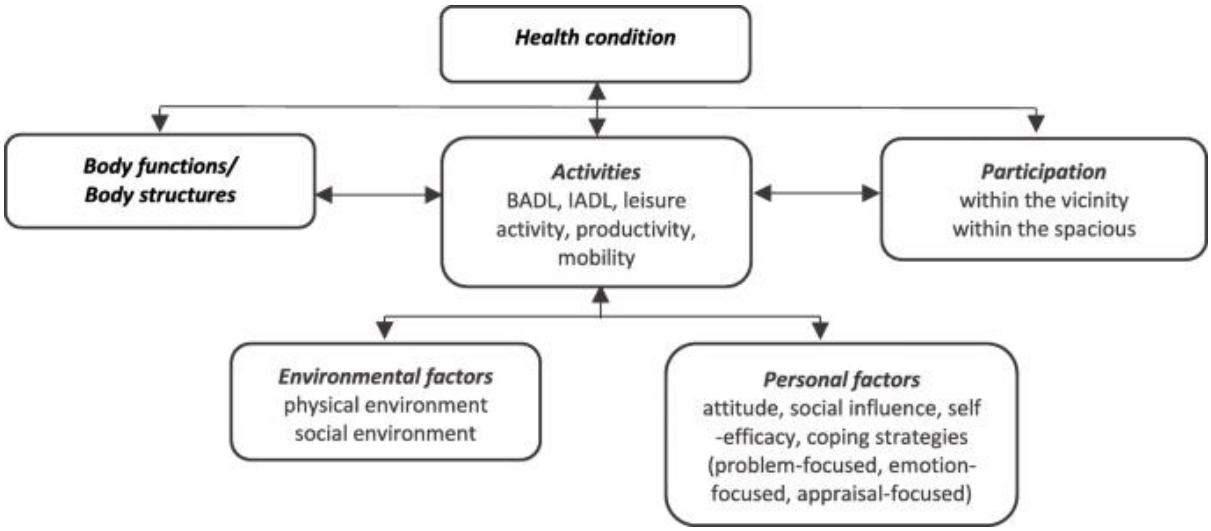


Figure 2: Analysis framework, based on ICF, CMOP-e and ASE-model

In the final step, the results were contextualized. When the results were reported, a distinction was made between the descriptive display of what the respondent indicated on the one hand, and the direct representation of the respondent's perception concerning functioning and determinants of behavior, changes in behavior and coping strategies on the other hand.

3.3.5. Reflection on the role of the researchers

The research group consisted of a multidisciplinary team, knowledgeable in the fields of sociology of health, occupational therapy, gerontology and family medicine. As a result, data analysis was influenced by these various academic and professional backgrounds.

3.4. Results

3.4.1. Demographic characteristics

Fourteen older adults were interviewed (eight women and six men), with their ages ranging from 65 to 101 years. Because we strived for maximum diversity, we included one respondent who was slightly younger (a difference of less than one year), but who had severe mobility problems. This person met all the other selection criteria. All participants indicated they had chronic health problems which impacted their functioning. The number of indicated problems varied from one to three. (Table 1)

Respondent	Gender	Age	Marital status	Reported health problems	Level of mobility	Residential situation	Living situation
1	female	80's-90's	widow	blood pressure, cardiac	restrictions on moving in- and outdoors	townhouse with stairs	living alone
2	male	80's-90's	widower	balance, vision	restrictions on moving in- and outdoors	townhouse with stairs	living alone
3	male	80's-90's	widower	memory	no restrictions on moving indoors; partial restrictions on moving outdoors	townhouse with stairs	living alone
4	female	100's-110's	widow	vision, falls, arthrosis	restrictions on moving in- and outdoors	townhouse with stairs	living alone (week); living with children (WE)
5	male	70's-80's	married	hernia	No restrictions on moving indoors; partial restrictions on moving outdoors	flat with elevator	living with wife

Respondent	Gender	Age	Marital status	Reported health problems	Level of mobility	Residential situation	Living situation
6	female	80's-90's	widow	normal aging diseases	no restrictions on moving indoors; no restrictions on moving outdoors	flat with elevator	living with partner
7	male	90's-100's	married	sleep, presbyacousis, mobility	no restrictions on moving indoors; partial restrictions on moving outdoors	detached house with stairs	living with wife
8	male	90's-100's	married	vision (blind), arthrosis, mobility	restrictions on moving in- and outdoors	ground floor of townhouse	living with wife
9	female	70's-80's	widow	mobility	restrictions on moving in- and outdoors	townhouse with stairs/stairlift	living alone
10	female	60's-70's	widow	mobility, backache	restrictions on moving in- and outdoors	flat with elevator	living alone
11	female	80's-90's	widow	mobility, intestinal	No restrictions on moving indoors; partial restrictions on moving outdoors	townhouse with stairs	living alone
12	female	70's-80's	married	rheumatoid arthritis, osteoporosis, dented vertebra	restrictions on moving in- and outdoors	detached house with stairs/stairlift	living with husband
13	female	60's-70's	married	arthrosis, heart rhythm, glaucoma	no restrictions on moving in- and outdoors	detached house with stairs	living with husband and sun with special needs
14	male	70's-80's	married	arthrosis, glaucoma	no restrictions on moving indoors; partial restrictions on moving outdoors	Assisted flat with elevator	living alone, separately from his wife

Table 1 Demographic characteristics

The analysis of the older adult's experiences is grouped under three themes: the older adult's perceived level of activity and participation, their perceived health, and the factors they perceive as influencing their activity level and participation.

3.4.2. Perceived level of activity and participation

The 'activity and participation' theme was categorized into five subthemes: Basic Activities of Daily Living (BADL), Instrumental Activities of Daily Living (IADL), productivity, leisure activity and mobility.

Eleven respondents indicated being able to handle BADL on their own. Three respondents indicated requiring assistance with dressing and undressing, with the extent of the required help varying from completely dependent to only needing help closing small zippers. About half of the respondents (eight) stated having problems with climbing stairs.

All respondents indicated perceiving limitations regarding IADL, productivity, leisure activity and mobility. Nearly all respondents reported being able to prepare small snacks. Doing laundry, cleaning, running errands and working in the garden were most problematic. The three respondents who reported problems with BADL reported performing only a few IADL activities. These respondents were over 90 years of age and two of them had a profound visual impairment. The remaining limitations were mostly related to strength, flexibility, endurance and balance. Strength refers to a global reduction in strength as well as specific strength loss in the hand region. The reduction of flexibility was mostly at the level of the hands and wrists. Visual impairments greatly limited being active in the field of IADL.

> *"In the kitchen, it's my wife who does everything. I can't do anything because I can't see it. I can't feed the pets anymore either, my wife does that. My wife also does the garden. When I go outside, I take my walking-frame, but last Sunday I took my cane. I should have used my walking-frame..."* (90's-100's - man with visual impairment and mobility issues)

One respondent had a part-time paid job. Two respondents gave informal care or did chores for family members and friends, which varied from having a fixed schedule to sporadic services. One respondent wanted to be more productive, but saw no opportunities.

All respondents (n=14) reported that the variety of pastimes available to them had been reduced, ranging from a slight to a great extent. The decrease included both outdoor activities and individual indoor activities, such as not being able to read a book.

All respondents reported a decrease in mobility, with six of the respondents using an ambulatory aid. One of these respondents indicated having very limited mobility due to multiple physical limitations, including severe visual impairment. This person no longer left the home to participate in social activities, but often received visits at home. All respondents had a decreased ability to travel long distances. Two respondents communicated being able to ride a bicycle but only a bicycle

adjusted to their needs. Five respondents still drove a car. Three respondents still went on holidays, of which one respondent still travelled like he used to in the past. The second respondent went on large trips, but only with a group. The third respondent indicated only travelling in comfortable circumstances. For example, he preferred to pay more for comfortable transportation. Overall, the respondents frequently relied on assistive devices or opted for alternative activities, both inside and outside the home. Nevertheless, the use of creative and less creative solutions did not remove all mobility restrictions, which led to less or adapted participation in previously familiar outside activities.

> *"The large walks have been left behind. Up until about four years ago, those still went fine, despite my back issues. And cycling, mostly uphill and downhill, I don't like going straight ahead all the time. It seems like it's more exhausting if I don't have variation."* (70's-80's - man with lower back-pain)

3.4.3. Perceived health

Most of the older adults (n=11) indicated being in good health, independent of the number of health issues they had, and the degree of limitation they experienced. Three people rated their health more poorly, of which two had severe mobility limitations. Both respondents wanted to stay active, despite their limitations. Nobody said their health was bad.

> *"I'm generally good, it's just my walking that's less good, but otherwise I'm healthy. My health never deteriorates. I'm happy with what I can still do."* (70's-80's - woman using a walking aid)

3.4.4. Factors older adults perceive as influencing their activity level and their participation

Categories that are mentioned as extrinsic factors that influence functioning are assistive devices, the dwelling and living environment, professional and informal support and medication. These factors can be both facilitating and inhibiting.

The most used assistive devices pertained to mobility (n=8). Five respondents go outside with a walker or a rollator. One respondent utilized a cane outdoors. Two older adults used a stair lift. Three older adults were advised to use a cane but refused to do so because of perceived stigma. The respondents stated that aids can facilitate one aspect of functioning, but also bring about new limitations in other areas. For example, a walking aid facilitates walking, but causes issues when

trying to transport things or perform certain other actions while walking. Kitchen appliances are less often used (n=2). Sometimes, specific kitchen appliances were used for household tasks that require hand-strength, such as a bottle-opener with an elongated handle.

> "*My walker and my rollator, these are my freedom. I use my walker upstairs and it stays there. I have my rollator downstairs. I always take my rollator with me when I go outside."* (70's-80's - woman living alone)

All respondents reported that their dwelling and living environments were adapted for them to function optimally. In two of the nine houses with more than one floor, a stair lift was installed. Two other older adults did not use the upper floors anymore but did not find their home not adapted to their needs. All older adults who lived in an apartment made use of the elevator present in the building. One respondent recently moved to assisted living and said this facilitated mobility. The majority of the older adults indicated that the neighbourhood was not sufficiently adjusted for people to move around safely. Stairs, the type of terrain and support points in the neighbourhood were indicated as important determinants for mobility.

The help from professional services was perceived as facilitating, albeit with certain limitations related to frequency and time. For example, certain types of services were not provided on weekends. The professional services consisted of help at home or respite care. Examples of services at home are home library service, garden service, meals on wheels and home care. Examples of respite care are day-care centers and a short stay at a care facility. The respondents generally perceived informal assistance by family and neighbours as facilitating. The respondents also mentioned disadvantages. Informal caregivers, just like professionals, are not always available. Informal caregivers have their own needs and worries and that can interfere with the provided informal care.

> "*Especially strength in my hands, that's what I experience. When I need to turn the key, then I need to do that twice and twist, or if I need to open a jar, then I give it to the boy next door."* (80's-90's - woman living alone)

Taking medication is perceived as normal. Still, older adults indicate that medication is not enough to alleviate all pain or discomforts, for example rheumatic pains. Despite optimal medication-intake, they still experience limitations. They also indicate that for certain afflictions, no suitable medication solutions are available yet.

3.4.5. Perspectives on determinants of functioning, social participation and health

Characteristics of attitude, social influence and self-effectiveness, as well as the applied coping strategy determine whether or not a person performs or participates in an activity.

3.4.5.1. Attitude

The older adult's attitude towards their – possibly reduced – functioning was determined by one or more of the following categories: significance, necessity, wellbeing, belief and desire for autonomy.

The care for a pet, partner, friend, grandchild and their property, as well as self-care were meaningful actions that motivated the older adult to remain active. Things they did not perceive as meaningful did not motivate them to be active or to participate socially.

> *"… I have trouble talking to other people, having a conversation, that's just not me … my mother was like that as well. Everyone knew she didn't do chatting."* (100's-110's - woman living alone)

Activities that are normally not performed by older adults because of bodily limitations were still performed in extraordinary situations. Enjoying the things they do was often mentioned in relation to 'doing things together' and doing things that lie within their sphere of interests, like hobbies. Both increased their feeling of wellbeing.

Being convinced that a certain way of behaving contributed to better physical or mental health, or a certain mental attitude can lead to being active or to healthier active behavior.

> *"I often tell myself "exercise in the morning, every day". But some do nothing, I wonder how people with back pain can sit for hours without adopting an ergonomic posture."* (70's-80's - cohabitating man)

The desire for autonomy was the greatest motivator for staying active. All older adults expressed the wish to maximally maintain their privacy.

> *"Get up, washing my privates and my face, I've already washed my privates when the nurses come to shower me. I want to wash my privates myself."* (100's-110's - woman living alone)

3.4.5.2. Social influence

The perceived social pressure and support that motivated being active or that influenced the frequency of participation mainly consisted of the non-professional environment, more specifically

the children and peers (friends and acquaintances). The most important peer in this matter was the partner. Perceived social pressure and support was seldom associated with the professional environment.

Traditions and religious activities were events that the older adults experienced as manifestations of social norms and as incentives for remaining active. Weekly church services and leaving the house for family events were the most common examples. The importance the older adult assigned to their (self-) image was a self-enforced norm, but it was often strengthened by a societal norm.

> *"I refuse to wear a hearing aid. I think it is a sign of old age…. My wife does everything in our household. Every two weeks the cleaner comes. Everything else we do ourselves… I don't like the idea that someone would think, I'm here with pensioners who neglects everything around them…"* (90's-100's - cohabitating man)

The older adults only mirrored active behavior of active peers in their immediate environment, since these tend to have a motivating influence on them.

> *"I think it's because you're still in your regular environment. You see people doing things and think "I can do that too" and you do it too. Because if I were to end up in a nursing home, it would be over quickly."* (80's-90's - cohabitating women)

3.4.5.3. Self-efficacy

The older adult's belief in their self-effectiveness was a determining factor for whether they attended activities and participated. The decision to be active was determined by the balance between the effort put in and the result this effort provided. Most older adults could estimate how much effort they needed to complete a certain action and how long they could maintain this.

> *"Running I've thought of that, but why should I do that? I can walk just as well."* (70's-80's - man living alone)

Eleven respondents adjusted their actions according to their insight into their own effectivity, but this was not the case for all older adults. Three older adults exceeded the limits of their comfort zone to still be able to perform certain actions.

> *"When I wake up, I think "I hope I don't have pain today for a change". Rheumatism, that sometimes takes two hours. And I think "If I didn't experience pain, I might miss it"… The laundry does not go as smoothly as it used to, where it used to take an hour, I now take one hour and a half. It's the same with cleaning."* (70's-80's - woman living alone)

3.4.6. Coping strategies

The older adults used various coping strategies, with problem-focused strategies being the most frequent and emotion-focused and appraisal-focused strategies being less frequent.

Older adults who employ problem-oriented coping strategies had a positive attitude and were more determined, since they had learned to solve problems on their own over the course of their life. To keep stress under control, these older adults dealt with problems actively. They looked for ergonomic solutions like sitting down whilst ironing, performing an action in steps, purchasing multiple walking aids to utilize in various locations, or they purchased ergonomic products.

> *"My husband and I regularly go cycling with our son. Walking long distances is no longer possible because of my foot injury. Cycling keeps us moving."* (60's-70's - woman living with sun with special needs)

Looking for social support from a partner, the neighbours or someone from the wider environment, such as the cashier, was often employed. Aside from that, older adults would anticipate possible issues like back pain by staying within their limits or working more slowly.

An emotion-focused coping strategy that was employed was seeking diversion, such as thinking of the grandchildren and meditation, by reading a prayer. Emotion-focused coping involves managing the emotional distress that is associated with a problematic situation. [33] It includes all the regulative efforts to diminish the emotional consequences of stressful events. [34]

> *"When I am in a lot of pain, I pray or think about my grandchildren. It distracts me from the pain."* (60's-70's - woman living alone)

An appraisal-focused coping strategy that came to the fore was humor, serving as a comforting thought. Appraisal-focused coping refers to the way a person thinks about the stressors or circumstances they are confronted with. People may alter the way they think about a problem by adapting their goals and values, such as by finding humor in a situation. [33]

> *"Putting things into perspective through humor… we try and agree with each other as much as possible. What's changed is that instead of softly whispering to each other we now have to yell at each other."* (90's-100's - cohabitating man)

3.5. Discussion and conclusion

3.5.1. Overall findings

Our study sheds light on the themes that need to be mapped to increase physically vulnerable older adults' therapy adherence.

Assistive devices, the older adult's dwelling and living environment, professional and informal support, and medication are perceived determinants of functioning, social participation and health that are important. These determinants can be both facilitating and inhibiting. This knowledge confirms the importance of Starks' findings that occupational therapists inquire about the presence of physical assistance, housing type, structural conditions of the home and the available space and layout. This information is gathered to support clinical reasoning. Also, questions are asked about the person's preferences for social support and personal assistance. [6,21] Considering this information will increase adherence to the occupational therapy recommendations. A study on beliefs of people living with rheumatoid arthritis showed that levels of concern about side effects of medication were high and related to non-adherence. [35]

Our study also indicates that the influence of medication is a factor that must be considered even more to increase adherence for recommendations. Thus, our findings are both consistent and complementary with the literature on influence of professional and informal support on the level of activity and participation, and on therapy adherence. [6,7,8,14,21,35,36]

Attitude, social influence and personal effectiveness were found to be of influence on the level of activity and social participation. A person's attitude is related to the significance the activity has for that person, the activity's importance, personal wellbeing, conviction and the desire for autonomy. Peers and children also have a social influence on the older person's activity level. Traditions, and religious activities in particular, along with personal effectiveness are motivating factors determining whether to perform or participate in an activity. Palominos' study on persons with rheumatoid arthritis states that a patient's beliefs influence the global impact on therapy adherence and coping patterns. The study proved that the older adult's belief that they were not able to control pain and the course of disease, has a statistically significant correlation with disability. Personal effectiveness is linked to the older adult's belief in their personal competencies and to the relationship between effort and result. [35] Recent work also demonstrated that the older adults' sense of confidence in using assistive devices drives continued participation in a specific activity. [8,37] This is in line with our study indicating that attitude, social influence and personal effectiveness influence on the level of

activity and social participation of the older adult. In addition, our study operationalizes these factors from the perspective of the older adult, which can facilitate occupational therapists and other healthcare providers to work person-centered. Preferences regarding personal assistance, readiness for change, adherence and concern for aesthetics are personal factors considered by occupational therapists to inform their clinical reasoning. [21] Supplementing these factors with gaining insight in the older persons' attitude, their sensitivity to social influence and their way they perceive their personal effectiveness completes the relevant information which allow occupational therapists to deliver complex interventions with high fidelity.

Finally, it appeared that the type of coping strategy the older adult adopts has an influence on their behavior. In our study, the older adults often used remarkable problem-focused strategies, which had a positive effect on their activity level and participation. Our findings are consistent with those from previous research into other health behaviors which generally show an influence of coping on preventive behavior and wellbeing. [38,44]

The use of a person-centered approach in care for older persons focuses on the older adult as a person with the ability to make autonomous decisions. Incorporating the uniqueness of each client's situation into the daily routines of the health professional, leads to increased well-being and satisfaction. [39] Well-being and satisfaction promote improved adherence and self-management behaviors in people with chronic health issues. [40-42] Therefore, it is necessary for a health professional to have insight in the client's perspectives. Interaction with frail older adults and their informal caregivers must be part of a geriatric comprehensive assessment to define the impact of illness and symptoms on a daily-to-day life. [43]

3.5.2. Conceptual framework

Therapy adherence is complex and has different determinants. The link between these determinants and therapy adherence is the older person's personal perspective on it. On the basis of the present study's findings, a conceptual framework based on TTM has been developed that might serve as a helpful tool to take into consideration the older adult's perspective on their functioning, social participation and health (Figure 3).

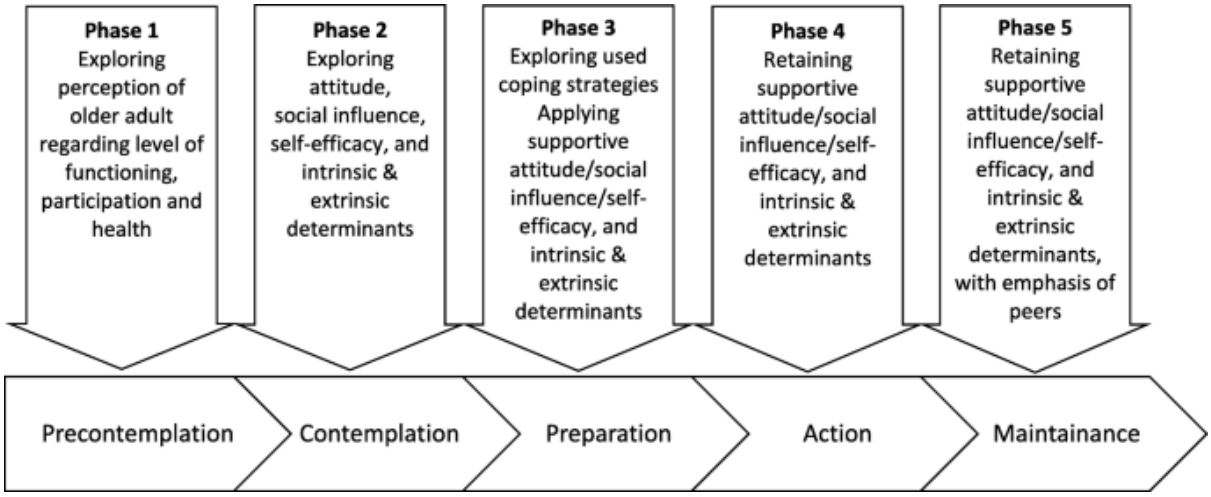


Figure 3: Conceptual model to determine factors influencing functionality, social participation and health

In our study, the older adults indicated being generally happy with their situation, independently of their level of functioning. 'Generally happy with the functioning level' and 'the experience of being in good health' are positive mindsets in the frame of perceived life quality, but not in the frame of therapy adherence, as these older adults show no interest in the benefits of a higher level of functioning. Within the TTM, these older adults are situated in the pre-contemplation phase. To take them to a higher level, it is desirable to have a detailed knowledge of their level of functioning, social participation and health (Figure 3 phase 1). Subsequently, the healthcare professional must have an overview of the facilitating and limiting intrinsic and extrinsic factors that influence the older adult's functioning (Figure 3 phase 2). The factors that facilitate behavioral changes should dominate the limiting factors. For instance, 'wanting to mean something to others' could be the primary motivation to remain active despite physical limitations. Previous research shows that these factors must be incorporated in the goalsetting to improve the outcome of an intervention. [45]

The older adult who is already aware of their limitations is situated in the contemplation phase or in a higher phase. These people can be gradually informed with regard to possible consequences and a suitable approach to their limitations. A gradual approach is essential to avoid forcing or provoking the older adult, as that might lead to resistance. The intrinsic and extrinsic factors (Figure 3 phase 3) play a key role in whether the change from intention (preparatory phase) to behavior (action phase) takes place, i.e., therapy adherence. Therefore, facilitating factors need to be optimally utilized and inhibiting factors need to be identified to be neutralized early in the process or, if possible, turned into facilitating factors.

The intention to achieve behavior and behavioral changes (contemplation phase) is jointly decided by the attitude, social norm and own effectivity. From the data-analysis we can deduce that the attitude of the older adult towards their -whether or not reduced- functioning and social participation is determined by the action's meaningfulness and necessity, as well as the older adult's wellbeing, belief and desire for autonomy. De Vries [31] claims that social influence can be categorized into three factors: the perceived social pressure, the social norm and modelling. Having insight in these factors helps healthcare workers to adequately prepare the older adult for making effective behavioral changes (Figure 3 phase 4). This process is facilitated by means of an overview of the coping strategies that the older adult employs. Using the environment, such as peers or informal caregivers who support the older adult, can help to give the new behavior a sustainable place in the older adult's life (consolidation phase) (Figure 3 phase 5).

The findings of our study also align with the models of health literacy. Health literacy entails people's knowledge, motivation and competences to obtain, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life to maintain or improve their quality of life throughout their life. [15] Our conceptual framework serves as an asset for strengthening the older adult's empowerment and supports the healthcare professional in coaching the older adult towards the last step of health literacy, i.e., applying health information to make decisions to maintain and improve their health.

Using the conceptual model leads to a more detailed overview of and better insight into the various determinants that influence the older adult's functioning, social participation and health. The developed conceptual framework can be a valuable support to the occupational therapist and other caregivers who work closely with vulnerable older adults to encourage better therapy adherence.

3.5.3. Strengths and limitations of this study

This qualitative study gives insight into the factors that play a role in the functioning and participation levels of home dwelling older adults. Qualitative research allowed to obtain in-depth insights in the perspectives of this population. In this way, factors that need to be considered to pursue client-centered successful treatment of vulnerable older adults were identified. Follow-up quantitative research is necessary to confirm the outcomes.

A limitation to the study is the number of respondents. Although we strived for maximum diversity in our sample, it is still possible that certain factors were missed.

Whether or not to use software for qualitative data analysis can be another point of discussion. Qualitative Data Analysis Software (QDAS) applications are designed for qualitative research assist in the management and analysis of qualitative data. Preparing, organizing and managing data are facilitated by using QDAS. QDAS applications however do not define conceptual categories or themes, develop conceptual diagrams, write memos and journals, gain insight into phenomena, or develop theoretical understanding. [46] Since we included a limited number of respondents (n=14), preparing, organizing and managing data was not an insurmountable work. Therefore, no software was used.

The conceptual framework can be used to identify the factors that determine the level of functioning of an individual older adult. The study limits itself to mapping the various factors that determine the level of functioning in a framework. It would not be correct to extrapolate the respondents' individual perceptions to the level of functioning of the whole vulnerable older adult population.

3.5.4. Implication of findings

In this study, it was the older adult's target to perform daily routines and meaningful activities as independently as possible. In order to help older adults maintain their level of independence, healthcare professionals should consider each individual's unique experiences. The conceptual framework presented in this paper provides elements to consider in the process of the client's empowerment and ways to anticipate a potential lack of therapy adherence. Per phase of the TTM, elements are identified that help health professionals, among which occupational therapists, to gain insight into the older person's perception regarding their performance and about the possible resistance and facilitators to achieve behavioral change. The occupational therapist can use this information for a client-centered approach and thus increase the chance of success of the treatment.

Future research needs to validate this conceptual framework and investigate its impact.

3.6. Abbreviations

ASE: Attitude-Social influence - Self- Efficacy Model; BADL: Basic Activities of Daily Living; CMOP-e: Canadian Model of Occupational Performance; GP: General Practitioner; IADL: Instrumental

Activities of Daily Living; ICF: International Classification of Functioning, disability and health; OT: Occupational Therapist; TTM: Transtheoretical Model of Change

3.7. Declarations

3.7.1. Ethics approval and consent to participate

The study was approved by the ethical committee of the University Hospitals of Leuven, Belgium (S58057). We took considered ethical decisions based on Casarett's study. [47] (Appendix 2: Ethical considerations)

The informed participant consent obtained was written. Anonymity was assured by removing all participant information from the transcripts that could lead to identification.

The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any deviations from the study as it was designed (and, if relevant, registered) have been explained.

3.7.2. Consent for publication

Not Applicable

3.7.3. Availability of data and material

All the interviews were transcribed into text files. The text files containing the transcripts are kept in locked files, accessible only by corresponding author. The datasets generated and analyzed during the current study are not publicly available due ethical approval. The dataset is not available upon request.

3.7.4. Competing interests

None of the authors received support from any organization for the submitted work, nor were there any financial relationships with organizations that might have had an interest in the submitted work

over the course of the past three years. There were no other relationships or activities that could appear to have influenced the submitted work.

3.7.5. Funding

This research was funded by the Flemish Policy Research Centre Welfare, Public Health and the Family, Belgium. An advisory committee approved by the policy research center annually gave feedback on the research process. They had no influence on the content of this systematic review.

3.7.6. Author contributions

LDC: researcher, teacher, OT and Gerontologist; AD: researcher, teacher and Sociologist; LB: researcher, teacher, OT and Gerontologist; MV: researcher and GP; MG: researcher and OT; BA: researcher, teacher, GP and head of the GP department.

LDC was responsible for the study concept and design, interviewed the respondents, transcribed the interviews, analyzed and interpreted the transcription, and drafted the manuscript under supervision of the other authors.

AD contributed to the study concept and design, and conducted a critical revision of the manuscript.

LB contributed to the analysis and interpretation of the transcription as second independent researcher, and conducted a critical revision of the manuscript.

MV contributed to the ethical reflections and conducted a critical revision of the manuscript.

MG contributed to the study design and performed a critical revision of the manuscript.

BA contributed to the study design and performed a critical revision of the manuscript.

All people who contributed to the work have been listed.

3.7.7. Acknowledgements

The authors would like to thank all the older adults who participated for sharing their opinions and experiences. The authors would also like to thank Ms. M. Kloppers and Ms. K. Schiepers for their linguistic review.

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Additional file 1: Interview guide

Icebreaker

Neutral expression regarding the housing situation.

Level of activity/participation

Please, describe how an average day for you looks like. What types of activities do you do? What activities in the community do you participate at?

Determining factors in general

- What facilitates you in doing these activities/participating? (attitude, mental limitations, physical limitations, influence of environment, …)
- What stops you from doing these activities/participating? (attitude, mental limitations, physical limitations, influence of environment, …)
- How important are the influences of other people (family, friends, …) on you being active?

Determining factor 'Self efficacy'

- How did activity/participating change for you over the years? What types of activity did you do/what activities did you participate in the past?
- Why don't you do them anymore? What are conditions to do them again?
- What is your attitude to aid? Do you have support? If you need support in future, what are you thinking of?

Demographic characteristics

- What's your age?
- What kind of work did you do before your retirement?
- How would you describe your general health? Do you have any health issues?

Closure

Do you want to add something?

Additional file 2: Ethical considerations

Ethical consideration regarding respondents

Providing understandable study results to respondents:

Respondents can learn from the results of the study. They can benefit from this study by alerting them to the various factors that affect their functioning and social participation.

Ethical considerations regarding future patients

Supports research that reaches a consensus on a standardized intervention protocol regarding support for functionality in daily activities and social participation:

The data from this research will be used to develop a high-quality approach for community and home-based Occupational Therapy for older adults.

Supports research that defines client-centered goals that reflect the unique goals and preferences of the elderly:

The information gained from this research provides insight into how older adults estimate their functioning. This insight can be used to support professionals to work more consciously with and adjust their mannerism towards their clients.

Ethical considerations regarding society

Provide information on efficient and effective intervention in regards to the primary care for older adults:

The results of this study will be used to define high-quality interventions for older adults. These interventions will lead to cost-effective care for home dwelling older adults and their greater satisfaction. Special attention will be paid to mapping out functioning determinants. These determinants will support the therapist in increasing adherence and client-focused work.

4. The willingness and barriers to collaborate in the care of frail older adults: perspectives of primary care professionals

BMC Geriatrics; De Coninck L.[1,2,3], Declercq A.[4], Bouckaert L.[3], Döpp C.5, Graff J.L.M.[5] and Aertgeerts B.[1,2] (2023) Published

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DOI: 10.1186/s12877-023-04163-y

ABSTRACT

Background

This study investigated the perspectives of primary care professionals, in particular general practitioners, registered nurses, physiotherapists and occupational therapists, on interprofessional collaboration, the barriers and the facilitators they perceive in the care of the frail older population.

Methods

We conducted a qualitative study. In-depth interviews with healthcare professionals were performed, using open-ended questions about their perceptions on the care of frail older adults and interprofessional collaboration.

Data was analyzed following the Basic Logical Model of Abduction and Creswell's coding method.

Results

Healthcare professionals indicated that when they explored problems complementary to the reasons for older people to contact a healthcare professional, these additional problems often seemed to be the main problem. They also stated that there was too little interprofessional collaboration in the care of complex chronic issues and lack of a shared vision on collaboration. Collaboration is still limited too much to contacting established professions.

Health information technology can support both, interprofessional collaboration and working on an evidence-based manner. It can also be a facilitator to inform patients. The availability and use of health information technology differs between the professions.

Success factors and barriers for sustainable collaboration were identified on several levels, namely innovation, individual, professional, patient, social context, context of the organization, economic and political context.

Conclusions

Our study shed light on the willingness and barriers in collaboration of healthcare professionals in primary care for older adults. There is little interprofessional collaboration, despite the willingness of the healthcare professionals to collaborate.

Keywords

primary care, interprofessional collaboration, frailty, barriers

4.1. Background

Healthcare systems across the world, among which Belgium, are challenged by an ageing population. Studies show that complex chronic issues require an interprofessional collaborative or an integrated approach to caregiving. [1-3] Integrated care holds the potential to enhance the quality, safety, and efficiency of healthcare delivery in complex chronic issues while improving patient experience and outcomes. WHO defines integrated people-centered health services as “providing health services at the right time, in the right place in the right way, locating services close to people and communities”. Integrated care encompasses a comprehensive perspective on health, transcending the mere focus

on diseases or interventions, to recognize the entirety of an individual and the ongoing care required across their entire lifespan. [4]

Moreover, recent studies on interprofessional collaboration in elderly primary care indicate that enablement models of integration can be successful in activating positive change towards independence for the older adult with complex needs. [5] Even though prevention of safety risks is not an explicit goal of the integrated care program studies show that integrated care address risks in social and environmental domains. [6] Older adults desire accessible, efficient and coordinated care that caters to their needs and preferences, while keeping in mind their rights and safety. [7] So, integrated care programs support the wish of older people: to live safely at home.

Interprofessional digital communication tools offer opportunities to support interprofessional collaboration. Health professionals indicate to be better informed about patients' current situations when using digital communication tools. However, the number of digital systems professionals simultaneously use, and different work agreements hamper tool use. [8,9] Health professionals often have their own discipline-specific tools with varying functionalities. This lack of interoperability of systems is a major barrier and might result in old-fashioned forms of communication such as using the phone. [10]

It is a key challenge in general for both policy makers and healthcare professionals to create an optimized professional setting for pursuing high quality of complex primary care. For instance, policy can have a significant role in realizing the tools' long-term use. [9] The Chronic Care Model (CCM) describes the components needed for qualitative complex chronic care and to improve patient's outcomes. The core components of the CCM include both community resources and policies, and health system organization namely self-management support, a delivery system design, decision support and a clinical information system. The components of CCM are essential in fostering productive interactions between healthcare professionals and their patients. This includes informed and empowered patients and a prepared pro-active practice team. The CCM states that interventions that encourage people to acquire self-management skills are essential in chronic illness care. [11-14]

European healthcare professionals and care-infrastructure are not sufficiently prepared to qualitatively treat the older population with chronic conditions. [15-17] The way primary care is organized and financed at this moment hinders the accessibility of certain healthcare professions which are proven to be effective in elderly care. [18] Healthcare professions that encourage people to acquire self-management skills are not adequately included in integrated care teams although enablement models of integration shows to be successful in activating positive change towards

independence for the frail older adult. [5] Occupational therapists are healthcare professionals whose main goal is to enable engagement in meaningful daily activities within the individuals' living environment, thereby fostering their health and well-being. [19] It has been shown that interprofessional interventions which involve occupational therapy in primary care are effective in delaying institutionalization of frail older adults. [20] Primary care occupational therapy can prolong the time older adults remain at home for at least 6 months. [21] Despite the evidence, occupational therapy in primary care remains an underused profession in most European countries, among which Belgium. [18] Consequently, there is a need for restructuring primary care to provide all relevant health professionals the opportunity to deliver optimal interprofessional care for frail elderly.

Beside the underuse of certain healthcare professionals, there are more barriers to implement an integrated chronic care model in primary care in Belgium. Defined barriers are patient empowerment and health promotion, interprofessional collaboration, integration and continuity between hospital and primary care and integration and continuity between healthcare and social welfare. [17] In the context of patient empowerment, a qualitative study on the perspectives of older adults on functioning, social participation and health provided data of interest for other involved healthcare providers to increase adherence of the target population. [22]

The barriers on interprofessional collaboration can be defined as challenges of definition and awareness of one another's roles and competences, sufficient communication and shared information, confidentiality and responsibility, team building and interprofessional training, long-term funding and regulations, and joint monitoring. [23,24] In less-involved healthcare professions, such as occupational therapy, there is an additional challenge in terms of awareness of each other's roles and competences, as knowledge of one another's roles is considered a prerequisite for trustworthiness. [23]

Following Grol's (2004) barriers to and incentives for change, various components need to be addressed when planning changes in practice, namely the characteristics of the patients and the professionals involved, the level of innovation, the social context, the organizational context, and the economic and political context. The characteristic of the patient implies their knowledge, skills, attitude and compliance. The characteristics of the individual professionals is about awareness, knowledge, attitude, motivation to change and behavioral routines. The level of innovation concerns what advantages the innovation brings in practice, the feasibility, credibility, accessibility and attractiveness. The social context is about the opinion of colleagues, culture of the network, collaboration and leadership. Organization of care processes, staff, capacities, resources, structures

are components that describe the organizational context. The financial arrangements, regulations, policies describes the economic and political context. [25]

There is still a need for insight in other barriers of changes in practice, among which the willingness of healthcare professionals to collaborate. The characteristics of the individual professional and the social context are substantial. However, the willingness to collaborate can also be influenced by the other components as defined by Grol. Therefore, this study aims to understand the perspectives of primary care professionals of interprofessional collaboration in care for the frail older population and considers both the well-known and less-involved primary care professionals relevant for the frail older population.

4.2. Objective

This study investigated the perspectives of primary care professionals, in particular general practitioners, registered nurses, physiotherapists, and occupational therapists, on interprofessional collaboration, and the barriers and facilitators they perceived in the care of the frail older population.

4.3. Methods

4.3.1. Design

In-depth interviews with healthcare professionals were performed, using open-ended questions about their perceptions on the care of frail older adults and interprofessional collaboration.

The theoretical framework underpinning this study is the Basic Logical Model of Abduction which uses abductive analysis as its qualitative data analysis approach. [26] Abductive analysis aims at generating novel theoretical insights through a dialog between sensitivity for cultivated theory and methodological heuristics. [27] In this way, the Basic Logical Model of Abduction emphasizes that research can be both inductive and deductive. Abductive analysis allows researchers to let themes, patterns and categories emerge from data (inductive) and, on the other hand, rely on existing analytical categories obtained from previous theories (deductive). Insightfully abducting during analysis consists of developing themes, codes and categories that structure data. When organizing and structuring the analyzed information, it might turn out that it fits within existing models. These

existing models supply insights which, in turn, lead to further analysis, so that broader and more extensive knowledge is gained. Abduction challenges researchers to develop their theoretical repertoires throughout the research process rather than setting all preconceived theoretical ideas aside during the research project. [28-29]

Our investigation is influenced by two theories, the CCM of Wagner (2001) and Grol's potential barriers to and incentives for change when planning a complex intervention. The data obtained from the interviews can be linked to the essential components of high-quality care to improve productive interactions as defined in the CCM by Wagner. Effective communication and collaboration are essential for a prepared and proactive practice team to pursue sustainability and achieve informed and empowered patients. [11,12] The codes identified during analysis encompassed communication and collaboration between patient and professional, and among professionals. The data can also be linked to the obstacles and motivations for change across various healthcare levels, as defined by Grol. [25] The codes identified during the analysis encompassed the individual healthcare professional, the patient, the innovation itself, the social context, the organizational context, and the economic and political context.

4.3.2. Sample selection and participants

The respondents were included if they met the following criteria: being a general practitioner, registered nurse, physiotherapist, or occupational therapist; being employed in primary care for at least three years; having experience with older adults with chronic health issues.

Purposive sampling was used, as we opted to strive for the greatest possible diversity and not for saturation. The network of the researchers and primary care professionals was addressed for recruitment. We set a minimum of twelve interviews, spread equally across the four professions. In the selection determination, we considered equal distribution of gender, type of practice (individual, mono-disciplinary or multidisciplinary practice), type of employment (self-employed or employee), and location of the practice (city, urban or rural). No two employees from the same workplace were included.

Respondents were informed by phone about the project and about what would be expected of them. If they agreed to participate an appointment was made for a face-to-face interview. Written informed consent was obtained prior to the interview. Thirteen respondents were contacted. One respondent refused to participate. This person did not give a reason. The interview was performed by an experienced researcher in the respondents' workplace.

4.3.3. Data collection

An interview guide was developed to elicit the participant's experiences, thoughts, and perceptions. (Supplement 1) The interviews lasted 40 minutes on average, were audiotaped and transcribed verbatim.

The in-depth interview guide questions were based on literature about facilitators and barriers influencing collaboration, as well as on the outcome of our own investigations on the perspectives of older adults on functioning, social participation, and health. [22, 30-32]

4.3.4. Data analysis

The researcher performing the interviews also transcribed the audiotapes. The interviews were then analyzed without using software. Data were analyzed following Creswell's methodology (2013) in which the steps of the analysis process are data management, reading and taking notes, describing of themes, classifying and interpreting, reporting and visualizing. [33]

Two researchers read and reread the transcripts to gain a comprehensive understanding of the content and context of the data. Subsequently, they selected the transcript of the interview of two respondents with divergent profiles. The researchers independently analyzed the text, made notes (short sentences, ideas, or core concepts) and attributed initial codes to the two interviews. The findings were discussed in detail to reach agreement on how to continue analyzing the interviews. The researchers divided the data into themes and text was grouped under meaningful categories. One researcher then analyzed the remaining ten interviews based on the agreement that emerged from the discussion. During the analysis process, subthemes were derived from the data using abductive reasoning. The second researcher reviewed this analysis and discussed alternatives with the first researcher. To ensure the reliability and validity of our analysis the findings are compared with existing theories to validate our interpretations. So, we gradually discovered theoretical frameworks to operationalize concepts of the CCM of Wagner (2001) and the potential barriers at various levels when planning an evidence-based complex intervention of Grol (2004). (Supplement 2) In the final phase of the cycle, the essence was captured in summarizing and presenting our findings in a coherent manner. [14,25]

4.3.5. Reflection on the role of the researchers

The research group consists of a multidisciplinary team, knowledgeable in the fields of sociology of health, occupational therapy, gerontology, and family medicine. As a result, data analysis was enriched by various academic and professional backgrounds.

4.3.6. Ethics approval and consent to participate

The study was approved by the ethical committee of the University Hospitals of Leuven, Belgium (S58057). Written and verbal information about the research and an opportunity for questions were given before informed consent was obtained by participants. Anonymity was assured by removing all participant information from the transcripts that could lead to identification.

The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any deviations from the study as it was designed (and, if relevant, registered) have been explained.

4.4. Results

4.4.1. Demographic characteristics

Twelve participants are selected. See table 1 for the characteristics of the participants included in the study.

Participant	Gender	Profession	Type of practice	Type of employment	Location
1	Male	General practitioner	Gen. practitioner group practice	Self-employed	Rural area
2	Male	General practitioner	Multi-disciplinary practice	Self-employed	Suburb
3	Female	General practitioner	Multi-disciplinary practice	Self-employed	Suburb
4	Female	Registered nurse	Registered nurse group practice	Employee	City
5	Female	Registered nurse	Multi-disciplinary practice	Employee	City

6	male	Registered nurse	Registered nurse group practice	Self-employed	Suburb
7	Female	Occupational therapist	Multi-disciplinary practice	Employee	City
8	Female	Occupational therapist	Multi-disciplinary practice	Employee	City
9	Female	Occupational therapist	Multi-disciplinary practice	Employee	Suburb
10	male	Physiotherapist	Physiotherapy group practice	Self-employed	Rural area
11	Female	Physiotherapist	Physiotherapy group practice	Self-employed	Suburb
12	Female	Physiotherapist	Physiotherapy solo practice	Self-employed	Suburb

Table 1: Characteristics of the respondents (n=12)

4.4.2. Reasons for older people to contact a healthcare professional

Although medical and functional problems are primary reasons for visiting a general practitioner, cognitive, mental, and social problems are also reported. Medical reasons are commonly cardiac or orthopaedic problems. Functional reasons are fall problems, balance problems and walking disabilities, and not being able to live independently anymore. Cognitive and memory problems, dementia, and fear of falling are mental problems older people indicate. Social reasons are mainly no longer being able to leave the house, less social participation, and loneliness. The burden of the informal caregiver, often the partner, is another reason to contact a general practitioner. During the consultation the general practitioner sometimes detects underlying issues such as reduced cognition.

The initial contact with the physiotherapist usually goes via referral by a general practitioner. Fall problems and mobility are the main contact reasons for physiotherapy, and further cardiac problems, orthopaedic problems, and being isolated.

Nurses are in most cases contacted by the informal carer on referral of the general practitioner. Nurses say that the typical nursing actions such as injections and wound care are often the initial reason for consulting them. Managing medication, hygiene care and burnout of the informal caregiver are also frequent reasons for being contacted. Loneliness is often an underlying factor for appealing a nurse.

The occupational therapist, who is often contacted via social services, express mainly being consulted when functional, social, mobility and/or cognitive problems arise or when the burden on

the informal caregiver becomes too heavy. The medical reason is often complex chronical issues, e.g., an older adult with stroke with permanent residual disabilities. Falls problem are often present.

All healthcare professionals report that they usually detect other problems underlying to the initial problem. Healthcare professionals say that when they explore the additional problems, these additional problems often are the main problem.

> *"For a start, the reasons they contact us are often physical problems. We are initially consulted for a wound on the coccyx, but it soon becomes apparent that much more is happening, the person is sedentary, he cannot vouch for his self-care, has few social contacts, is lonely, the burden on the family becomes too heavy, ….*" (Registered nurse)

4.4.3. Interprofessional collaboration in general

All healthcare professionals find that there is not enough collaboration in the care of complex chronic issues. They specify that information exchange is essential to adjust the treatment. Information sharing usually limits itself to problems, but it is also important to know what goes well. A general practitioner mentioned a lack of a shared vision on collaboration. Collaboration is still limited too much to contacting only a few professions.

> *"Collaborating … insufficient. We are trying to make some progress, but that asks joint vision, I notice that we still have too less vision to collaborate. What we do is contact the nurse and physiotherapist. The professions we were taught during our training."* (General practitioner)

Additionally, several health professionals demonstrate that, with the aim of closing the gap, local initiatives are taken to get organized. One healthcare professional argued that not only organized meetings are useful. A talk with other healthcare professionals by co-incidence in the workplace can also be fruitful. One healthcare professional communicated that she resigned due to lack of structured communication and collaboration where it concerned patient matters. She felt that she could not provide the desired quality of care in this way and applied for a job in a team where collaboration was highly regarded.

> *"My patients received high-quality physiotherapy treatment, but I noticed that there was more going on and that collaboration with the general practitioner or social worker was necessary. In that practice there was no room for communication with external partners. Now I work in a practice where there is attention for communication and collaboration. I'm convinced this is a precondition in elderly care."* (Physiotherapist)

Healthcare professionals who work in mono- or multidisciplinary primary care practices regularly participate in internal team meetings on patient related matters. External interprofessional meetings on patient-related matters are sometimes organized upon discharge from the hospital or in complex situations. The care coordination of the health insurance organization organizes these interprofessional meetings. Healthcare professionals from the hospital's discharge team, the informal caregiver, general practitioner, and registered nurse frequently participate at these interprofessional meetings. Physiotherapists sometimes participate. Occupational therapists are rarely invited to these meetings. One occupational therapist who also has a part-time job as care coordinator of a health insurance organization, signify that, due to task demarcation, she cannot assume her role as occupational therapist in cases where she is asked to act as care-coordinator.

> *"Collaboration, yeah, it's kind of necessary, but in practice it's very difficult. On the phone, with caregiver services… You pass on the information, but you seldom get information back. There is no exchange of ideas…. I also have a colleague who is a social worker. We both work at same organization. To work efficiently, we sometimes divide the tasks. She does the start-up and subsequently I take it over."* (Occupational therapist)

The general practitioners mark that they mostly collaborate with primary care nurses, physiotherapists, and the informal caregivers. When a patient is discharged from hospital, general practitioners often have discharge meetings with the hospital staff. Regularly, general practitioners also collaborate with dieticians and the family care service.

The registered nurses collaborate mostly with the general practitioners and family care services. They express sometimes collaborating with physiotherapists, and seldomly with occupational therapists.

> *"When we notice someone becoming more dependent, we also try to involve family care service, even if that is only for two hours a week, and in this way, we also try to get a larger network among the patients."* (Registered nurse)

Physiotherapists also indicate that they collaborate with general practitioners. The physiotherapists, as is the case for nursing, need a referral of the general practitioner.

Occupational therapists mostly collaborate with social workers and family care services. They occasionally are in contact with physiotherapists. Occupational therapists indicate that, during their interventions, they receive a lot of information from family care services. These people know the older adult well because they spend more time at the older adult's house, and they are sometimes there when the occupational therapist performs his intervention.

4.4.4. Collaboration with lesser-known healthcare professions

Two of the general practitioners, all registered nurses and all physiotherapists indicate that primary care occupational therapy is almost unknown territory for them. One general practitioner has an occupational therapist in their team. This occupational therapist is involved in prevention in general, falls prevention in particular, mobility, and physical posture and ergonomics. Two general practitioners who do not collaborate with an occupational therapist, admit not knowing how to contact them. Also, the nurses and physiotherapists admit not knowing how to contact an occupational therapist.

> *"And I think that they do not know what occupational therapy is, what occupational therapists exactly do in primary care … At home with one of my clients where I was consulted for a secondary table, I met the physio. I introduced myself and the physio told me the general practitioner asked him to look for a wheelchair, but he didn't know anything about wheelchairs. I told him I'd look for it. You see, there's a demand, but if you don't meet accidentally…"* (Occupational therapist)

After being informed on the role of occupational therapy in primary care, all healthcare professionals show their interest in referring to and collaborating with an occupational therapist. They confirm that it is desirable that occupational therapists are known in the region.

Two occupational therapists indicate that they regularly inform general practitioners on the occupational therapy intervention, but never receive any response. Although the occupational therapists state that they are seldom invited to an interprofessional consultation, they do advocate the added value of their presence and once general practitioners know them, they show an interest in collaboration. One occupational therapist tells that at an external multidisciplinary meeting where that person acted as case manager, a general practitioner showed interest in the role of the occupational therapist.

> *"Last time at a patient meeting, I really had the feeling 'My advice is finally being heard!'. The general practitioner responded to something I suggested and emphasized it. And the fact that all other disciplines heard it, gave me a sense of recognition. After all, we all work for the benefit of that one patient."* (Occupational therapist)

Occupational therapists communicate that the informal carers, family care service and social workers possess a lot of useful information that may improve the quality of their intervention.

Informal caregivers and family care services spend the most time with the older adult and know a lot of that person. The social workers are interesting because they are often the first to map out the complexity of the problem.

4.4.5. Use of health-information technology

Health information technology can support both, interprofessional collaboration and working on an evidence-based manner. It can also be a facilitator to inform patients.

4.4.5.1. Electronic data registration and sharing

Except for the occupational therapists, all interviewed healthcare professionals use a profession specific labelled electronic patient registration system. The registered nurses of monodisciplinary practices inform that their record is part of the central patient record. The self-employed registered nurse and self-employed physiotherapist declare that they keep data in hard copy as well as electronically. They emphasize that they either don't have the time to fill in the electronic record correctly or see the electronic registration of data as a barrier. One physiotherapist prints his therapy report to hand over to the general practitioner.

> *"A computer between the older adult and myself creates distance when I talk to him. I use pen and paper to write things down and to explain."* (Physiotherapist)

The healthcare professionals working in a multidisciplinary team indicate that they use a central record where each professional add the relevant information for his discipline. The healthcare professional only has access to that part of the information that is relevant for their intervention.

The occupational therapists register their data into a central patient record system of their place of employment to the degree that is possible. Some occupational therapists individually developed a digital occupational therapy record form. This digital record can either be a structured electronic tool or single Word-template.

Safely sharing electronic data among all healthcare professionals is limited possible in Belgium. The data exchange e.g., occupational therapists and physiotherapists often initially takes place by telephone, by mail or – where applicable – during an interprofessional consultation. Within the multidisciplinary group-practices, certain data is shared through the central electronic patient record. Healthcare professionals admit not being aware of all the possibilities of electronic patient records. Two healthcare professionals who have a professional IT-registration tool indicate that they

do not use them consistently. The reason they give is low usability. They feel like distancing themselves from the patient using IT during the consultation.

Aspects that are perceived as useful, are the automatic registration of the number of treatment sessions the patient got, the electronic diary and – in the case of mono- or multi-disciplinary group practices- sharing data.

One healthcare professional declares a refusal to share data electronically out of respect for the patient's privacy. This healthcare professional believes contacting other healthcare professionals over the phone to be a better alternative.

4.4.5.2. Health-information technology to support quality of care

Except for one person, the term evidence-based practice is known by all interviewed healthcare professionals. The application of electronic devices to implement the evidence-based practice (EBP) principles varies among the various professional groups.

General practitioners use electronic databanks with evidence-based data. Two of the interviewed general practitioners have IT-tools that automatically link the evidence-based data to the electronic health record of the patient (Evidence linker). These healthcare professionals also use an electronic Decision Support System (DSS). The physiotherapists indicate they rely on the information and training that their scientific professional association provides. The registered nurse who works in a structured primary care organization indicates the team members contact the organization's central office when they require scientifically supported information for an intervention. This nursing organization develops protocols on which the at-home Registered nurses base their treatment. The occupational therapists indicate attending training and searching evidence-based information on their own through several databases. They also indicate that finding this information is difficult as their search usually does not provide the expected results.

> *"The guidelines within our interprofessional practice are 'you work evidence-based' and that's where it ends. We expect that everyone that works in the practice works evidence-based. With all due respect to what others think about that, I don't think that what we say is the only truth but what we do is based on that (EB)."* (General practitioner)

4.4.6. Incentives and barriers for sustainable collaboration

The interviewed healthcare professionals identified success factors and barriers for collaboration, which we listed according to the various levels of healthcare of Grol and colleagues (2004).

4.4.6.1. Innovation

Concerning electronic data sharing, healthcare providers indicate that the electronic record must be accessible both, in the office and at the patient's home. A smooth use of the device, meaning no errors in the program and easy to use, such as clicking on pre-programmed rubrics, is also a precondition. Pre-programmed rubrics are preferrable provided that all necessary information is covered within these rubrics.

> *"An additional problem is the internet connection at the home of the older adult. Hardly any older adult I visit has an internet connection. Only when a younger person lives at the same place, there is internet connection."* (Physiotherapist)

All healthcare professionals indicate that it must be possible to decide tailor-made which data to share with who, but this depends always on the condition the patient allows data to be shared. Respecting privacy is the highest priority for all interviewed healthcare professionals.

A threshold that is indicated, is the accessibility of lesser-known professional groups. General practitioners, registered nurses and physiotherapists indicate they are not familiar with contacting occupational therapists. They often do not know local primary care occupational therapists and do not know how to find them. They indicate that if they do not know the way, it will be almost not possible for the older adult to contact an occupational therapist.

> *"Honestly, no service has ever suggested working with an occupational therapist … Sometimes I think "occupational therapy will be helpful in this case", but how should I reach them? I really do not know it . Not knowing a local primary care occupational therapist is a barrier for referring."* (General practitioner)

An advantage is that the specific value in the context of health and wellbeing of an occupational therapy intervention is confirmed by all interviewed professionals. Another advantage is that an occupational therapist visits the older adult a limited number of times to achieve the stated target. A general practitioner indicates that one or two occupational therapists who operate in one area might increase accessibility and can increase a sustainable collaboration.

4.4.6.2. Individual professional

All healthcare professionals unanimously agree on the importance of collaboration and emphasize the willingness to collaborate when it concerns the older adult with complex chronic issues. In line with this, they argue that sustainable collaboration requires effort from multiple actors in many areas and that the better you know each other, the easier to communicate and collaborate.

The healthcare professionals are aware of their behavioral routines in contacting the best know professions among which general practitioner, registered nurse, and physiotherapist. Dieticians and occupational therapists are less contacted. In addition, it is not clear how to contact an occupational therapist.

Most of the healthcare professionals do not experience many barriers in electronic data sharing, as long as the patient is informed and gives his consent on which data can be shared with whom, and the healthcare professionals can decide to protect data themselves.

> *"Honestly, I do not see downsides to electronic data sharing. Of course, it is the patient who decides what is and what is not shared. The condition is that the patient is informed and gives his consent."* (General practitioner)

Patient

Healthcare professionals indicate that admitting that one becomes help dependent is a barrier for that person to appeal for supplementary healthcare provision.

> *"Sometimes I have the feeling that for some older adults, if you do not talk of a problem, the problem does not exist. Even if you are convinced that the person knows the problem. This makes it difficult to refer for supplementary healthcare provision."* (Registered nurse)

Healthcare professionals also indicate that knowing the different professions or being introduced to them by someone they trust is a facilitator for the patient to accept that various health professions are involved.

4.4.6.3. Social context

Two healthcare professionals suggest shadowing another profession for a day to have more insight in, and respect for the other profession.

Several healthcare providers pose that an older adult will accept collaboration with a healthcare provider who is not yet involved more easily**,** when a trusted healthcare provider or a peer informs them that a certain treatment will be an added value for them.

One general practitioner who works in an interprofessional healthcare team stipulates that working in a team improves job satisfaction. The fact that healthcare providers are surrounded by people with the same opinion, the same way of working prevents burnout.

> *"What I sometimes say laughing is that you only have people who feel good at their job simply because you do things together, provide added value together and continuously feel that you are surrounded and supported."* (General practitioner)

4.4.6.4. Context of the organization

Healthcare providers who work per performance indicate that their timetable is filled with patients, so there is little time for consultation with external parties. All healthcare professionals confirm that the foreseen resources for these multidisciplinary meetings are not sufficient. Healthcare providers who do not work per performance argue that participating at multidisciplinary meetings cause less of a problem.

The compartmentalization of services is also indicated as a barrier.

One central person or organization who organizes and co-ordinates the interprofessional meetings locally, is perceived as an advantage. This person must be accessible for all local healthcare providers and transcend individual healthcare organizations. Healthcare providers also indicate to have an overview of the local health structure, so that one can see who to contact for which health question. This overview also exposes where the gaps are situated.

The absence of a central secure electronic record in which data can be shared selectively with consent of the patient, is perceived as a deficiency. In the case of the patients' consent to share data, the system must deliver the possibility to the healthcare provider to determine which data are relevant to share with each individual healthcare provider.

> *"What we do is use the interprofessional consultation as a supporting record where the registered nurses, the physiotherapist, the dietician, the podiatrist, and the occupational therapist all work with, this within our healthcare house. What we're trying to approach is to see this healthcare facility as an organic entity because then you have mutual contacts and that mind-expanding vision, that continual contact, but then you also continually update the records et cetera."* (General practitioner)

4.4.6.5. Economic and political context

All healthcare professionals indicate that the current financial regulations do not facilitate interprofessional collaboration. A decent compensation for interprofessional meetings should be provided.

A regional coordinator who organizes and coordinates these meetings is a precondition for a sustainable collaboration on regional level.

> *"What are the practical barriers? First at all the patients not knowing the system… If it is a registered nurse that brings it up, when it's a general practitioner, if it's a peer, then they're inclined to follow them. And then you also have the problem of financing."* (General practitioner)

4.5. Discussion and conclusion

4.5.1. Overall findings

Our study sheds light on the willingness for and barriers to collaboration of healthcare professionals in primary care for older adults, with particular attention to occupational therapy as an underused profession. There is little interprofessional collaboration among the Belgian healthcare professionals in primary care, despite the willingness of the healthcare professionals to collaborate.

Knowing each other as healthcare provider is a facilitator to build a sustainable partnership. Interprofessional meetings are essential, but do not always have to be planned. Meeting each other on the work field, short informal contacts between healthcare professionals are also important for information transfer in the context of good care.

Respecting each other within the uniqueness of each one's job is a precondition of a fluid collaboration. It is not only important to know the content of the job of each involved healthcare professional, also knowing the local healthcare professionals is a facilitator for interprofessional collaboration in primary care. It happens that the care provider discovers hidden care needs and must refer to more suitable care providers to meet that specific care need. Knowing the different professions or being introduced to them by someone they trust is a facilitator for the patient to accept that various health professions are involved.

The older adult is sometimes reluctant to do anything about his situation. Using technics of motivational interviewing can improve motivation. An informed patient is a facilitator to achieve improved outcomes. Therefore, working on health literacy is a factor of success.

In Belgium, the quality of primary care for the elderly can be improved by systematically encouraging local healthcare professionals to gain a better understanding of different care professions. The recently established regional primary care areas may provide support in this regard. A regional primary care area is a network of primary care providers in a geographically defined area consisting of one or more cities or municipalities.

4.5.2. Components to be addressed to achieve a sustainable collaboration

In accordance with Grol's (2004) barriers to and incentives for change at different levels of healthcare, we detected several components that need to be addressed to achieve a sustainable collaboration. [25]

The detected components in our study on the level of innovation, the patient, the individual professional and the social context , the organizational contex and the economic and political context are in line with the components found by D'Hanis (2015) and Hansson (2018). [17,24] D'Hanis (2015) detected lack of patient empowerment and health promotion, multidisciplinary teamwork, integration and continuity between hospital and primary care, and integration and continuity between healthcare and social welfare as barriers to implement an integrated chronic care model in primary care. [17] Hansson (2018) detected obstacles for collaboration on three levels: societal, organizational, and individual. Regulations and financial instruments, lack of time for health professionals, and insufficient communication can hinder collaboration. [24]

Wagner's CCM aims to transform the daily care of patients with chronic illnesses from acute and reactive to proactive, evidence-based, patient centered and planned care. CCM describes the components which interact to promote high quality care for patients with chronic disease. [11,12] Our study focused on productive interactions, more specifically on communication and collaboration. Regarding the patient, we found that the initial communication about the demand for care of the older adult did not always correspond to the need for care. A recent study on provider discussion on health goals and psychosocial needs shows that older adults report fewer psychosocial issues and health goals, what can lead to missed opportunities. [25] This emphasize that health professionals in primary care who work patient centered must be sensitive for the underlying and non-expressed needs to deliver the correct care and to refer to other healthcare professionals where desirable.

The results of our study are in accordance with the findings of D'Hanis (2015) regarding the fact that the health system and delivery system in primary care in Belgium is still fragmented. This fragmentation results in services that are not yet properly coordinated. [17] Recently, primary care zones have been established in the Dutch speaking part of Belgium. A primary care zone is a geographically defined area, formed by one or more municipalities and managed by a care council. The target of these primary care zones is to establish an effective and high-quality primary care through better coordination. [34]

The CCM states that a clinical information system should facilitate and promote the exchange of information between providers and patients. [11,12] In our study, the healthcare professionals indicate to be willing to share electronic data with other involved professions when explicitly permitted by the patient. This is only on condition that sharing the data improves the quality of the care, and that this happens in a safe manner. The availability and the usage of HICT varies strongly between the various profession groups. General practitioners have the most facilities to register, process and share data in a safe and efficient way.

In the Dutch speaking part of Belgium, the digital BelRAI instruments are gradually implemented. BelRAI is the Belgian implementation of the InterRAI assessment tools. RAI stands for resident assessment instruments. BelRAI instruments map the care needs of vulnerable people in a structured and standardized way with the aim of pursuing qualitative care planning and achieving quality monitoring. [35]

The decision support system must provide evidence-based guidelines that should be embedded into daily practice and should be shared with patients to encourage participation. [11,12] Where it comes to HICT being used for quality support of the intervention, our study also shows major differences between professional groups. Eliminating this imbalance by delivering access to smart software such as an electronic DSS and Evidence Linker is essential to improve the quality of care of older adults.

Self-management support emphasizes the patient's role in managing health. [11,12] Our study shows that healthcare professionals underscore the importance of a well-informed patient. Technics of motivational interviewing, health literacy and education are used to achieve an informed older adult, e.g., occupational therapists use HICT to inform older adults.

Community involves linking and using community resources that support healthcare. [11,12] Recent studies emphasize the significance of social support for the functional status of frail older adults. Finding ways to maintain social support among older adults may offer a promising approach to delay

functional decline. Our research demonstrates that healthcare professionals also recognize the value of social support and endeavor to expand the social network among older adults. [36]

4.5.3. Quality of evidence

Keeping in mind the inclusion criteria of the respondents, maximum variety was pursued in terms of employment status, age, and location of the practice (city, suburb, or rural area). The number of respondents were equally divided between professional groups. Since we used purposive sampling, we selected healthcare professionals with an opinion on the subject.

The Johanna Bridge Institute critical appraisal tool for qualitative research (2020) is used to critical appraise our study. [37] We considered congruity between the philosophical perspective and the research methodology, and between the research methodology and the research objectives, the methods to collect data, the presentation and analysis of the data and the interpretation of results. We included a statement about the researcher's cultural and theoretical orientation to clarify the role of the researcher in the research process. The researcher did not know the respondents, which limited his influence on the research. We included quotes which ensures the presence of the participants in the report. The conclusions are based on interpretation of the data collected through interviews. So, we can state that methodological quality of our study is of such a degree that bias in its design, conduct and analysis are avoided.

4.5.4. Implications for clinical practice

This study found that healthcare professionals are open to a better collaboration and data-sharing to improve the quality of their interventions.

There is a general need for more collaboration in the care of the older adult. Given the willingness to collaborate between the various care-professions, there is a need for structure and means that facilitate this collaboration in primary care. There should be a concentrated effort to strive for equality where it concerns HICT, so that all healthcare professions can efficiently base their therapeutic procedures on evidence-based research.

When it comes to the possibilities of electronic data capturing, data processing and sharing, there is a clear discrepancy between the various professional groups. The level of availability and accessibility of scientific evidence to support intervention is dependent on the type of profession.

The opportunities for efficient collaboration and for detecting evidence that substantiates the intervention are not equal for the different professions.

4.5.5. Implications for further research and development

Further development must be performed so that all healthcare professions have access to HICT that underpins their therapy with evidence, and that creates the opportunity to share data in a secure way.

There is also a need for a structure and culture that promotes the collaboration between the healthcare professions.

4.6. Conclusion

Belgian healthcare professionals have shown a willingness to collaborate and exchange information to improve outcome measures, if the privacy of the older person is maintained. However, there are several barriers that need to be addressed. Some barriers can be tackled at the regional level through the initiatives of individual healthcare professionals, while others require structural changes at the policy-making level.

4.7. Abbreviations

CCM: Chronic Care Model

EBP: Evidence-Based Practice

DSS: Decision Support System

HICT: Health Information and Communication Technology

4.8. Declarations

4.8.1. Acknowledgements

The authors would like to thank the health professionals who participated for sharing their opinions and experiences. The authors would also like to thank Ms. D. Bester for the linguistic review.

4.8.2. Author contributions

LDC was responsible for the study concept and design, interviewed the participants, transcribed the interviews, analyzed, and interpreted the transcription, and drafted the manuscript under supervision of the other authors.

AD contributed to the study concept and design, and conducted a critical revision of the manuscript.

LB contributed to the analysis and interpretation of the transcription as second independent researcher and conducted a critical revision of the manuscript.

CD performed a critical revision of the manuscript.

MG contributed to the study design and conducted a critical revision of the manuscript.

BA contributed to the study design and conducted a critical revision of the manuscript.

All people contributed to the work are listed.

4.8.3. Funding

This research was funded by the Flemish Policy Research Center Welfare, Public Health and the Family, Belgium. An advisory committee approved by the policy research center annually gave feedback on the research process. They had no influence on the content of this study.

4.8.4. Ethics approval and consent to participate

The study was approved by the ethical committee of the University Hospitals of Leuven, Belgium (S58057) and performed in accordance with the Declaration of Helsinki. Informed consent to participate was obtained from the participants. Anonymity was assured by removing all participant

information from the transcripts that could lead to identification. The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any deviations from the study as it was designed (and, if relevant, registered) have been explained.

4.8.5. Availability of data and materials

All the interviews were transcribed into text files. The text files containing the transcripts are kept in locked files, accessible only by the corresponding author. The datasets generated and analyzed during the current study are not publicly available and are not available from the corresponding author on request due to reasons concerning participant privacy and confidentiality.

4.8.6. Consent for publication

Not Applicable.

4.8.7. Competing interests

None of the authors received support from any organization for the submitted work, nor were there any financial relationships with organizations that might have had an interest in the submitted work over the course of the past 3 years. There were no other relationships or activities that could appear to have influenced the submitted work.

4.8.8. Authors' occupation and background

LDC: researcher, occupational therapist, and gerontologist

AD: researcher and sociologist

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Supplementary material 1: Interview healthcare professional in primary care

Introduction

Purpose of the interview and practical information

Reason of care consultation and referral

- What are the most common needs elderly people with chronic health issues consult you?
- For what kind of requests do you refer to colleagues? To whom?
- To whom do you refer for help concerning functionality?
- Can you explain the task of an occupational therapist in primary healthcare? (If they don't know, informing them)
- What can be advantages of implementing occupational therapy systematically in primary healthcare? Disadvantages?

Collaboration

- Do you find that it is desirable to collaborate with other professions regarding the target group elderly people with chronic health problems?
- What do you see as factors for a successful collaboration? Which criteria should be met for a successful collaboration?
- What can be improved regarding collaboration?

Data sharing

- What kind of information on your patient do you want to receive from other healthcare professionals? What exactly from whom?
- What do you think is the most efficient way to get this information?

Electronic data sharing

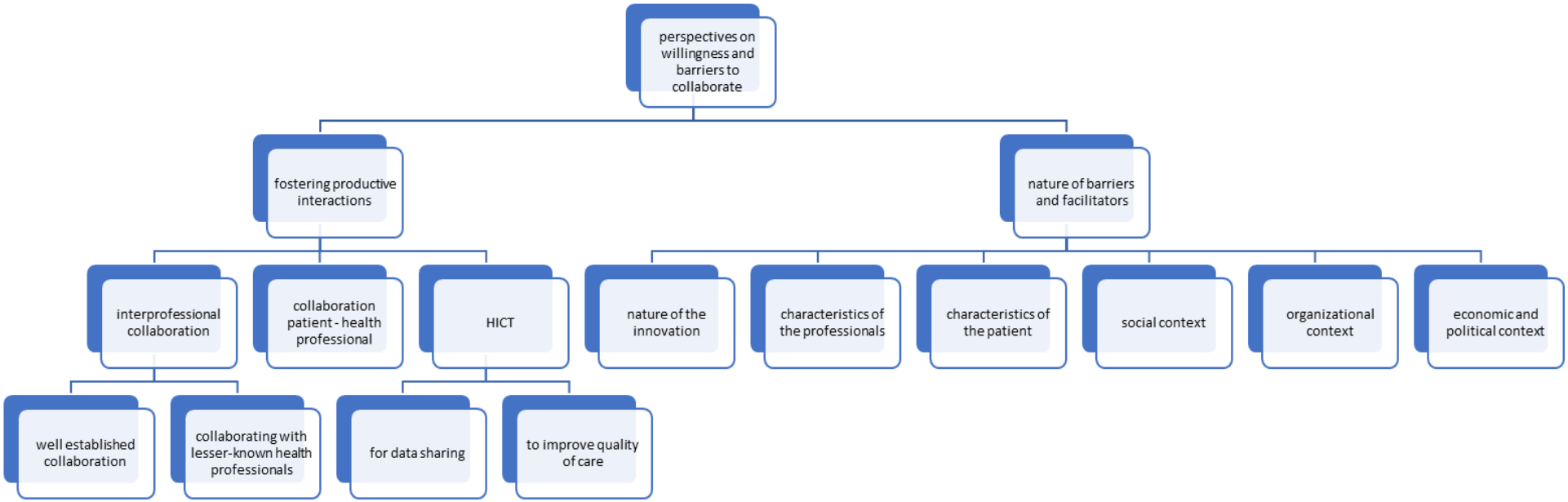
- What do you think are the advantages and disadvantages of electronic data sharing?
- Can you share electronic data on a safe secure way with other healthcare professionals? To whom and what kind of data do you already share?
- In your opinion, what needs to be changed to share electronic data efficiently?

Closure

- Do you want to add something?

Thanking for participating.

Supplementary material 2: Code tree developed in a dialogue between theory-driven and data-driven qualitative analysis



5. Promoting meaningful activities by Occupational Therapy in Elderly care. Part 1: Roadmap for the development of the ProMOTE-intervention

BMC Geriatrics; De Coninck L.[1,2], Declercq A.[3], Bouckaert L.,[4] Döpp C.[5], Graff J.L.M.[5] and Aertgeerts B. [1,2] (2023) Submitted

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ABSTRACT

Background

This article describes the research activities undertaken to design a high-adherence-to-therapy and evidence-based occupational therapy (OT) intervention to optimize functional performance and social participation of home-based physically frail older adults and wellbeing of their informal caregiver.

Methods

A roadmap was created to develop the OT intervention 'ProMOTE' (Promoting Meaningful activities by Occupational Therapy in Elderly). This roadmap is based on the Medical Research Council (MRC) Framework and is supplemented with elements of the Intervention Mapping approach.

Results

The roadmap for the development of ProMOTE-intervention follows the phases of the MRC-framework supplemented with components of the Intervention Mapping approach. The intervention emerges as the product of the first two phases of the MRC-framework. The last two phases serve to inform on the quality measurement of the protocol and the implementation of the OT intervention.

Conclusion

This study transparently reflects on the process of a high-adherence-to-therapy and evidence-based intervention to optimize the functional performance and social participation of the home-based physically frail older adult living. The ProMOTE-intervention contributes to safely aging in place and to maintaining social participation. A further rigorous study of the effect of the OT intervention on adherence, functional performance and social participation is recommended based on the findings reported here, which may force the implementation of this intervention on a national level.

Keywords

frail older adults, informal caregivers, primary care, functional performance, social participation, adherence, intervention development

Funding

This study was developed without funding.

5.1. Introduction

Sixty eight percent of the older adult population (65 years and older) is currently living with multiple chronic conditions.[1] Multiple chronic conditions in this population are associated with decreased performance of meaningful daily and social activities. Being able to participate in physical and social activities, however, are key determinants of successful and healthy aging. [2] Interventions aiming to improve independence in performing meaningful daily activities and to maintain social participation are an effective way to improve the health and wellbeing of frail older adults. As a result, it also reduces the use of, and the costs associated with, ongoing homecare services. [3-5]

Occupational therapists are health professionals whose main goal is to enable engagement in meaningful daily activities within the individuals' living environment, thereby fostering their health and well-being. [6] Given the profession's specialized education and skills in functional assessments,

activity analysis, skill development, problem-solving barriers, environmental assessments, adaptation, compensation, and remediation, occupational therapists are well equipped to support clients in managing their multiple chronic conditions. [7] Recommendations provided by an occupational therapist have resulted in significant improvement in the older adult's functioning, a reduction of falls rate and fewer readmissions to the hospital. [8-10,3,4]

The implementation of specific interventions in elderly care can be faced with difficulties owing to several factors, one of these being the adherence of the older adults and their caregivers. Despite the desire of the older adults and their caregivers to continue to live independently, therapy adherence is not evident in this population. [11-13] The causes of (non-)adherence to therapy are diverse and include the belief in the effect of an intervention, the involvement of the older adult and their caregivers in goal setting and the degree of interprofessional collaboration. [12,14,15]

Because of its properties, such as the number of components involved, uncertainties about adherence and interactions with its context, interventions for multiple chronic conditions are complex interventions which requires flexibility in intervention delivery. Attention should be paid to the resources required to support intervention reach and impact in real world implementation, and to the conditions needed to realize its mechanisms of change. The UK Medical Research Council (MRC) developed a framework for developing and evaluating complex interventions to support researchers to develop complex interventions that consider both the intervention components and its interaction with the context. [16] In addition, there is also the Intervention Mapping approach which is a protocol for developing effective behavior change interventions. Intervention Mapping approach describes the iterative path from problem identification to problem solving or mitigation and consists of six steps. [17,18]

There is a need for a detailed evidence-based intervention that aims to increase the adherence of home-based physically frail older adults and their informal caregiver to OT recommendations for functional performance and social participation. There is also a growing understanding that the development of an intervention protocol should be more transparent. [19] Therefore, this study is twofold. The first part of this study describe the development and feasibility of an evidence-based intervention that aims to increase adherence to OT recommendations. The second part discusses the content of the developed evidence-based intervention which is described elsewhere.

5.2. Purpose

To describe the development and feasibility of a high-adherence-to-therapy and evidence-based occupational therapy (OT) intervention to optimize functional performance and social participation of home-based physically frail older adults and wellbeing of their informal caregiver.

5.3. Method

To develop the evidence-based OT intervention ProMOTE (PROmoting Meaningful activities by Occupational Therapy in Elderly), a roadmap was designed based on the MRC Framework supplemented with elements of the Intervention Mapping approach. [18,5]

The MRC framework maximizes the likelihood of developing a successful intervention and consists of four phases, namely development (phase I), feasibility and piloting (phase II), evaluation (phase III) and implementation (phase IV). [16,20,21] This study describes the roadmap of phases I and II. Phases III and IV inform on the evaluation and implementation of the OT intervention, which is not the focus here.

To describe the developmental process in even more depth, components of the Intervention Mapping approach have been added to the MRC framework. [18] The six steps of the Intervention Mapping approach can be mapped onto the four phases of the MRC framework. (Figure 1)

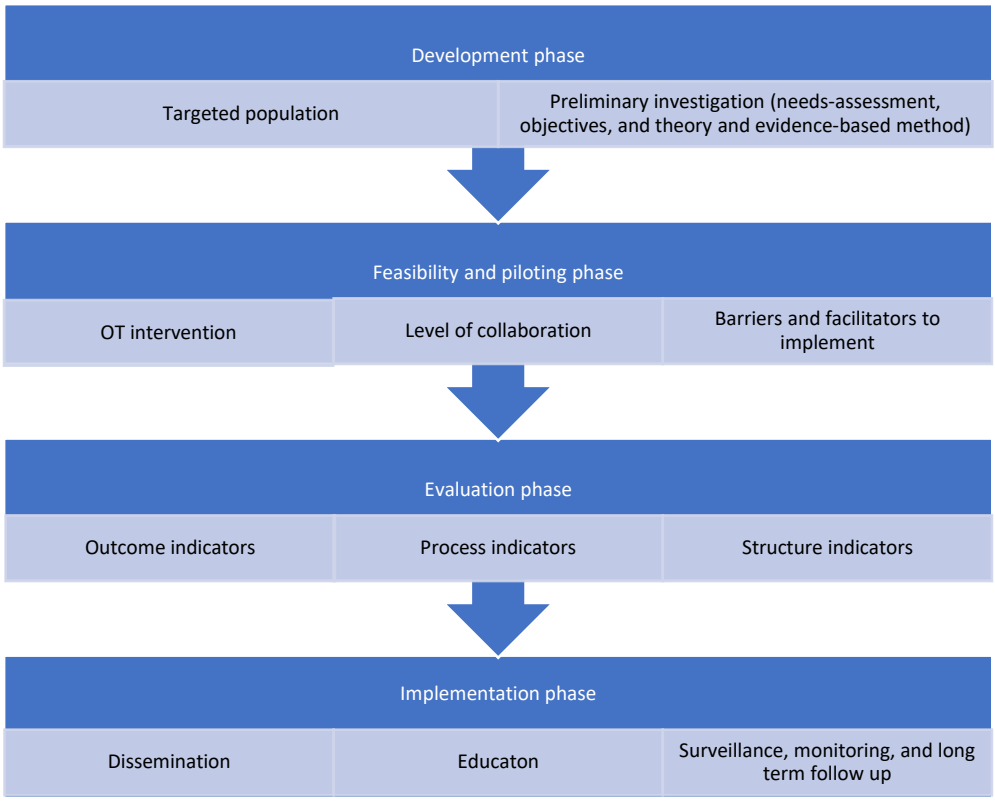


Figure 1: Developmental process of the evidence-based OT intervention based on Intervention Mapping approach incorporated in the phases of the MRC-framework

The first three steps of the Intervention Mapping approach correspond to the first phase of the MRC framework, which represents development. These three Intervention Mapping approach steps are the description of a needs-assessment, defining the objectives of the intervention and the description of the theory- and evidence-based methods. Intervention Mapping approach step four concerns integrating methods and the practical applications into the local context, and can be linked to phase II of the MRC framework, i.e. feasibility and piloting. Intervention Mapping approach steps five and six correspond respectively to phases III and IV, evaluation and implementation, of the MRC framework [18,21], which are not the focus of this paper.

The outcome of phases I and II of the roadmap are described in this study and results in the evidence-based OT intervention aimed to increase adherence to treatment and in recommendations for designing phases III and IV.

5.4. Results

As outlined above, the roadmap for the development of the ProMOTE-intervention follows the phases of the MRC-framework supplemented with components of the Intervention Mapping approach. The OT intervention emerges as the product of the first two phases. The last two phases serve to inform on the quality measurement of the protocol and the implementation of the OT intervention.

5.4.1. Phase I: Developing a complex intervention

To develop a complex intervention, problem analysis is a necessary step in identifying which elements must be changed and for whom. [18,21] The problem in the home-based physically frail older adult population is that adherence to treatment, among which OT interventions, is often weak.

5.4.1.1. Target population

The target population is older adults living at home who are restricted in at least one basic or instrumental activity of daily life and who have experienced one or more of the following in the last 12 months: a fall, restrictions in social participation, receiving home-health services and/or receiving support of an informal care giver. The age of the target population is 70 and older. Older adults living in a nursing home or presenting with moderate to severe cognitive impairment are not included, notwithstanding that certain aspects of the ProMOTE-intervention can also be applied to that population.

5.4.1.2. Preliminary investigation (needs assessment, objectives, and method)

The lack of adherence to recommendations or exercises influences the functional performance and social participation of home-based physically frail older adults. Our objective was to develop an evidence-based OT intervention that aims to increase the adherence of this population.

We identified determinants of therapy adherence improvement by means of a literature review and qualitative research. [13,22,23] A systematic review with meta-analysis was conducted to assess the effectiveness of OT in improving performance in daily living activities and social participation in community-dwelling physically frail older adults. This study provided convincing evidence that OT improves functioning and social participation in this population and detects the characteristics of effective intervention. [22] Qualitative research was conducted to investigate the perspectives of older

adults on their own functioning and social participation, and to detect the factors influencing these components. Assistive devices, the older adult's dwelling and living environment, professional and informal support and medication are perceived as important external determinants for retaining functioning and social participation. Attitude, social influences, and personal effectiveness emerge as internal factors related to whether a person performs or participates in an activity. [13] Based on the results of these investigations, we developed a preliminary OT intervention for which a pilot implementation was performed to inform on potential barriers. [24] The outcome of this pilot, supplemented with scientific evidence, yielded components for the improvement of therapy adherence which can be assigned to one or more of the following clusters: time to intervention, self-efficacy, prioritization, collaboration, and information exchange. (Table 1)

Table 1: Components of adherence improvement

- Reducing the time between the initial demand for the intervention and the actual implementation thereof [24,25]
- Building of a trust-relationship [13,22,24,26]
- Determining shared decision-based goals [14,22,24,27]
- Using strategies to empower older adults, such as improving health literacy [12-14,22,28]
- Starting with addressing a limited number of goals that are set as priority by the older adult [24,29,30]
- Embedding the goals within meaningful daily activities of the older person [13,14,22,24]
- Exploring and discussing barriers and facilitators of an intervention with the older adult [13,14,24]
- Providing objective information on the process of the defined goals [14,22]
- Collaboration with social network [12,14,22]
- Fluid interprofessional communication and collaboration [14,22,24]
- Monitoring the desired changes over a period and providing a follow-up session [14,24,25]

5.4.2. Phase II: Piloting and feasibility

5.4.2.1. Piloting the preliminary OT intervention

Piloting the preliminary OT intervention adds value with regards to a sustainable implementation in the broader working field. We piloted the preliminary protocol in a district community center to refine and measure feasibility. One occupational therapist, one final year undergraduate OT student and eight physically frail older adults along with their informal caregivers, if present, participated in the pilot. Interprofessional collaboration was essential due to the complexity of the cases. The content of the OT intervention itself, the level of collaboration and, as mentioned above, the barriers and facilitators to implementation were the subject of measurement. [24]

With the pilot implementation, the comprehensiveness and feasibility of the intervention is taken into consideration, and adjustments are made accordingly. The content of the preliminary intervention is refined according to both the participants' needs and the received feedback. Case finding is conducted prior to 'functional assessment'. The opportunity to spread the functional assessment over two home visits is suggested if the assessment is too burdensome for the older adult. The step 'goal setting and developing intervention plan' has been split due to the specificity and importance of each component. [24]

5.4.2.2. Determining the level of collaboration

In our pilot implementation, the occupational therapist collaborated with the older adult, their informal caregiver, and the involved health professionals. An analysis of the care network confirms that the complex star network reported on by Grol (2020) is the most common network type present, which means that the older adult mostly has one informal caregiver and multiple health professionals. In a complex star network, the power in terms of access to information and contacts is held not only by the older adult, but also by another actor, which is often the informal caregiver. [31]

Collaboration with the informal caregiver has two main objectives for the occupational therapist: to pursue the older adult's goals, on the one hand, and to support the informal caregiver themselves to keep the workload bearable, on the other hand.

Each older adult involved in the pilot is receiving treatment from multiple health professionals. During the 10-week period of the pilot, the occupational therapist collaborated with nine other health or well-being professionals or services, specifically social workers, general practitioners, physiotherapists, care coordinators or case managers, home services, a mental health center, a pharmacist, an assistive device store and transport services. [24] In the final version of the evidence-based ProMOTE-intervention, particular attention is paid to interprofessional collaboration between these providers.

5.4.2.3. Feasibility: Barriers and facilitators of implementation

The success of implementing an intervention that deviates from routine actions is influenced by barriers and facilitators. These influencing factors can be divided into six components: concrete innovation, the individual professional, the user and the informal caregiver, the social context, and the organizational and economic-political context. [32,33] The innovation level consists of advantages in practice, feasibility, credibility, accessibility, and attractiveness. Determinants of the individual professional include awareness, knowledge, attitude, motivation to change and behavioral routines,

while determinants on the level of the user are knowledge, skills, attitude, and compliance. Factors relating to social context include the opinion of colleagues, culture of the social network, collaboration, and leadership. Organizational context refers to organization of care processes, staff, capacities, resources such as computerized decision support systems and structures. Financial arrangements, regulations and policies are determinants of the economic and political context.

We made an inventory of the barriers and facilitators that we detected via various sources, namely scientific evidence, interviews with health professionals and older adults, and insights gained during the pilot. (Table 2) This overview allows us to adapt the preliminary OT intervention to anticipate difficulties with implementation.

Table 2: Determinants of success and barriers to the OT intervention

Facilitators	**Barriers**
Innovation	
− Computerized decision support system which detects physically frail older adults or older adults at risk of physical frailty − System that links evidence to the electronic health record (e.g., Evidence Linker) − Secure digital information exchange system − - Intervention is evidence-based	− Lack of supportive electronic devices
Individual professional	
− Health professionals involved receive basic education and training in collaborating with patients with complex chronic conditions − Local health professionals know each other − Health professionals have knowledge of the evidence-based practice method − Methodology for health literacy is part of the basic competences of occupational therapist and other involved health professionals − Freely available scientific evidence translated to local context − Professional pride	− Professionals not believing in the added value of the interventions

Facilitators	Barriers
User	
− Congruence between personal expectations of user(s) and set goals − Insight into the problem, potential cause, and potential consequences for user and, if relevant, informal caregiver − Actions tailored to the pace of user with special attention to actions of assessment phase − Experienced support from peers and family	− Denial of the problem − Lack of motivation − Additional costs of intervention such as the purchasing of assistive devices − Experienced social stigma
Social context	
− Congruence between expectations of informal caregiver and set goals − Insight into the problem, potential cause, and potential consequences for informal caregiver − Positive attitude of colleagues towards innovation − Opinion leaders who support the innovation − Collaborative leadership	− Denial of the problem − Lack of motivation or interest of informal caregiver − Content and value of occupational therapy in primary care not well known by informal caregivers and health professionals
Organizational context	
− Structurally embedded procedure which detects physically frail older adults or high-risk individuals − Integrated care is routine in primary care − OT is already integrated in the daily clinical practice − Innovative intervention implemented within routine actions − Innovative intervention adapted to local context − Indicators (effect-process-structure) available at start of implementation of the intervention	− Ingrained, inflexible organizational system
Economic and political context	
− Sufficient allowances for assistive devices and home adaptations − Sufficient compensations for OT intervention	− OT not structurally embedded in primary care in Belgium

5.4.2.4. Ultimate evidence-based ProMOTE-intervention

Based on the outcome of previous steps, the preliminary OT intervention has been adjusted. The resulting ProMOTE-intervention consists of six components, with collaboration serving as the common thread. The components of this intervention are 'case finding, functional assessment, goal setting, developing an intervention plan, implementing and monitoring the intervention plan and evaluating'. These components are comparable with the comprehensive geriatric care model and are described elsewhere. [34] Collaboration between the older adult, the informal caregiver(s) and the involved health professionals is essential during the intervention. Components important for adherence to the intervention, as described in Table 1, are interwoven during the entire intervention.

5.4.3. Recommendations for phase III and IV

In this section, suggestions for designing phases III and IV are described based on the results of phases I and II.

5.4.3.1. Phase III: Evaluating interventions and reporting

The evaluation of the ProMOTE-intervention should consist of a quality measurement of both the intervention and the OT service.

QUALITY MEASUREMENT OF THE INTERVENTION

Consistent with the Donabedian model of health quality (1988), quality measures must extend beyond the perspective of the outcomes. [35] Process and structure indicators are equally important because they give insight into the possible reasons for the (lack of) achievement of the treatment effect. Thus, the evaluation must also be conducted from the perspective of structure and process.

Outcome or effect indicators measure changes that occur as a result of the ProMOTE-intervention. The effect measurement captures the coverage of the recommendations, referring to the extent to which the recommendation induced effect. The impact of adherence to the recommendations on the level of functional performance, social participation, and quality of life of the older adult, as well as the perceived burden and quality of life of the informal caregiver, are also measured.

Process indicators evaluate how the ProMOTE-intervention is delivered and how the older adult deals with the received recommendations. The compliance of the therapist with the intervention

should be measured by analyzing their records and registering the extent to which the additional education and supervision sessions are followed. The measurement of how the older adult deals with the recommendation addresses the following subcategories: the content of recommendations and whether recommendations are followed as planned (yes/no). If the recommendations are not followed as indicated, the quantity and coverage will be measured. Quantity consists of the number of recommendations followed, time from when recommendations are followed and if the recommendations are followed for as long as planned.

Structure indicators assess the environmental factors and resources required to deliver a high-quality OT intervention. Contextual factors that might have an impact on the adherence of the older adult to the recommendations can be diverse. Non-adherence to recommendations for safe participation in activities could be due to insufficient allowances for assistive devices and home adaptations. Alongside the impact of contextual factors on adherence of the older adult, the contextual factors that might influence the compliance of the therapist are also measured. Lack of secure digital software such as electronic health records, computerized decision support systems and Evidence Linker might complicate work efficiency.

QUALITY MEASUREMENT OF THE OT SERVICE

Quality management evaluations of the OT service in general must be conducted periodically. The World Federation of Occupational Therapy (WFOT) supports OTs in conducting quality work by providing the Quality Evaluation Strategy Tool (QUEST). [36] QUEST includes seven dimensions that are most relevant to occupational therapy services in their framework. The dimensions include accessibility, appropriateness, effectiveness, efficiency, person-centeredness, safety, and sustainability. In accordance with the Donabedian model of health quality (1988), the seven dimensions are measured by the quality perspectives of structure, process, and outcome. [35,36]

5.4.3.2. Phase IV: Implementation

To pursue a sustainable implementation of the ProMOTE-intervention on a national level, a pilot-implementation study must be conducted. The goal of this pilot study is to select the most effective implementation strategy. Education and inter-vision sessions between peers must be organized to assure and increase compliance of the involved health professionals.

Dissemination among professionals

Publishing research is an integral part of an implementation strategy, although the effective application of evidence into practice requires more than the publication of research findings. Platforms that are easily accessible and known by the occupational therapist are valuable tools in dissemination, one example being the website of the national professional association. Within the context of the present study, a clinical guideline is also being developed and will be submitted to the national validation committee of the Center for Evidence-based Medicine (CEBAM). After validation, the guideline will be disseminated via the national platforms Evidence-based Practicenet (EBPnet.be) and Working group Development of primary care guidelines (EBP-guidelines.be), among others. These platforms disseminate nationally validated guidelines for primary care and are well known by health care professionals in Belgium.

Dissemination among older adults and their caregiver

Knowledge translation and dissemination among the older adults is another aspect of implementation that requires attention. This can take multiple forms, for example communications from health care providers or health insurance companies and patient platforms.

Health care providers and insurance companies can inform their client individually. They can additionally amplify oral information with flyers, posters, and banners.

National patient platforms, such as Health and Science (Gezondheidenwetenschap.be) for the Dutch speaking part of Belgium or Health information (Infosanté.be) for the French speakers, disseminate reliable information about health in an accessible format. They synthesize and translate the validated Belgian guidelines into lay language and promote them via their website. Elderly advisory and participation bodies of governments can communicate the knowledge in two directions, namely towards the elderly and towards the policy makers. For instance, the Flemish Elderly Council (Vlaamse-ouderenraad.be), which is a non-profit consultation platform consisting of various organizations of and for the elderly, coordinates awareness-raising campaigns to inform the elderly about topics that concern them, and they additionally advise on policy relating to the elderly population.

Education

The selection of implementation strategies that consider previously identified barriers to adherence requires careful consideration. Education as a means of implementation is aimed at both higher

education institutions and the professional field. It consists of promoting awareness of change, stimulating interest and involvement, creating understanding, developing insight into one's own routines, developing a positive attitude towards change and creating positive intentions/decisions to change. [37] Educational tools will be developed for both the content of the intervention as well as for the mastering of communication and collaboration skills for the therapists.

SURVEILLANCE, MONITORING, AND LONG TERM FOLLOW UP

Integration of the ProMOTE-intervention into an organized program facilitates sustainability of the actions into routine. Inter-vision sessions between occupational therapists, preferably with various levels of experience, must ensure that there is an intrinsic motivation to continue monitoring of the intervention. Such inter-vision sessions can be organized regionally and should become part of the regular work of the occupational therapist to support sustainability and quality of treatment.

5.5. Discussion

This article set out to describe the development and feasibility of an evidence-based intervention that aims to increase the adherence of home-based physically frail older adults to OT recommendations for functional performance and social participation. It also provides recommendations for designing the future evaluation and implementation of the ProMOTE-intervention.

Informed by theoretical foundations and previous qualitative research, we designed the ProMOTE-intervention for the home-based physically frail older adult and their caregiver (Table 1). In this intervention, the occupational therapist collaborates with the older adult and their caregiver within an integrative care team to deliver flexible, person-centered, integrated and proactive OT.

5.5.1. Strengths, limits and challenges of this study

Among the strengths of this study are: (1) the establishment of theoretical underpinnings through implementation of the MRC-framework for designing and evaluating complex interventions with supplemental use of the steps of the IM-model; (2) the evidence-based approach; (3) input from health professionals and informal caregivers regarding their insights into collaboration; and (4) the piloting of the ProMOTE-intervention to evaluate its feasibility, which included the inventory of barriers and facilitators of implementation.

An update of the MRC migrated the protocol into a new framework for developing and evaluating complex interventions at the end of 2021. [16] No conflicts between the framework used in this study and the updated framework were identified.

A limitation of this study to take under consideration is the methodological quality of the reported studies on adherence. A double-blind RCT is in general the best method of evaluating health care interventions. Differences in outcomes between groups can be confidently attributed to the difference in interventions received if contextual factors are controlled and patients are randomized to alternative comparison groups. [38] Studies on adherence are often part of complex interventions. Due to the complexity of the interfering factors, the risk of bias in complex interventions is typically high. [39,40] For this reason, the reported studies on adherence are in general of low methodological quality.

To date, we have piloted the preliminary intervention on feasibility. A future challenge is to evaluate the ProMOTE-intervention on its effectiveness.

A subsequent challenge is to measure the impact of an ProMOTE-intervention in clinical OT practice. The impact of OT on outcomes and costs is a concern of integral quality management.

5.5.2. What this study adds

To the best of our knowledge, this study is the first that describes the development of an OT intervention aimed at increasing functional performance and social participation of community-dwelling frail older adults.

This study provides researchers, clinicians, and decision makers transparency about the development and therefore also about the validity of the ProMOTE-intervention.

Combining the MRC framework with the Intervention Mapping approach in the way we performed it is a method that enables to further detail the intervention, especially when it concerns an intervention for complex bio-psycho-social diseases. This method may enable other researchers to take maximum account of all components that influence the development of a complex intervention.

5.6. Conclusion

This study transparently reports on the development process of a high-adherence-to-therapy and evidence-based OT intervention to optimize the functionality and social participation of the physically frail older adult living at home. The ProMOTE-intervention will contribute to safely aging in place and to maintaining social participation.

The precise description of how the intervention was developed provides the opportunity to verify the validity of the development process.

5.7. Declarations

5.7.1. Ethics approval and consent to participate

Not applicable

5.7.2. Consent for publication

Not applicable

5.7.3. Availability of data and materials

Not applicable

5.7.4. Competing interests

None of the authors received support from any organization for the submitted work and they have to financial relationships with any organizations that might have an interest in the submitted work in the previous three years; there is also no other relationships or activities that could appear to have influenced the submitted work.

5.7.5. Funding

This study was developed without funding.

5.7.6. Authors' contributions

LDC was responsible for the design of the study protocol and drafted the manuscript under supervision of the other authors.
BA, MG, AD, CD and LB contributed to the critical revision of the manuscript.
All who contributed to the work have been listed.

5.7.7. Acknowledgements

Not applicable

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Figures and tables

Table 1: Components of adherence improvement

- Reducing the time between the initial demand for the intervention and the actual implementation thereof (Bleijlevens et al., 2010; De Coninck et al., 2020)
- Building of a trust-relationship (Palmadottir, 2003; De Coninck et al., 2017; De Coninck et al., 2020; De Coninck et al., 2021)
- Determining shared decision-based goals (Collado-Mateo et al., 2021; De Coninck et al., 2017; Tang Yan et al., 2014; De Coninck et al., 2020)
- Using strategies to empower older adults, such as improving health literacy (Collado-Mateo et al., 2021; De Coninck et al., 2017; De Coninck et al., 2021; Taylor et al., 2019; Cumming et al., 2001)
- Starting with addressing a limited number of goals that are set as priority by the older adult (Mikolaizak et al., 2018; Clemson et al., 2008; De Coninck et al., 2020)
- Embedding the goals within meaningful daily activities of the older person (Collado-Mateo et al., 2021; De Coninck et al., 2017; De Coninck et al., 2020; De Coninck et al., 2021)
- Exploring and discussing barriers and facilitators of an intervention with the older adult (Collado-Mateo et al., 2021; De Coninck et al., 2020; De Coninck et al., 2021)
- Providing objective information on the process of the defined goals (Collado-Mateo et al., 2021; De Coninck et al., 2017)
- Collaboration with social network (Collado-Mateo et al., 2021; De Coninck et al., 2017; Cumming et al., 2001)
- Fluid interprofessionnal communication and collaboration (Collado-Mateo et al., 2021; De Coninck et al., 2017 ; De Coninck et al., 2020)
- Monitoring the desired changes over a period and providing a follow-up session (Collado-Mateo et al., 2021; Bleijlevens et al., 2010; De Coninck et al., 2020)

Table 2: Determinants of success and barriers to OT intervention

Facilitators	**Barriers**
Innovation	
− Computerized decision support system which detects physically frail older adults or older adults at risk of physical frailty − System that links evidence to the electronic health record (e.g., Evidence Linker) − Secure digital information exchange system − Intervention is evidence-based	− Lack of supportive electronic devices
Individual professional	
− Occupational therapists and other health professionals involved receive basic education and training in collaborating with patients with complex chronic conditions − Local health professionals know each other − Occupational therapists has knowledge of the evidence-based practice method − Methodology for health literacy is part of the basic competences of occupational therapist and other involved health professionals − Freely available scientific evidence translated to local context − Professional pride	− Professionals not believing in the added value of interventions
User	
− Congruence between personal expectations of user and set goals − Insight into the problem, potential cause and potential consequences for user and, if relevant, informal caregiver − Actions tailored to the pace of user with special attention to actions of assessment phase − Experienced support from peers and family	− Denial of the problem − Lack of motivation − Additional costs of intervention such as the purchasing of assistive devices − Experienced social stigma

Social context	
− Congruence between expectations of informal caregiver and set goals − Insight into the problem, potential cause and potential consequences for informal caregiver − Positive attitude of colleagues towards innovation − Opinion leaders who support the innovation − Collaborative leadership	− Denial the problem − Lack of motivation or interest of informal caregiver − Content and value of occupational therapy in primary care not well known by informal caregivers and health professionals
Organizational context	
− Structurally embedded procedure which detects physically frail older adults or high-risk individuals − Integrated care is routine in primary care − OT has been already integrated in the daily clinical practice − Innovative intervention implemented within routine actions − Innovative intervention adapted to local context − Indicators (effect-process-structure) available at start of implementation of the intervention	− Ingrained, inflexible organizational system
Economic and political context	
− Sufficient allowances for assistive devices and home adaptations − Sufficient compensations for OT intervention	− OT not structurally embedded in primary care

6. Promoting meaningful activities by Occupational Therapy in Elderly care. Part 2: Content of the ProMOTE-intervention

BMC Geriatrics; De Coninck L..[1,2], Declercq A. [3], Bouckaert L. [4], Döpp C. [5], Graff J.L.M. [5] and Aertgeerts B.[1,2] (2023) Submitted

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ABSTRACT

Background

This article describes the contents of a high-adherence-to-therapy and evidence-based occupational therapy (OT) intervention that aims to optimize functional performance and social participation of home-based physically frail older adults and wellbeing their informal caregiver.

Method

A roadmap based on the Medical Research Council (MRC) Framework and supplemented with elements of the Intervention Mapping approach was created to develop this evidence-based OT

intervention. The TIDieR checklist, which contains the minimum recommended items for describing an intervention, is applied to describe the intervention in detail.

Results

The designed OT intervention ProMOTE is an intervention which consists of six steps and describes in detail the evidence-based components that are required to obtain an operational intervention for practice, and which is also transparently described for research aims.

Conclusion

This OT intervention aims to optimize the functional performance and social participation of the physically frail older adult living at home. The OT intervention contributes to safely aging in place and to maintaining social participation. The designed intervention goes beyond a description of the 'what. The added value lies in the interweaving of the 'why' and 'how'. By describing the 'how', our study makes the concept of 'therapeutic use-of-self' operational throughout the six steps of the OT intervention.

A further rigorous study of the effect of the OT intervention on adherence, functional performance and social participation is recommended based on the findings reported here, which may force the implementation of this intervention on a national level.

Keywords

Frail older adults, informal caregivers, primary care, functional performance, social participation, adherence, intervention protocol

Funding

This study was developed without funding.

6.1. Introduction

For a significant proportion of the older adult population, the ability to perform meaningful daily activities and to fully participate in society is compromised by age-related limitations. To compensate for these limitations, one in three older adults is supported by an informal caregiver. [1] Remaining active and being able to participate, however, are key determinants of successful and healthy aging. Remaining active brings structure to daily life and serves a purpose. [2-4] People who

perform meaningful daily activities in their habitat not only preserve their autonomy, but also experience a sense of belonging, identity, familiarity, and safety. [5-8] Additionally, older people rate their wellbeing more positively when participating in social activities. In their habitat, physically frail older adults keep in touch more easily with existing contacts. [9,10] Consequently, an effective way to improve the health and wellbeing of frail older adults is to promote their participation in meaningful daily and social activities. Interventions aiming to improve independence in performing meaningful daily activities and to maintain social participation also reduce the use of, and the costs associated with, ongoing homecare services. [11-13] As a consequence, there is not only a personal and social need, but also an economic need for an evidence-based occupational therapy (OT) intervention that increases adherence to recommendations regarding functional performance and social participation of home-based physically frail older adults.

Occupational therapists are health professionals whose main goal is to enable engagement in meaningful daily activities within the individuals' living environment, thereby fostering their health and well-being. [14] Recommendations provided by an occupational therapist to adapt a person's behavior, and if necessary their caregivers' behavior, as well as to compensate for the limited abilities by applying assistive devices and home modifications, have resulted in significant improvement in the older adult's functional performance, a reduction of falls rate and fewer readmissions to the hospital. [11,12,15-17] However, the full potential of these recommendations is only achieved when implemented comprehensively.

The implementation of specific interventions in practice can be faced with difficulties owing to several factors, one of these being the adherence of clients and their caregivers. Despite the desire of the older adults and their caregivers to continue to live independently, therapy adherence is not evident in this population. [18,19] The causes of (non-)adherence to therapy are diverse and include the belief in the effect of an intervention, the involvement of the older adult and their caregivers in goal setting and the degree of interdisciplinary collaboration. [19-21] Occupational therapists assess the needs of the older person and their informal caregivers in a person-centered manner, empower them to take responsibility for their own health, make use of shared decision making in goal setting and in the implementation of the intervention plan and collaborate with other professionals. [22,23]

The complexity of age-related issues necessitates an interprofessional approach to improve the functional performance and therapy adherence of older people and their caregivers. [24,25] This complexity depends on the personal situation and social context of the older person, the underlying intention of the interdisciplinary collaboration, their interaction and sharing of knowledge. Health care professionals are expected to communicate, collaborate and respect each other's contributions.

[26-28] In line with these collaborative principles, interprofessional collaboration in primary care aims for a better result by adopting an integrated approach. Integrated care can be defined as a process by which health care professionals of various disciplines focus on the same issue or need of a person in an integrated, cohesive and comprehensive manner. It is a form of service delivery that provides a continuous transition between health and social welfare services. [19,29,30]

This study is twofold. The first part of this study provided a conscientious roadmap of the development of the ProMOTE-intervention (**Pro**moting **M**eaningful activities by **O**ccupational **T**herapy in **E**lderly care) and is described in this journal as a separate publication (under submission) The objective of this paper is to describe the contents of the ProMOTE-intervention.

6.2. Purpose

To describes the contents of a high-adherence-to-therapy and evidence-based OT intervention that aims to optimize functional performance and social participation of home-based physically frail older adults and wellbeing of their informal caregiver.

6.3. Method

6.3.1. Target population

The target population is older adults living at home who are restricted in at least one basic or instrumental activity of daily life and who have experienced one or more of the following in the last 12 months: a fall, restrictions in social participation, receiving home-health services and/or receiving support of an informal care giver. The age of the target population is 70 and older. Older adults living in a nursing home or presenting with moderate to severe cognitive impairment are not included, notwithstanding that some aspects of the OT intervention can also be applied to that population.

6.3.2. Design

The design of this study is based on a review of published articles described in a separate publication (under submission). This study is not a protocol of an experimental study. No human participants,

human material, or human data were involved in the study. So, it does not fit under experimental studies as described in the Declaration of Helsinki.

To develop the evidence-based OT intervention, a roadmap was created based on the Medical Research Council (MRC) Framework supplemented with elements of the Intervention Mapping approach. [31,32] This roadmap is described in this journal as a separate paper (under submission).

The TIDieR checklist is applied to describe the intervention in detail. This checklist contains the minimum recommended items for describing an intervention. The items included in the TIDieR checklist are a brief name, the rationale of goals that underpin the intervention, any materials used in the intervention, the processes, activities or procedures the intervention providers carry out, the intervention provider, the modes of delivery of the intervention, where the intervention should be applied, the number of intervention sessions delivered and over what period, level of tailoring the intervention, modifications, attention to adherence and the assessment of the intervention. Additional information can be provided where necessary for the replication of the intervention. [33]

6.4. Results

The developed intervention consists of six steps comparable with the comprehensive geriatric care model. The steps of this model are case finding, functional assessment, goal setting, developing an intervention plan, implementing and monitoring the intervention plan and evaluating with collaboration serving as the common thread. [34] Collaboration between the older adult, the informal caregiver(s) and the involved health professionals is essential during the whole course of the intervention. The determinants factors that influence adherence to the intervention are interwoven during the entire intervention e.g. using strategies to empower the older adult.

The intervention is not a strictly linear process, but rather a process in which components are executed iteratively as necessary.

Each step of the intervention describes in detail the goal (why), action (what), approach and communication (how), resources (what and how), collaboration (who and how), timeframe (when) and quality indicator (OI: outcome indicator; PI: process indicator; SI: structure indicator) each component of this intervention. (Table 1: The ProMOTE-intervention)

6.4.1. Case finding

Detecting older adults who are physically frail or at risk of physical frailty constitutes part of the daily clinical handling of health professionals, in particular the general practitioner, registered nurse, physiotherapist and occupational therapist, and if relevant also the social worker. [35] Older adults at risk must be referred upon detection to an occupational therapist and by extension to other relevant health professionals. Valuable screening instruments for case finding include the Clinical Frailty Scale of Rockwood, the Frailty Phenotype and BelRAI-screener. [36-38]

Linking the screening instrument to the computerized decision support system of the electronic health record improves the compliance of the health professional. [39] If no electronic health record with computerized decision support system is available, the health professionals must be empowered to routinely detect older adults at risk. Awareness-raising activities, for instance via information sessions integrated into routine quality meetings, are essential to sustainably maintain compliance of the involved health professional. [20,35]

It may also be necessary to organize interprofessional meetings to get to know the local network of involved health professionals. On the one hand, this helps to become familiarized with each other in the context of referral. On the other hand, it facilitates the acquisition of further knowledge regarding the professional profile of the various care providers. General practitioners (GPs) indicate that they do not know enough about the possibilities of OT in primary health care. To overcome this barrier, an evidence-based awareness-raising module 'OT@home' has been developed to better familiarize GPs with OT. Characteristic of this awareness-raising module is that it can be tailored to the requesting organization. [40] In this way, the intervention meets the requirement for the pursuit of adherence, namely collaboration with involved health professionals. [20]

Interprofessional collaboration does not end with case finding. Interprofessional collaboration remains desirable throughout the entire therapy process, whether or not this takes place under the coordination of a case manager or care coordinator.

6.4.2. Functional assessment

The functional assessment is completed for the older adult, and if appropriate, the informal caregiver. To achieve adherence, the first contact between the occupational therapist and the older adult is best continued within a week after the case finding. [41]

The occupational therapist uses performance-based measurement instruments to assess the older adult's ability to perform daily activities and to participate in social life. [42] Within the context of ensuring adherence, evaluating the older adult's perception of their functional performance and verifying their wishes and needs are just as important as measuring the level of functional performance, social participation and evaluating the home environment. [43,44]

The assessment takes place at the home of the older adult. Assessment results may vary depending on the place where the assessment is carried out. [45] A functional assessment can be exhausting for the older adult, and it may therefore be more advantageous to divide the assessment into two parts to ensure a reliable result. [35] Conducting the assessment in a manner that is tailored to the elderly person and in their habitat contributes towards building a trust-relationship.

In addition to building a trust-relationship, the occupational therapist uses verbal and non-verbal communication strategies. To become an active partner in the therapy process, the health professional, in this case the occupational therapist, pursues proactive commitment from the older adult and their informal caregiver. [46,47] The occupational therapist therefore not only informs the older adult about the results of the assessment, but also translates the practical consequences thereof for the daily functional performance of the older adult. [43,48]

In consulting the older adult, the occupational therapist exchanges information with relevant health professionals in a secure (digital) way. The involved health professionals, in particular the GP, are important actors in improving adherence. [41]

6.4.3. Goal setting

The occupational therapist pays attention to increasing the health literacy of the older adult, and if relevant their informal caregiver. The occupational therapist discusses possible care options and treatment opportunities with OT so that the older adult can make informed decisions. The occupational therapist does this shortly after the assessment to further build up the trust-relationship. Rapport between health professionals and their clients is essential for a good course of therapy. [41,49,50]

The outcome of the COPM or another client-centered tool aids in establishing the factors that are important for the older adult. Using principles of Motivational Interviewing supports the health professional in allowing the older adult to find out what their priorities are, to grade the goals and to split the goals up to keep them attainable. [35,51,52]

The occupational therapist engages with the older adult, and if relevant the informal caregiver, in a participatory model of decision making by collaborating with the person to identify their priorities and goals. [54] Prioritizing at least three of the goals that the older adult identified as high priority contributes to an increase in therapy adherence. When developing the goals, the occupational therapist and the elderly person also place emphasis on feasibility. [43,50,52]

6.4.4. Developing the OT intervention plan

The occupational therapist collaborates with the older adult to determine the optimal OT intervention. In shared decision making, both parties select the actions to undertake in order to achieve the intended goals. The OT intervention focuses on meaningful activities, and consists of a broad spectrum of actions, including giving information on the intervention opportunities, improving health literacy, skills training, recommending assistive devices and home adaptations, training in the use of the recommended devices and adaptations, recommending and training behavior change, teaching alternative or compensatory strategies, coaching, monitoring and referring.

In cooperation with the older adult, the occupational therapist plans a feasible time schedule to gradually implement these actions, starting with the actions associated with the goals that have been assigned the highest priority.

There is strong evidence that the GP is an important agent in adherence improvement, and the occupational therapist therefore keeps the GP informed about the OT intervention plan, and if relevant other involved health professionals. [41]

6.4.5. Implementing the OT intervention plan and monitoring

The developed intervention plan is implemented in the habitat of the older adult. The occupational therapist follows this treatment plan diligently, and the effectiveness of the intervention is closely monitored. However, deviations from the intervention plan are still possible. Based on their therapeutic competences and experiences, the occupational therapist can adjust the intervention plan for well-considered reasons. Any adjustments are done in consultation with the older adult, and if relevant their informal caregiver.

The OT intervention is divided over several sessions. The number of sessions varies and is determined by several factors, such as the complexity of the case, the level of health literacy, the degree of trust or the level of adherence. The occupational therapists communicate about the

extent to which a goal has been achieved and about the degree of the older adults' satisfaction with the therapy process.

Interprofessional meetings are organized where this proves necessary, e.g. to collaborate to increase therapy adherence. These meetings are coordinated by either a case manager or a care coordinator.

6.4.6. Evaluating

To measure if the goals of the intervention are achieved, the older adults' levels of functional performance and social participation are objectively reassessed using performance-based measurement instruments and/or by means of an interview with the older adult regarding their perception of their own functional performance and social participation. Where relevant, the informal caregiver will be involved. A report of the levels of functional performance and social participation is shared with the relevant health professionals.

Table 1: Content of the ProMOTE-intervention

Goal (why)	Action (what)	Approach and communication (how)	Resources (what and how)	Collaboration (who and how)	Timeframe (when)	Quality indicator (OI: outcome indicator; PI: process indicator; SI: structure indicator)
Case finding						
Detecting the older adults at risk	Detection of older adults who are physically frail or at risk of physical frailty during routine daily practice of relevant health professionals and social workers Getting to know the local health professionals	Embedding a strategy to identify cases in the daily routine care of the involved health professionals in primary care preferably supported by Computerized Decision Support System. [39] Organizing interprofessional meetings	Clinical Frailty Scale implemented in computerized decision support system of electronic health record of all involved health professionals If no electronic health record is in use, screening instruments such as clinical Frailty Scale [36] or InterRAI-Pre-screener Assessment Tool or BelRAI-screener must be routinely implemented in daily practice Using local awareness-raising work packages	Referring the detected person to the occupational therapist, and by extension to other relevant health professionals Organizing interprofessional meetings to get acquainted with the local health professionals and to acquire more knowledge about the professional profile of each health professional	As part of the daily clinical action of the health professional Older adults at risk must be referred at the time of detection Yearly interprofessional boosting meetings	Presence of computerized decision support system (SI) If not: screening instrument embedded in daily routine care (SI) Referring for OT at the time of detection (PI) Number of participants in interprofessional meetings (OI) Number of various professionals in interprofessional meetings (OI)

Functional assessment						
Gaining insight into the functional abilities and expectations of the older adult–and where relevant the informal caregiver–and determinants influencing their abilities	Older adult: Assessing the functional (dis)abilities, social participation, self-perception of these abilities, personal needs and home environment Informal caregiver: Assessing the balance of workload – workforce and personal needs Communicating the output of the assessment to the older adult, and if appropriate to the informal caregiver Increasing insight into the effect of the outcomes Increasing health literacy applied to the individual context	Performing the assessment in the habitat of the older person Spreading the assessment over two sessions to reduce the load, if necessary [52] Using verbal and non-verbal communication strategies to build a genuine, trusting and respectful relationship with the older adult [46] Using techniques of Motivational Interviewing to increase the sense of ownership	Older adult: Instruments to measure functional ability and social participation, personal needs and expectations (such as intake interview or COPM) and home environment Informal caregiver: Instruments to measure burden of the informal caregiver	Inventorying the network [27] After consultation with the older adult themselves, exchanging information with relevant informal caregivers in a secure way, e.g. via digital shared patient records	First contact within a week after case-finding Functional assessment can be divided over several sessions Consultation on the results of the assessment immediately after the assessment	Availability of the assessment instruments (SI) Availability of the results of the assessment - regarding older adult: Functional performance and social participation (OI); self-perception (OI); home environment (OI) - regarding informal caregiver: Burden (OI) personal needs (OI) The extent to which information about the test results is provided to the older adult and/or informal caregiver (PI) The extent to which information on causes, prognoses and overview of solutions regarding the experienced disabilities is communicated to the older adult and/or their informal caregiver (PI)

Goal setting						
Achieving acceptable goals for both the older adult and the occupational therapist, and where relevant the informal caregiver	Determining the shared OT goals of both the person and occupational therapist Determining the shared goals of both informal caregiver and occupational therapist	Sharing information with the older adult, and where relevant the informal caregiver, to promote an understanding of available options for health care to aid the person in making an informed decision [46] Providing information on the benefits of behavior adaptations and training. Using principles of MI: highlighting the benefits that improving functional performance and social participation will bring to their life and to those in their context (informal caregiver, peers and family) Collaborating with the older adult to identify their priorities and goals [53] ; Listening with intent, curbing preconceptions, soliciting patient's perspectives and validating conclusions to incorporate reciprocal trust [55] Implementing at least three of the goals identified by the older adult as priority goals [41,43,50,52]	Results of OT assessment Therapeutic use-of-self [18]	Communicating the outcome of the assessment and goal setting with the GP, and if relevant other involved health professionals Recording the goals in shared patient records Organizing a multidisciplinary consultation if relevant	Immediately after the functional assessment has been performed	Presence of shared decision making during goal setting (PI) Availability of prioritized goals (OI) Whether or not information is shared with the GP (PI)

Developing intervention plan						
Establishing a clear plan of action to achieve the goals	Determining the optimal OT intervention prescription Prioritizing the prescribed actions	Collaborating with the older adult, and where relevant the informal caregiver, to select and prioritize the actions to achieve the goals and to plan a feasible time schedule Collaboration with the GP regarding communication of the recommendations to the older adult and/or their informal caregiver [41] Encouraging the older adult to seek help and encouragement from their context	Results of goal setting Activities that are meaningful to the older adult	Recording the intervention plan in the shared patient records Providing possibility to organize interprofessional meetings where necessary, e.g. to increase therapy adherence Providing possibility of care coordination or case management	Following the goal setting	Availability of an intervention plan (OI) The extent to which actions are selected in collaboration with the older adult (PI) The extent to which information is shared with the GP (PI)
Implementing and monitoring intervention plan						
Pursuit of success in achieving the goals and gaining insight into the progress	Implementing the prescribed actions in phases Detecting new and unexplored limitations	Dividing the actions and recommendations over several sessions Number of sessions can vary depending on various factors, such as the complexity of the case and the level of health literacy Adjusting where necessary and in shared decision-making procedures Continuously communicating the	Habitat of older person Intervention plan Use-of-self	Recording status praesens of intervention in the shared patient records	Reducing the time between the assessment and the actual implementation of recommendations as much as possible [41]	The extent to which the prescribed actions are implemented in phases (PI) The extent to which the goals are reached after implementation of the intervention plan (OI) The extent to which the prioritization of goals and actions was considered during implementation (PI)

		actions associated with the goals to the older adult, and if relevant the informal caregiver Reminding the older adult to seek help and encouragement from their context (informal caregiver, peers and family) Naming objectives that are achieved				
Evaluating						
Determining whether treatment can be finalized or must be adjusted	Older adult: Interviewing the self-perception of functional (dis)abilities and social participation RE-assessment of the home environment Informal caregiver: assessing the perceived balance of workload – workforce and personal needs Writing a final report	Communicating the outcome of the evaluation with the older adult, and where relevant the informal caregiver Using open-ended questions	Using standardized OT assessment instruments where relevant	Sharing the final report with the GP and other relevant health professionals	Evaluation takes place during the intervention process (to adjust if necessary) and at the end of the intervention	Whether or not the final report is available (OI) Whether or not the final report is shared with the interprofessional team (PI)

6.5. Discussion

This article describes the contents of an evidence-based OT intervention that aims to promote functional performance and social participation of home-based physically frail older adults, and to increase their health literacy and their adherence to OT recommendations. Informed by theoretical foundations and previous qualitative research, we designed the OT intervention for the home-based physically frail older adult and their caregiver (Table 1).

In this intervention, the occupational therapist collaborates with the older adult and their caregiver within an integrative care team to deliver flexible, person-centered, integrated and proactive care. The need for a high-adherence-to-therapy OT intervention which is based on evidence-based components to optimize the occupational performance and social participation of the physically frail older adult residing at home is addressed.

This OT intervention has been developed for implementation in the Belgian primary health care context. With appropriate context adaptation, it should be transferable to other primary health care structures.

6.5.1. Strengths and challenges of this study

Among the strengths of this study are: (1) the establishment of theoretical underpinnings through implementation of the MRC-framework for designing and evaluating complex interventions with supplemental use of the steps of the IM-model described elsewhere; (2) invoking the TIDieR checklist to improve the completeness of reporting; (3) the evidence-based approach; (4) the occupation-based approach and (5) the human-centered approach.

We believe that a positive result of the intervention will be the maintenance of the older adult's functional performance in meaningful daily activities, which is a key determinant of successful and healthy aging. [3,4,56] The OT intervention focuses not only on the improvement of functional performance and social participation, but also on improvement of health literacy and improvement of adherence to the OT recommendations. These outcomes promote resilience, which is useful to help find solutions to new problems independently and to seek balance among daily occupations. [57,58] Positive relationships with clients are shown to be vital for therapeutic outcomes and clients' satisfaction. [59] To empower people, in particular to strengthen resilience and improve therapy adherence, this study emphasizes from the outset the value of 'use-of-self' by fostering a relationship of trust, among others.

The interprofessional approach, which is essential for coping with the complexity of comorbidities within chronic diseases, is covered by the OT intervention. [24,25] Case finding is described as an interprofessional fact. To facilitate adherence improvement, the intervention plan is shared with the GP and the other health professionals. Interprofessional meetings are organized if it proves necessary. The OT intervention stimulates interprofessional collaboration throughout the entire therapy process, whether or not this takes place under the coordination of a care coordinator.

A future challenge of this study is to evaluate the OT intervention on its (cost-)effectiveness. To date, we have only piloted the intervention on feasibility aspects. [35] We did not perform a pilot-feasibility trial for evaluating limited effectiveness or a randomized controlled trial for evaluating effectiveness, therefore we did not measure the effect of the intervention. The evaluation of effectiveness can provide evidence for the decreased need for home care and the risk associated with early admission to nursing homes. A pragmatic RCT is a suitable design to measure the effectiveness of OT intervention. To avoid performance bias, a cluster RCT should be considered.

A subsequent challenge is to measure the impact of an OT intervention in clinical OT practice. The impact of OT with regard to improved outcomes and lower costs is a concern of integral quality management. To measure a sustainable impact of the OT practice, the World Federation of Occupational Therapy developed QUEST. [60] QUEST is a valuable tool for demonstrating the value of the OT intervention within the OT practice from seven dimensions, specifically appropriateness, sustainability, accessibility, efficiency, effectiveness, person-centeredness and safety. With these dimensions, not only the effect, but also the conditions determining the chance of success of an intervention have been mapped out. Appropriateness requires that the right occupational therapy service is delivered to the right person in the right place by the right provider, and all at the right time. Sustainability reflects the continued improvement and extension of quality occupational therapy services into the future. Accessibility refers to the ease of obtaining occupational therapy services. These seven dimensions must be made operational in terms of effect, structure and process indicators. In this way, not only the effect of the OT intervention is measured, but also the reasons for whether an effect is achieved and if implementation is expected. [60]

Finally, to disseminate the intervention at national level, higher education must be involved. The training of OT students and further training of occupational therapists in clinical practice is a prerequisite for a wide implementation of the OT intervention.

Also, regional expert groups for intercolleagual quality testing and support are proven to be important prerequisites for national dissemination and sustainable implementation. [61]

6.5.2. What this study adds

To our knowledge, this study is the first to investigate adherence to an OT intervention aimed at increasing functional performance and social participation of community-dwelling frail older adults.

The OT intervention is an intervention based on evidence-based components and existing of six steps, describing in detail, per step the goal, actions to be taken, the approach and communication, the resources needed, the timeframe, the involved partners and measurable quality indicators of the intervention. With these steps, both the clinical and research work field must be able to implement the OT intervention. The OT intervention describes not only 'what': the added value lies in the interweaving of the 'why' and 'how'. By describing the 'how', our study makes the concept of 'therapeutic use-of-self' operational throughout the six steps of the OT intervention.

6.6. Conclusion

This study reports on the content of a high-adherence-to-therapy and evidence-based OT intervention to optimize the functional performance and social participation of the physically frail older adult living at home. The OT intervention will contribute to safely aging in place and to maintaining social participation.

A further rigorous study on the effect of the OT intervention on adherence, functional performance and social participation is strongly recommended, which may force the implementation of this intervention on a national level.

6.7. Declarations

6.7.1. Ethics approval and consent to participate

All methods were carried out in accordance with relevant guidelines and regulations
Ethics approval and consent to participate is not applicable because no humans, human material or human data are involved.

6.7.2. Consent for publication

Not applicable

6.7.3. Availability of data and materials

All data generated or analysed during this study are included in this published article.

6.7.4. Competing interests

None of the authors received support from any organization for the submitted work and they have no financial relationships with any organizations that might have an interest in the submitted work in the previous three years; there is also no other relationships or activities that could appear to have influenced the submitted work.

6.7.5. Funding

This study was developed without funding.

6.7.6. authors' contributions

LDC was responsible for the design of the study protocol and drafted the manuscript under supervision of the other authors.
BA, MG, AD, CD and LB contributed to the critical revision of the manuscript.
All who contributed to the work have been listed.

6.7.7. Acknowledgements

Not applicable

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7. Occupational therapy for maintaining functional performance and social participation of the home-based physically frail older adult: Development of an evidence-based guideline

Canadian Journal of Occupational Therapy; De Coninck L.[1,2,3,4], Bouckaert L.[4], Gielen E.[5], De Schutter F.[6], Cordyn S.[7], Declercq A.[8], Graff M.[9], Aertgeerts B.[1,2] (2023) Submitted

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ABSTRACT

Background

This study aims to describe the developmental process of a clinical guideline to support occupational therapists in improving the functional performance and social participation of physically frail older adults, maintaining it, and/or preventing relapse. The clinical question of the guideline sounds “How to develop an evidence-based occupational therapy clinical guideline to optimize functional performance and social participation of home-based physically frail older adults?”

The aim of this study is to describe the developmental process of this guideline.

Method

The clinical guideline was developed de novo in accordance with the guideline development manual of the Belgian Working Group Development of Primary Care Guidelines (WOREL) and the Appraisal of Guidelines for Research and Evaluation II (AGREE-II), underpinned by the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) framework.

The development process was divided into five stages: (1) preparation, (2) determining the scope, target audience, and clinical questions, (3) conducting a structured literature search, analysis, and critical appraisal, (4) translating the evidence to decisions, and (5) drafting and validating the guideline.

Results

The clinical guideline provides 52 recommendations mapped in five clinical sub-questions. The scope of the five sub-questions follows the clinical reasoning process namely: case finding, assessment, goal setting and intervention and the topic collaboration. The recommendations are clustered in themes per sub-question. Each recommendation is followed by an information section, the literature syntheses of the studies on which the recommendation is based and the stakeholder's opinion that is considered to adapt the preliminary recommendation to the local context, where relevant implementation tools are recommended.

Conclusion

The key objective of this guideline is to provide evidence-based recommendations for occupational therapists to guide their decision-making and clinical practice in working with physically frail older adults. The guideline was validated by the Belgian Centre for Evidence-Based Medicine (Cebam) and will be disseminated in primary care in Belgium. To achieve a sustainable implementation, an implementation plan specifically designed for this guideline will be developed.

Keywords

occupational therapy, evidence-based practice, guideline, frailty, occupational performance, social participation

Funding

This study was funded by the Belgian government with the support of Evikey, an organization to support evidence-based practice in Belgium.

7.1. Background

The growing elderly population presents a challenge that goes beyond purely medical considerations. Half of those aged over 75 have two or more chronic conditions, while two in five have four or more. [1] The term physically frail elderly refers to older persons who become frail due to complex age-related conditions and are at increased risk of losing function. Frailty describes a condition characterized by reduced physiological reserve and resistance to stressors, leading to increased vulnerability to adverse outcomes such as hospitalization. [2] Gobbens (2012) defines frailty as dynamic state affecting an individual who experiences losses in one or more domains of human functioning (physical, psychological, social), which is caused by the influence of a range of variables, and which increases the risk of adverse outcomes. [3]

Frailty increases with age, occurring in 15.7% of 80-84-year-olds and rising to 26.1% among those aged 85 or older. [4]

7.1.1. Occupational therapy

Occupational therapists are experts in enabling occupation. Occupational therapists aim to empower individuals to participate in activities of daily living and empower their environment. [5]

Occupational therapy has a significant impact on the functional performance, mobility and social participation of physically frail older persons. [6] Functionality or functional performance is defined as 'all actions that a person performs in the context of self-reliance in terms of Basic Everyday Life Activities (BADL) and Instrumental Everyday Life Activities (IADL)'. Mobility is described within the International Classification of Daily Functioning, Disability and Health (ICF) as 'changing and maintaining body position, walking, and moving''. Participation is represented as 'involvement within a life situation'. [7]

The benefits of remaining functional and living an autonomous life are diverse. [8] Performing physical activities improves cardiovascular health and supports the slowing down of age-related diseases such as osteoporosis and sarcopenia. [9] Maintaining functionality and living an autonomous life brings structure to daily life and essential aspects of well-being, including a positive self-concept, self-esteem, and a sense of competence. [10]

Remaining functional provides the opportunity to socialize and maintain personal relationships. Social participation is a determinant of successful and healthy aging. [11] Older adults consider their well-being more positive when they participate in social activities. [12,13]

Occupational therapists are expected to implement evidence-based practice. Working in an evidence-based manner is essential for occupational therapists to provide the highest quality of care.[14]

7.1.2. Evidence- based occupational therapy

Evidence-based practice (EBP) ensures that occupational therapists provide the most effective and efficient interventions for their patients. EBP involves making clinical decisions that are informed by the best available research evidence, along with clinical expertise and patient preferences and adapted at the local context. [15,16]

Working in an evidence-based way has several benefits. It improves health outcomes, reduces costs and enhances patient safety. [17-21]

By practicing in an evidence-based manner, healthcare professionals possess the necessary skills to effectively consider and incorporate patient preferences when making decisions , show more compliance, feel more empowered, experience more job satisfaction and feel more connected with their colleagues. [22-27] Healthcare organizations have less staff-turnover and it reduces practice variation. [25,28,29]

Occupational therapists can maximize the chances of positive outcomes and improvements in older adults' well-being and functional performance by having the ability to find, understand, and use information that is supported by scientific evidence for the older adult. However, there are barriers that hold back the implementation of evidence in practice in occupational therapy. The main barriers are: insufficient facilities, lack of competences to find the evidence and to read research, and difficulty understanding statistical analyses. [30] These barriers can be solved by implementing clinical guidelines.

7.1.3. Occupational therapy practice guidelines

Clinical or practice guidelines are systematically developed recommendations designed to support healthcare professionals in making informed decisions about appropriate health care for specific circumstances. [31] Guidelines are based on a thorough review and synthesis of the best available

evidence, combined with expert consensus and consider the preferences of the audience. Finally, clinical guidelines must be adapted to the local context. [26,32]

Clinical guidelines already translated the original studies and associated statistics into concrete recommendations. The problem that the occupational therapists indicates, as 'not having enough time to read the research' or 'not having sufficient skills to analyse the statistics' is solved in this way. The third factor 'insufficient facilities' which often refers to the lack of free access to scientific studies is mainly solved since many clinical guidelines are available for free.

A barrier might be that not that many occupational therapy guidelines have yet been developed worldwide. There is a need for a clinical guideline on optimizing functional performance and social participation of physically frail older persons.

7.2. Objective

This study aims to describe the developmental process of a clinical guideline to support occupational therapists in improving the functional performance and social participation of physically frail older adults, maintaining it, and/or preventing relapse. The clinical question of the guideline sounds *"How to develop an evidence-based occupational therapy clinical guideline to optimize functional performance and social participation of home-based physically frail older adults?"*

7.3. Method

The clinical guideline was developed de novo in accordance with the guideline development manual of the Belgian Working Group Development of Primary Care Guidelines (WOREL) and the Appraisal of Guidelines for Research and Evaluation II (AGREE-II), underpinned by the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) framework. [33-36]

An interprofessional guideline development group (n= 9), in consultation with a representative group of health professionals, managers, experience experts, and caregivers (n= 27), was responsible for developing the guideline. A monitoring committee set up by Belgian government Public Health followed the process and interim results.

The pre-final version has been reviewed by a reading committee existing of two senior methods experts of WOREL. After adjusting, based on the feedback of the reading committee, the guideline

has been submitted to the national validation committee of the Belgian Centre for Evidence-based Medicine (Cebam).

The development process was divided into five stages, which included (1) preparation, (2) determining the scope, target audience, and clinical questions, (3) conducting a structured literature search, analysis, and critical appraisal, (4) translating the evidence to decisions, and (5) drafting and validating the guideline.

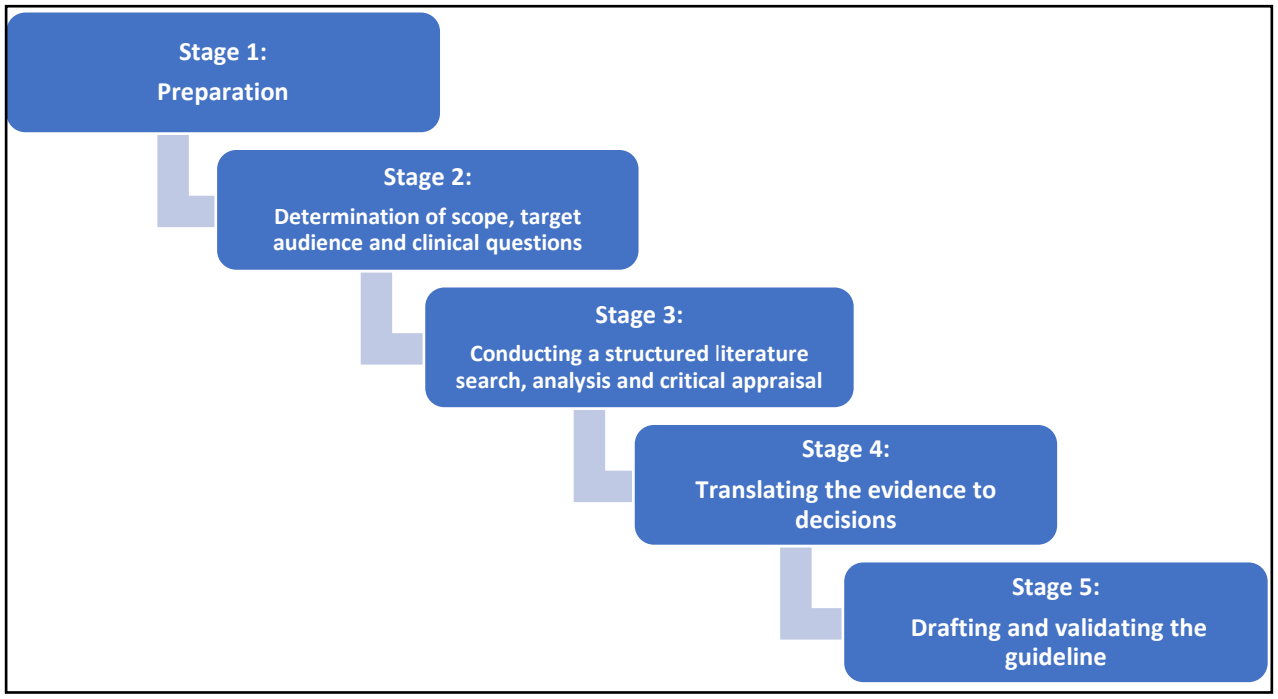


Figure 1: Stages in guideline development process

7.3.1. Stage 1: Preparation

The goal of the preparation stage was to define the people and tools necessary for the development of the guideline. The tools required included availability of databases, software for mapping literature, and online collaboration platforms. A guideline development group (GDG) and a stakeholder group were established.

This guideline was developed by an interdisciplinary GDG consisting of four occupational therapists, a general practitioner, a geriatrician, a registered nurse, and a physiotherapist, in accordance with the international agreement that GDGs should be multidisciplinary in their composition. [37]

The stakeholder group consisted of clinicians from the same professions as the GDG members, supplemented by a social worker, representatives of experienced experts and caregivers, managers, and policy makers.

An external supervision committee provided advice on the guideline development process. This committee comprised of representatives of the funding body, method experts from the Belgian Working Group Development of Primary Care Guidelines WOREL, method experts from the evaluation division of the Belgian Centre for Evidence-based Medicine (Cebam), and method experts from the division guideline implementation of the Belgian Network for Evidence-based Practice (EBPnet).

The available databases included Cochrane Database of Systematic Reviews, PubMed, Cinahl, and OTD-base. Reference manager was used to map the literature.

Online meetings with the GDG and stakeholders were conducted using Microsoft Teams.

7.3.2. Stage 2: Determination of scope, target audience and clinical questions

The target population, rationale, and scope of the proposed guideline were determined by the funding body.

The target population was identified as home-based, physically frail older adults. This group includes older adults who become frail or vulnerable due to complex age-related conditions and are at increased risk of loss of function. Frailty is characterized by reduced physiological reserve and reduced resistance to stressors, leading to increased vulnerability to adverse outcomes, such as hospitalization [2]. Gobbens (2012) defines frailty as 'a dynamic state affecting an individual who experiences losses in one or more domains of human functioning (physical, psychological, social), which is caused by the influence of a range of variables, and which increases the risk of adverse outcomes'. [3] This guideline focuses on the vulnerable to moderately frail older adult situated at levels 4 to 6 of Rockwood's Clinical Frailty Scale. Older adults situated at levels 1 to 3 of Rockwood's Clinical Frailty Scale, namely very fit to managing well, may also benefit from the formulated recommendations.

The target users of the guideline are occupational therapists who work with home-based frail older adults and their informal caregivers. Occupational therapists are health professionals whose primary goal is to enable individuals to engage in meaningful daily activities within their living environment.

The guideline aims to support clinical decision-making within the occupational therapy treatment process (from detection to follow-up) and interprofessional collaboration. Since the treatment of frail older adults requires an interprofessional approach, other care providers can also make use of the recommendations if the content is in line with their job description.

The rationale of this guideline is reducing variation in the treatment of limitations in functional performance and social participation to deliver effective and efficient tailored-made occupational therapy interventions.

A PIPOH was described to support defining the search terms.

	Term	**Synonym**	**Hyperonymous**	**Hyponym**
P	*Physically frail elderly person living at home 75 years or older and/or its social environment*	*physically frail elderly, older person over 75 years, "Frail Elderly"[Mesh], "Social Environment"[Mesh],*	*Elderly, "aged"[MeSH Major Topic], "Aged, 80 and over"[Mesh], "Frailty"[Mesh], ageing in place, community dwelling elderly "Social Support"[Mesh], "Social Networking"[Mesh], "Social Environment"[Mesh], "Family"[Mesh], "Social Capital"[Mesh].*	*"Homebound Persons"[Mesh], "Environment"[Mesh], "Independent Living"[Mesh]. "Spouses"[Mesh], "Caregivers"[Mesh], "Nuclear Family"[Mesh], informal care*

	Term	Synonym	Hyperonymous	Hyponym
I	*Quality evidence-based occupational therapy intervention, whether as part of a multidisciplinary approach or not*	*"Occupational Therapy"[Mesh], "Patient Care Team"[Mesh], multidisciplinary approach*	*"Interdisciplinary Communication"[Mesh], "Case Management"[Mesh], "Therapeutics"[Mesh], "therapy"[Subheading], "Patient-Centered Care"[Mesh], "Intersectoral Collaboration"[Mesh], "Activities of Daily Living"[Mesh]*	*"Clinical Decision-Making"[Mesh], "Decision Making, Shared"[Mesh], "Disability Evaluation"[Mesh], "Treatment Outcome"[Mesh], "Geriatric Assessment"[Mesh], occupational therapy assessment, occupational therapy diagnosis, "Goals"[Mesh], set goal,* *"Primary Prevention"[Mesh], "Secondary Prevention"[Mesh], "Tertiary Prevention"[Mesh].* *Coaching, support, advice, "Teaching"[Mesh], "Psychosocial Support Systems"[Mesh], "Directive Counselling"[Mesh], "Counselling"[Mesh], "Distance Counselling"[Mesh], "Therapeutic Alliance"[Mesh], "Mentoring"[Mesh], "Social Learning"[Mesh], "Self-Management"[Mesh], support informal care, aids, "Sensory Aids"[Mesh], "Hearing Aids"[Mesh], "Communication Aids for Disabled"[Mesh], "Audiovisual Aids"[Mesh], eating aids, walking aids, washing aids, cooking aids, dressing aids, leisure aids, sitting aids, home modification, "Housing"[Mesh], home adaptation, falls prevention,* *"Mobile Applications"[Mesh], "Recreation Therapy"[Mesh], "Animal Assisted Therapy"[Mesh], "Healthy Lifestyle"[Mesh], "Computer User Training"[Mesh],* *curation, "Rehabilitation"[Mesh], "rehabilitation"[Subheading], "Physical Conditioning, Human"[Mesh],* *"Pain Management"[Mesh], "Patient Positioning"[Mesh], transfer techniques, joint protection techniques, energy management,*

	Term	Synonym	Hyperonymous	Hyponym
P	*Occupational therapists and other involved caregivers*	*"Occupational Therapy"[Mesh], "Physicians"[Mesh], "General Practitioners"[Mesh], "Physical Therapists"[Mesh], "Nurses, Community Health"[Mesh], "Licensed Practical Nurses"[Mesh], "Nurse Clinicians"[Mesh], "Geriatricians"[Mesh], "Community Health Nursing"[Mesh], "Home Health Nursing"[Mesh] "Geriatric Nursing"[Mesh], "Allied Health Personnel"[Mesh], "Family Nurse Practitioners"[Mesh], "Case Managers"[Mesh]*	*"Community Health Workers"[Mesh], "Patient Care Team"[Mesh], "Community Medicine"[Mesh], "Community Health Services"[Mesh], "Delivery of Health Care"[Mesh], "Family Nursing"[Mesh]*	*"Home Health Aides"[Mesh],*
O	*Degree of functionality and social participation*	*Functionality, "Social Participation"[Mesh], "Social Integration"[Mesh].*	*"Human Activities"[Mesh], "Activities of Daily Living"[Mesh], "Exercise"[Mesh], "Social Capital"[Mesh], participation, "Sense of Coherence"[Mesh], "Quality of Life"[Mesh], "Quality-Adjusted Life Years"[Mesh]*	*"Leisure Activities"[Mesh], "Community Integration"[Mesh], "Community Participation"[Mesh], "Social Support"[Mesh].*

	Term	Synonym	Hyperonymous	Hyponym
H	*Primary care, with -in the context of cooperation- extension to acute geriatric services, geriatric rehabilitation centres, geriatric day centres and geriatric day hospital*	*"Home Care Services"[Mesh], "Primary Health Care"[Mesh], "Ambulatory Care Facilities"[Mesh].*	*"Delivery of Health Care"[Mesh], "Health Care Sector"[Mesh], "Delivery of Health Care, Integrated"[Mesh], "Comprehensive Health Care"[Mesh].*	*"Home Care Services, Hospital-Based"[Mesh], "Foster Home Care"[Mesh], "Home Health Aides"[Mesh], "Home Nursing"[Mesh], "Physicians, Primary Care"[Mesh], "Hospitals, General"[Mesh], "Adult Day Care Centres"[Mesh], "Respite Care"[Mesh], "Hospitals, Community"[Mesh], "Community Health Centres"[Mesh], "Home Care Services, Hospital-Based"[Mesh],*

Table 1: PIPOH of the central clinical question

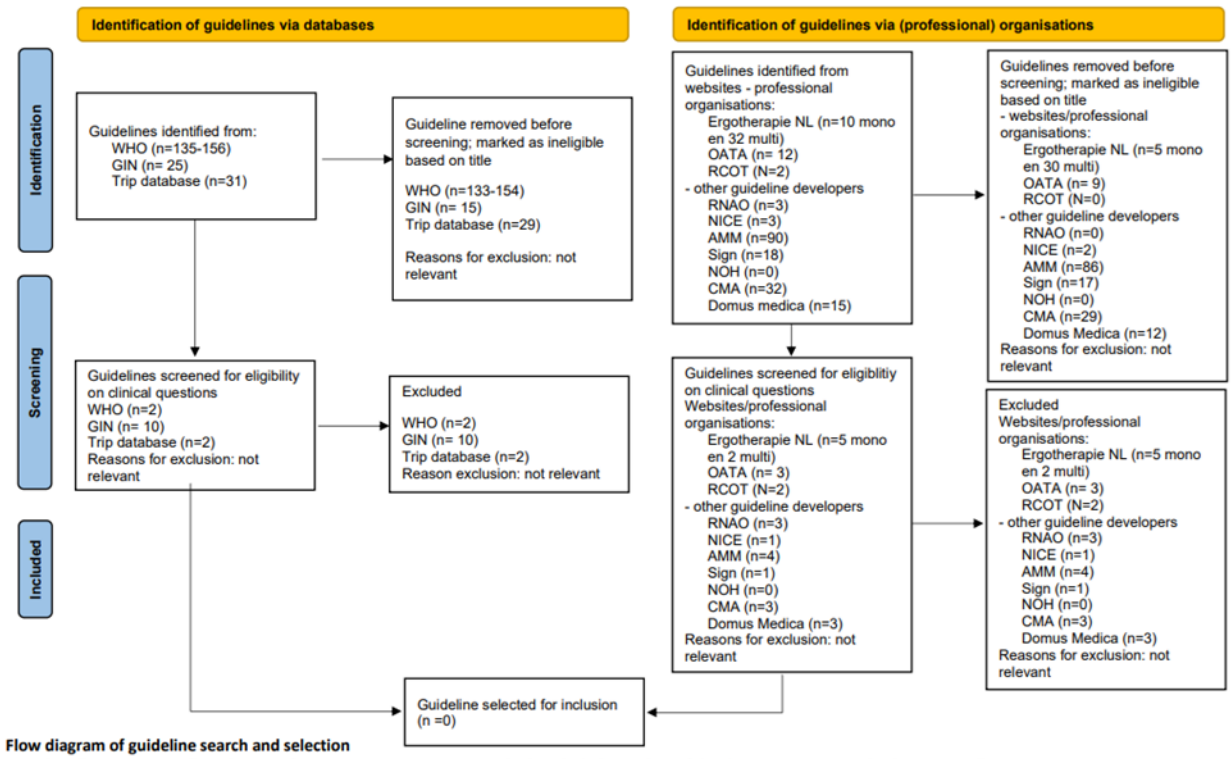
The guideline development group determined in consensus *five* clinical sub-questions in the scope of the central clinical question. These sub-questions follow the process of clinical reasoning of the occupational therapist complemented with one question on collaboration.

1. Clinical sub-question 1: How can physically frail older adults be detected (case finding)? How can they and/or their social context be referred to occupational therapy?
2. Clinical sub-question 2: Which multifactorial occupational therapy assessment is appropriate for home-based physically frail older adults and/or their context?
3. Clinical-sub-question 3: Which method is appropriate for setting goals with the home-based physically frail older adults and/or their context?
4. Clinical sub-question 4: Which multifactorial occupational therapy interventions are appropriate in the home-based physically frail older adults and/or their context?
5. Clinical sub-question 5: How can the occupational therapist who is working with the home-based physically frail older adults and/or their social context, contribute to disciplinary, integrated and/or transmural care?

This guideline only deals with aspects on frailty that are not covered by previously published relevant clinical guidelines, which is the case on falls prevention. So, for certain aspects on falls prevention, we crosslink to the existing occupational therapy guidelines on falls prevention. [38,39]

7.3.3. Stage 3: Structured literature search, analysis and critical appraisal

The availability of existing guidelines on occupational therapy interventions in physical frail older adults was determined by conducting a literature search on national and international databases and websites among which the Belgian website of Evidence-based Practice net (BPnet.be), the Guideline International Network (G-I-N.net), the Royal College of Occupational Therapy (rcot.co.uk) and the World Health Organization (WHO.org). Also, professional occupational therapy associations are questioned on their knowledge of occupational therapy guidelines on frailty. (Figure 2)



Flow diagram of guideline search and selection
Based on "PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources"

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

Figure 2: Flow diagram of guidelines search and selection

Due to the absence of available guidelines, a search for systematic reviews and original studies was performed on four databases, namely Cochrane Database of Systematic Reviews, PubMed, Cinahl and OTD-base. (Supplement 1) Inclusion criteria of studies were (1) reporting on physical frail older adults with age related issues complying with stages 4, 5 and 6 of Rockwood's Clinical Frailty Scale, (2) having residual injuries, permanent or otherwise, resulting from a condition with loss of function (such as permanent loss of strength after a stroke), (3) having a specific health condition (such as Parkinson's disease) was included for the proportion of treatment of the age-related problems (4) whether or not using informal care and (5) living at home (including assisted living or adapted elderly

home). To determine these criteria, the in- and exclusion criteria of the original studies or the protocol of these studies were analysed. Exclusion criteria were (1) being in rehabilitation for one or more supplementary conditions with loss of function (such as rehabilitation after a total hip prosthesis) or (2) having pronounced cognitive impairments (such as diagnosed having dementia)). Articles that focused on Mild Cognitive Impairment were also excluded, because evidence-based information on these health conditions already exist, among which the EDOMAH-program of Graff and colleagues (2006) and the clinical guidelines on total hip prosthesis of the Royal College of Occupational therapists (RCOT) (2017) and WOREL (2021). [40,41,42]

The selected literature was analysed in literature matrixes. Critical appraisal was conducted on the included articles using the checklists for critical appraisal of Scottish Intercollegiate Guidelines Network (SIGN) and of Joanna Bridge Institute (JBI).

7.3.4. Stage 4: Translating evidence to decisions

The literature matrix of each sub-question was structured to identify themes that can be used to formulate recommendations and to identify gaps in the literature. Based on the literature review, initial recommendations were drafted and submitted to stakeholders for approval, adjustment, and contextual adaptation. Additionally, stakeholders suggested recommendations to fill the identified gaps.

Subsequently, for each recommendation, the quality of evidence and strength of the recommendations were determined using the GRADE coding instructions from the Cochrane Handbook for Systematic Reviews of Interventions, version 6.3. [36] The assessment of the certainty of scientific evidence, for all outcomes that were decisive in formulating the recommendation, is expressed as three levels: high (A), moderate (B), or low (C). 'Very low quality of evidence' was not included. The strength of the recommendation is expressed using score 1 (strong recommendation) or score 2 (weak recommendation). A good practice point (GPP) indicates a recommendation based on expert opinion or on literature that was modified during contextual adaptation to the extent that it can no longer be linked to the initial literature. Such recommendations were rated as strong. [33] Weak recommendations based on very low evidence or on expert opinion were not included.

When determining the strength of recommendation, determinants perceived by older adults themselves as affecting their level of functioning and social participation were considered. The study Perspectives of older adults with a chronic condition on functioning, social participation, and health: a qualitative study was used to identify these determinants. [43]

7.3.5. Stage 5: Drafting and validating the guideline

The model of Grol et al. (2003) was used to describe the facilitators and barriers to change at different levels of healthcare that need to be considered before implementing the guideline. [44] These levels include innovation, individual professional, patient, social context, organizational context, and economic and political context. Tools such as tests and informative patient flyers were mapped to facilitate the implementation of the guideline during the finalization of the draft.

The resulting practice guideline was presented to the Belgian Centre for Evidence-based Medicine (Cebam) for validation to ensure its methodological quality. The Cebam validation committee, consisting of methodological and content experts and a chair, used the AGREE-II instrument to assess the guideline. [34] The committee provided one major comment and a few minor comments which were considered. The guideline is approved in its current form by Cebam in March 2023.

7.4. Results

The clinical guideline provided 52 recommendations spread over five clinical sub-questions. This article provides a summary of the original clinical guideline. The full guideline is available in Dutch on the database of the Guideline International Network (GIN) and on the website 'Sqaqel.com'. A point of care summary in Dutch, French and English can be found on 'ebpnet.be'. (Supplement 2).

The guideline is structured in such a way that occupational therapists can easily find the information they need in a particular situation. Therefore, we clustered the recommendations in themes per sub-question. Each recommendation is followed by an information section, the literature syntheses of the studies on which the recommendation is based and the stakeholder's opinion that is considered to adapt the preliminary recommendation to the local context. Where relevant we also recommend implementation tools.

7.4.1. "How can physically frail older adults be detected (case finding)? How can they and/or their social context be referred to occupational therapy?"

Frailty in primary care often remains undetected until it presents itself in later stages, wherein even seemingly minor incidents can lead to substantial health crises that greatly impact an individual's level of function and independence. Frailty evolves slowly and for that reason at risk of under-

detection. Identifying frail patients will improve clinical outcomes and there is increasing evidence that it is cost effective. [45] Identifying frailty in older adults aged 75 years and over is suggested. Screening on frailty can be performed during regular consultations and home visits. Systematic performing home visits to screen on population level is not necessary. [46-49]

All primary healthcare professionals have a responsibility in detecting frailty during the regular consultations and home visits, and in referring the older adult to receive the best care. Occupational therapists also have the competence to identify frail older adults and high-risk for frailty persons. Occupational therapists must profile themselves as experts in screening problems in functioning in daily life to ensure that the other healthcare providers know when to refer to an occupational therapist.

There are various valid assessment tools in the form of self-report, clinical observation or a combination of both to detect frailty. [46,50,51] The choice of the frailty screening should be determined by the purpose and the context in which the tool will be used.

The profession of occupational therapy is not yet widely known in primary care in Belgium. Occupational therapy's unique focus on the value of 'meaningful action' promotes the functional performance of older adults and supports participation, inclusion, respect and safety. Occupational therapists should profile themselves as experts in screening problems in functioning in daily life. Referral between health care professionals should be encouraged.

We grouped the recommendations on screening frailty into the themes 'case finding, preventive home visits, profiling occupational therapy in the context of screening and referral, screening instruments and referral (who and structures)'.

7.4.2. "Which multifactorial occupational therapy assessment is appropriate for home-based physically frail older persons and/or their context?"

The gold standard model to assess the needs of older adults with frailty is a comprehensive geriatric assessment (CGA). A CGA is a multidimensional and interprofessional approach that identifies at least the medical, social, and functional requirements of older adults and is used to develop a care plan. [52] An assessment of the functional requirements also includes screening of the physical, social, cognitive and mental capacities of the older adult. Being a multidimensional assessment requires an interprofessional team approach that includes at least medical expertise, nursing, social care, occupational therapist, and physiotherapist. [53] Although the comprehensiveness of the assessment,

the ability of the older adult to muster the energy needed to accomplish the task must be considered. It may be desirable to spread the performance of the assessment over time.

Measuring the needs of a frail older adult is a challenge due to the complexity of frailty and the diversity of individual needs of the frail older adults. Occupational therapists can specifically contribute to the functional requirements of the frail older person by making an inventory of the older adult's occupational performance history and experiences, their patters of living, interests, values and needs, functional abilities and factors that support or limit these functional abilities. The experience of loneliness in older adults has shown associations with declining health and well-being. [54] Occupational therapists pay attention to the ability to participate in the community. For instance, occupational therapists not only measure the ability of a person to drive, if required they also coach the older adult in finding and using alternative transport to continue the usual social participation activities.

Based on the literature and experts' opinion, recommendations on multifactorial occupational therapy assessment are developed on following themes: methods in assessment, content of assessment falls prevention, cognition, BADL and IADL in general, and IADL-driving and IADL-technology in particular, and task allocation under health professionals.

7.4.3. "Which method is appropriate for setting goals with the home-based physically frail older adults and/or their context?"

Occupational therapy delivers a contribution to strengthening primary health care to provide integrated and person-centered care by including interventions that maintain the intrinsic capacity and functional ability of older adults. In addition to a person-centered assessment, the occupational therapist define and prioritize goals in shared decisions with the older adult.

The four stages of goal setting applied by occupational therapists are as follows: (1) negotiating the goals, (2) setting and prioritizing the goals, (3) planning the goals, and (4) evaluating the goals. Before client-centered goals can be established, occupational therapists must gain insight into the older person's routines, activity performance level, willingness to change, and functional capabilities.

The International Classification of Functioning, Disability and Health (ICF) can be utilized to categorize goals. [55] An adapted version of the 'aid for decision-making in occupation choice' (ADOC) application can be a valuable tool for occupational therapists to identify clients' needs, preferences, and perceived difficulties in collaboration with the client. [56] Goal setting and planning are based on priorities derived from for instance the Canadian Occupational Performance Measure (COPM) or

newly identified priorities arising during the intervention. Collaborative planning of future interventions is grounded in meaningful activities. [57] When setting goals, influencing factors to consider include belief in the usefulness of housing adaptation, belief in fall prevention through housing adaptation, and previous positive experiences with housing adaptation. [58] Goal planning is conducted in consultation with the client and their context, considering the older adult's capabilities and context (e.g., pace of behavioral change, financial resources) as well as the occupational therapist's capabilities and employment status. Occupational therapists prioritize these goals in collaboration with the older person and/or their informal carer. Shared decision making is an integral part of an occupational therapy approach. [6,59]

The occupational therapist's experience, coaching skills, and clinical judgment contribute to realistic planning. The initial assessment tools can also be employed in re-evaluating goals to reflect therapy progress, such as the ADOC, which can be used by older persons and occupational therapists alike. [56]

The guideline defines general recommendations on goal setting, and specific recommendations on stages in goal setting, teamwork and advanced care planning.

7.4.4. "Which multifactorial occupational therapy interventions are appropriate in the home-based physically frail older adults and/or their context?"

Occupational therapists practice in a client-centered manner, which entails emphasizing the following aspects: holistic care, respect for values, freedom of choice, personal growth, and purposeful living. [60] Providing tailored-made evidence-based occupational therapy interventions driven by the needs of consumers must empower older adults to be more informed about their treatment options. Increased therapy adherence is observed through interventions that prioritise patient participation, encompassing educational (health-promoting) and behavioural (behavioural change) dimensions. [61]

Older adults can effectively manage everyday situations if they possess adequate physical, psychological, material, and psychosocial resources or have the skills to access these resources. Implementing interventions that target motivation, personal responsibility, physical activities, and the social and environmental aspects will enhance the older person's resilience and sense of coherence (connection, cohesion). Having a sense of coherence allows individuals to comprehend, influence, and find meaning in various situations. [62]

The recommended occupational therapy interventions in this clinical guideline consist of increasing health literacy, providing advice on modifying methods for performing daily activities, offering

guidance on assistive devices and practicing their use, providing advice on home adaptation, including lighting, offering advice on ergonomics, engaging in practice of daily activities, teaching self-management strategies, teaching fall prevention strategies and providing advice on service options.

7.4.5. "How can the occupational therapist who is working with the home-based physically frail older adults and/or their social context, contribute to disciplinary, integrated and/or transmural care?"

The central role in occupational therapy is the expert in enabling occupation and is surrounded by six transversal roles: communicator, collaborator, practice manager, change agent, scholarly practitioner and professional. [63] In the context of the occupational therapy approach of frailty, interprofessional collaboration is required to achieve optimal results. [64,65]

To engage in interprofessional practice effectively, occupational therapists need to comprehend not only their own professional roles but also the overall scope of practice of other healthcare professionals. This understanding enables them to harness the collective competencies of the healthcare team, leading to optimal service and outcomes for the older population. After consultation and with the consent of the older adults or where relevant their proxies, occupational therapists collaborate with other professionals to establish shared goals and facilitate collective decision-making and problem-solving. Health information and communication technology may facilitate communication between the involved parties.

The themes of the recommendations included in this sub-question are care coordination, transmural collaboration, confidentiality and Health Information Technology.

7.5. Discussion

Occupational therapists play a pivotal role in enabling occupations and in promoting social participation of home bound physical frail older adults. The goal of this clinical guideline is to improve the quality of elderly care by standardizing and optimizing clinical occupational practices without losing sight of the individual needs of the older adult and his informal caregiver. This guideline focuses on physically frail older adults, although most of the recommendations are also applicable to older adults with cognitive limitations. The choice to limit the guideline to older adults with physical

disabilities was made to delineate the scope of the clinical guideline to keep this guideline usable for clinical practice, and to not repeat what has already been described in other guidelines.

This clinical guideline explicitly aims to assist occupational therapists in making informed decisions on promoting occupational performance and social participation. By following this clinical guideline, occupational therapists and other primary healthcare professionals can improve health outcomes and wellbeing, enhance patient safety, reduce variations in practice, and promote consistency in healthcare delivery. This clinical guideline is divided into topics following the clinical reasoning models, namely screening, assessment, goal setting, treatment, and management.

To ensure that clinical guidelines for older people who have multiple comorbid conditions are informative and relevant, some components must be considered. Hwang et al. (2022) suggest the following recommendations for more inclusive and relevant guidelines for older adults (1) increase inclusion of older people and those with multiple health conditions in clinical studies, (2) develop and recognize evidence search strategies and outcomes specific to different groups of older individuals, as they are not a homogeneous population, and (3) use cross-referencing and vignettes to assist in clinical decision-making for individuals with multiple health conditions and (4) adopt a patient-centered approach with supported decision-making. [66] The development procedure of our clinical guideline took these four recommendations into account. The preferences of older adults and their caregivers were considered by involving them in the process of guideline development. To define the population for whom this guideline is intended, we took ranges of functional performance as basis instead of age. We cross-referenced to other guidelines to break down the silo effect of our clinical practice guideline operating in isolation. We emphasizes the need for consideration on clinical decision making for multi-morbidity. Our guideline has been developed on an evidence-based way, in balance between scientifically-driven, patient-driven and expert-driven and considering the context.

The complexity of frailty and the lack of high-quality scientific literature on occupational therapy on this topic made it challenging to develop a guideline. However, most recommendations are based on the outcome of a structured literature review. If no literature was available, stakeholders were consulted, and a predefined consensus procedure was performed to define good practice point recommendations.

7.5.1. Strengths and limitations of this study

There is international agreement that a guideline development group (GDG) should be multi-disciplinary in its composition with representation from all relevant professions. Patients, their informal caregivers and other relevant parties should also be involved in the development process. [37]

Our multi-disciplinary GDG consisted of a general practitioner, a geriatrician, a nurse, a physiotherapist, three occupational therapists, and two people with double degree occupational therapy and gerontology. Seven out of nine of the GDG members already had expertise in guideline development. By composing this multi-disciplinary team, we anticipated psychosocial factors, among which problems of overcoming professional hierarchies that can affect small group processes.

Because frailty is a multicomponent problem, occupational therapists must collaborate with colleagues of other professions. By involving different professions, we provided various perspectives which ensures that the occupational therapy recommendations become adapted at an interprofessional context of the work field.

A group of stakeholders representing all relevant professions, the older population, informal caregivers and representatives of the management, provided feedback on the guideline's contextual adaptation. The added value of stakeholders in guideline development lies in their ability to contribute expertise and provide diverse perspectives. In this way relevance and practicality are ensured that enhances quality. The group of stakeholders included participants across Belgium, both from Flemish and French talking communities, from urban centres and rural locations, and representing diverging organizations (going from patient representatives and their proxies, over independent healthcare professionals and service organizations, to policy-making organizations and representatives of higher educational institutes). The participation of the stakeholders was high throughout the whole guideline development process. The involvement of these stakeholders promotes acceptance, strengthens the guidelines and supports their effective application in healthcare settings.

The guideline followed the methodology of the guideline development manual of the Belgian Working Group Development of Primary Care Guidelines (WOREL) and the AGREE-II, underpinned by the GRADE-framework, which must assure the methodological quality. The guideline development manual of WOREL (2021) has already been applied to dozens of Belgian guidelines that obtained the Cebam validation certificate and is seen as the golden standard for guideline development in Belgium. This manual is updated frequently. [33] If additional methodological input was required, the guideline developer's handbook of Scottish Intercollegiate Guideline Network (2019) was consulted.

[67] To evaluate the quality of the guideline the AGREE-II instrument has been applied and low-scoring criteria were adjusted before submitting the guideline to division guideline validation of Cebam. The guideline was finally validated by Cebam which guarantees the methodological quality of the clinical guideline and confirms that the guideline is adapted to the Belgian context.

In addition to the recommendations, the guideline contains practical information for occupational therapists and implementation tools. These additional resources should simplify implementation of the recommendations in practice. A point of care summary of the guideline has also been produced and disseminated via the Belgian website for point of care information for primary health care providers ebpnet.be.

A limitation might be that several of the included articles had moderate to low level of evidence. Interventions on complex diseases such as frailty typically involve multiple components or strategies that interact with each other and with the context in which they are implemented. Designing and evaluating such interventions can be challenging, as it may be difficult to identify and measure all the relevant factors that contribute to their effectiveness. Another reason might be that it is difficult to blind due to the nature of the intervention. For instance, when a certain assistive advice is recommended it is difficult not to detect that a person is assigned to the intervention group.

The fact that all meetings were converted from on location to online meetings due to COVID, made it difficult to involve frail older people and their caregivers in the GDG. Live contact was limited due to the national COVID regulations. The digital accessibility and skills of this population made it difficult to participate in online meetings. This problem has been solved by introducing phone calls with these experienced experts and by involving representatives of senior citizens' organizations in the stakeholders' meetings.

Due to limited time and resources, we were not in the position to conduct a systematic review including all types of empirical studies. So, we developed search strings per clinical question and adjusted the designs in our search strings depending on the content of each clinical question. For instance, in the search string of the clinical question on goal setting we set no limits on the design, while in the search string of the clinical question on occupational therapy approach, we limited to systematic reviews, meta-analysis and randomized controlled trials. By adapting the designs per search string to the nature of the clinical question, we aimed for both an achievable quantity of studies to analyse and avoided missing studies.

7.5.2. Practical implications

The current guideline needs to be implemented in practice, and the effect of this implementation needs to be evaluated. When implementing a clinical guideline on occupational therapy for frail older adults in primary care, several factors should be considered, among which the availability of resources, staff education and training, patient and caregiver involvement, integration with existing care processes, monitoring and evaluation, collaboration and coordination and cultural considerations.

When implementing this guideline or parts of it, the following point should be considered. A guideline is a tool to support healthcare professionals. It is not a protocol or standing order. Clinical guidelines provide guidance and support for making diagnostic or therapeutic decisions. They summarize for the care provider in primary care what the best policy is from a scientific point of view for the average patient. In addition, there is the context of the patient, who is an equal partner in decision-making. It is possible that the health care provider and patient together make a different best choice in a responsible and reasoned manner. [33]

7.5.3. Educational implications

Occupational therapists and other healthcare providers involved in the care of frail older adults should be educated and trained on the content of the guideline to ensure its proper implementation. The application of this clinical guideline can be included in the divisions occupational therapy of the higher educational institutes. This is possible in various ways, a new multi-faceted education program can be developed, or the guideline or parts of the guideline can be included in the regular program. When including this guideline knowledge, skills and attitude components should be considered. Also, the implementation during the students' internships should be considered.

In the Belgian Interuniversity Master of Science in Occupational Therapy program, the methods of guideline development are taught to strive for more evidence-based guidelines in the field of occupational therapy. Using as best practice the national guidelines that are applicable to their field of work must support the students' interest in this topic.

7.5.4. Research implications

To achieve an effective implementation of this guideline, a multicomponent implementation programme must be developed and piloted. The 5-step approach for guideline implementation of Peters and colleague (2020) supplemented with components of the intervention mapping approach is a feasible method for developing an implementation protocol. A pilot implementation study must assess the feasibility of implementation.[68]

Considering the need for interprofessional collaboration in frail older adults and the complexity of the home care setting, there is a need for effective interprofessional collaboration within this population and for further research on it.

7.6. Conclusion

This is the first validated, de novo evidence-based occupational therapy guideline for maintaining functional performance and social participation of the home-based physically frail older adults in Belgium and to the best of our knowledge also the first guideline on this topic worldwide. The key objective of this clinical guideline is to provide evidence-based recommendations for occupational therapists to guide their decision-making and clinical practice on functional performance and social participation in working with home-bound physical frail older adults. This guideline is developed by a multi-disciplinary expert panel, based on systematic literature review, critical evaluation of the available scientific evidence and adjusted based on the feedback of stakeholders. This must guarantee the scientific quality and well-founded reliability of this clinical guideline. An implementation plan and pilot of the implementation of the guideline must strengthen the feasibility of the guideline in clinical practice.

7.7. Declarations

7.7.1. Ethical considerations

The guideline development group was able to conduct its work in complete independence. This guideline was not influenced by views or interests of the funding body, the Belgian Government of Public Health.

7.7.2. Abbreviations

ADOC: aid for decision-making in occupation choice

AGREE II: Appraisal of Guidelines for Research & Evaluation II

BADL: Basic Everyday Life Activities

Cebam: Belgian Center for Evidence-based Medicine

CGA: comprehensive geriatric assessment

COPM: Canadian Occupational Performance Measure

EBP: Evidence-based practice

GDG: Guideline Development Group

GRADE: Grading of Recommendations, Assessment, Development, and Evaluation

IADL: Instrumental Everyday Life Activities

ICF: International Classification of Daily Functioning, Disability and Health

JBI: Joanna Bridge Institute

SIGN: Scottish Intercollegiate Guidelines Network

WOREL: Belgian Working Group Development of Primary Care Guidelines

7.7.3. Acknowledgements

We thank all people who contributed to the development of this clinical guideline.

We like to thank Prof P. Vanroyen and Mme M. Goossens of the Belgian Working Group guideline development in primary care (WOREL) for the external review of the guideline and prof A. Desoete for the unreserved support during the guideline development process.

We are grateful for the critical constructive feedback of Prof D. Kos, Mme A. Ledoux and Mr M.E. Guisset during the entire development process of the guideline.

We also thank all the healthcare organizations and other institutions who contributed direct or indirect to the development of this guideline: Master of Science in Occupational Therapy of KULeuven, Academic center for General practice of KULeuven (ACHG), Division geriatrics of

UZLeuven, Wetenschappelijke Vereniging voor Vlaamse kinesitherapeuten (WVVK), Scientific questions and Quality evidence linked (SQaQel), Wit-Gele Kruis, Union Professional Ergothérapie (UPE), Artevelde University of Applied Sciences and the Working group guideline development in primary care (WOREL).

7.7.4. Authors' contributions

LDC: Study design, data collection, data analysis, draft of the guideline and draft of the manuscript under supervision of the other authors.

LB: Study design, data collection, data analysis and draft of the guideline.

EG: Intervision and critical evaluation of the guideline

FDS and SC: Intervision of the guideline

ADC and MG: Critical revision of the manuscript

BA: Supervision of the guideline process and critical revision of the manuscript

7.7.5. Availability of data and materials

Not applicable.

7.7.6. Ethics approval and consent to participate

Not applicable. The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any deviations from the study as it was designed (and, if relevant, registered) have been explained.

7.7.7. Consent for publication

Not applicable.

7.7.8. Competing interests

LDC is staff member of Cebam, not involved in the validation of this guideline. BA is principal of Cebam, not involved in the validation of this guideline.

All authors declare that they have no competing interests. There were no conflicts of interest among the members of the multidisciplinary working group or the participating experts.

7.7.9. Author details

LDC: researcher, teacher, OT and Gerontologist; AD: researcher, teacher and Sociologist; LB: researcher, teacher, OT and Gerontologist; MG: researcher and OT; BA: researcher, teacher, GP and head of the GP department; FDS: physiotherapist; SC: registered nurse; AL: occupational therapist, researcher, teacher; MEG: occupational therapist, teacher

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Supplement 1: Search strategy per clinical question

Clinical sub-question 1: ***How can physically frail older adults be detected (case finding)? How can they and/or their social context be referred to occupational therapy?***

Concepts search strategy

1a focus detection

1b focus referral

	Description	Pool of search terms
P	Physically frail older adults age of 75 and over living at home and/or its social environment	"Frail Elderly"[Mesh] OR "Aged, 80 and over"[Mesh] OR Frailty[Mesh]) AND "Primary Health Care"[Mesh]
I a	Detection	"Diagnosis"[Mesh] OR "house calls"[Mesh] OR screen* OR determin* OR detect* AND ("Occupational Therapy"[Mesh] OR Physicians[Mesh] OR "General Practitioners"[Mesh] OR "Physical Therapists"[Mesh] OR "Nurses, Community Health"[Mesh] OR "Licensed Practical Nurses"[Mesh] OR "Nurse Clinicians"[Mesh] OR "Community Health Nursing"[Mesh] OR "Home Health Nursing"[Mesh] OR "Geriatric Nursing"[Mesh] OR "Family Nurse Practitioners"[Mesh] OR "Family Nursing"[Mesh] OR Geriatricians[Mesh] OR "Allied Health Personnel"[Mesh] OR "Community Health Workers"[Mesh] OR "Patient Care Team"[Mesh] OR "Community Medicine"[Mesh] OR "Social Workers"[Mesh] OR "Home Care Services"[Mesh])
I b	Referral	("Referral and Consultation"[Mesh] OR "Patient Handoff"[Mesh] OR refer* OR handover OR transmission OR assignment OR "Information Dissemination"[Mesh] OR "Health Information Exchange"[Mesh]) AND ("Occupational Therapy"[Mesh] OR Physicians[Mesh] OR "General Practitioners"[Mesh] OR "Physical Therapists"[Mesh] OR "Nurses, Community Health"[Mesh] OR "Licensed Practical Nurses"[Mesh] OR "Nurse Clinicians"[Mesh] OR "Community Health Nursing"[Mesh] OR "Home Health Nursing"[Mesh] OR "Geriatric Nursing"[Mesh] OR "Family Nurse Practitioners"[Mesh] OR "Family Nursing"[Mesh] OR Geriatricians[Mesh] OR "Allied Health Personnel"[Mesh] OR "Community Health Workers"[Mesh] OR "Patient Care Team"[Mesh] OR "Community Medicine"[Mesh] OR "Social Workers"[Mesh] OR "Home Care Services"[Mesh])
C	/	/
O	Efficiently and effectively detected and referred to occupational therapy in primary care	/

Databases consulted:

Cochrane Database of Systematic Reviews, Medline (via Pubmed), Cinahl (via EBSCO), OTDbase

Methods inclusion criteria

- Design: Systematic reviews and meta-analyses, RCTs, observational studies and qualitative studies
- Methodologically of sufficient quality measured with SIGN or JBI critical appraisal tool.
- Search period: conception database until 30 June 2022

Content in- and exclusion criteria:

Inclusion:

- the physically frail older adult and/or the informal carer
- primary care or referral to primary care
- detection or referral

Exclusion:

Comprehensive geriatric assessment (concerns second clinical sub question)

Clinical sub-question 2: Which multifactorial occupational therapy assessment is appropriate for home-based physically frail older adults and/or their context?

Concepts search strategy

2a focus older adult

2b focus social context/informal caregiver

2c focus physical context

	Description	Pool of search term
P a	Older adult	"Frail Elderly"[MeSH] OR "Aged, 80 and over"[MeSH] OR "Frailty"[MeSH]
P b	Social context/ informal caregiver	"Social Environment"[MeSH] OR ''Social Support''[MeSH] OR ''Social Networking''[MeSH] OR ''Friends''[MeSH] OR ''Family''[MeSH] OR ''Caregivers''[MeSH]
P c	Physical context	"Housing for the elderly" [Mesh] OR "Environment Design"[Mesh] OR "Built Environment"[Mesh] OR "Environment"[Mesh] OR "Environment, Controlled"[Mesh] OR "home" OR "house"
I	Multimodal occupational therapeutical assessment	"Disability Evaluation"[Mesh] OR "Geriatric Assessment"[Mesh] OR "Clinical Decision-Making"[Mesh] OR "Diagnostic Self Evaluation"[Mesh] OR "Patient Health Questionnaire"[Mesh] OR "Needs assessment" [Mesh] OR "Patient outcome assessment"[Mesh] OR "Self-Assessment"[Mesh] OR "Patient acuity"[Mesh] OR "Treatment Outcome"[Mesh] OR "House calls"[Mesh] AND "Occupational Therapy"[Mesh]
C	/	
O a	Abilities and disabilities of the older adult	"Activities of Daily Living"[Mesh] OR "Self-Management"[Mesh] OR "Physical Functional Performance"[Mesh] OR "Social Participation"[Mesh] OR "Community Integration"[Mesh] OR "Community Participation"[Mesh] OR "Social Integration"[Mesh] OR "Social Capital"[Mesh] OR "Human

		Activities"[Mesh] OR “Healthy Lifestyle"[Mesh] OR "Quality of Life"[Mesh] OR "Sense of Coherence"[Mesh] OR "Quality-Adjusted Life Years"[Mesh] OR "Leisure Activities"[Mesh] OR “ Health Literacy"[Mesh] OR “patient compliance”[Mesh] OR "Anxiety"[Mesh] OR "Sedentary Behavior"[Mesh] OR “occupational performance” OR “occupational competence” OR “accidental falls” OR “fear of falling”
O b	Barriers and facilitators of the social context	“Workload"[Mesh] OR “Psychological Burnout”[Mesh] OR "Social Support"[Mesh] OR "Social Capital"[Mesh] OR “Respite Care"[Mesh] OR “Stress, Psychological"[Mesh] OR “Adaptation, Psychological”[Mesh] OR "Sense of Coherence"[Mesh] OR "Physical Functional Performance"[Mesh] OR “caregiver burden” OR “caregivers burden” OR “overload” OR “overcharge”
O c	Barriers and facilitators of the physical context	"Activities of Daily Living"[Mesh] OR "Physical Functional Performance"[Mesh] OR "Community Integration"[Mesh] OR "Community Participation"[Mesh] OR "Social Integration"[Mesh] OR "Human Activities"[Mesh] OR “Healthy Lifestyle"[Mesh] OR "Quality of Life"[Mesh] OR "Sense of Coherence"[Mesh] OR "Quality-Adjusted Life Years"[Mesh] OR "Leisure Activities"[Mesh] OR “patient compliance”[Mesh] OR “occupational performance” OR “accidental falls” OR "Safety"[Mesh]

Databases consulted:

Cochrane Database of Systematic Reviews, Medline (via Pubmed), Cinahl (via EBSCO), OTDbase

Methods inclusion criteria:

- Design: Systematic reviews and meta-analyses, RCTs, observational studies and qualitative studies
- Methodologically of sufficient quality measured with SIGN or JBI critical appraisal tool
- Search period: conception of database until 30 June 2022

Content in- and exclusion criteria:

Inclusion:

- the physically frail older adult and/or the informal carer
- occupational therapy assessment or assessment of functioning/meaningful action or social participation in primary care or in function of return to primary care
- both assessment instruments, assessment batteries, and assessment procedures
- assessment of the living environment

Exclusion:

Assessment on people with dementia or with markedly impaired cognitive functioning

Clinical-sub question 3: Which method is appropriate for setting goals with the home-based physically frail older adults and/or their context?

Concepts search strategy

	Description	Pool of search terms
P	Older adult and/or his context	“Aged”[MeSH] OR “Frail Elderly”[MeSH] OR “Aged, 80 and over”[MeSH] OR "Frailty"[MeSH] OR “Homebound Persons”[MeSH] "Social Environment"[MeSH] OR ‘’Social Support’’[MeSH] OR ‘’Caregivers’’[MeSH]
I a	Methods goalsetting	"Goals"[Mesh] OR "Treatment Outcome"[Mesh] OR "Directive Counseling"[Mesh] OR "Counseling"[Mesh] OR "Distance Counseling"[Mesh] OR “motivational interview*” OR “collaborative goal setting” OR “occupation-focused goal*” AND "Methods"[Mesh] AND "Occupational Therapy"[Mesh]
I b	Attitude en vaardigheden bij doelbepaling	"Goals"[Mesh] OR "Treatment Outcome"[Mesh] OR "Directive Counseling"[Mesh] OR "Counseling"[Mesh] OR "Distance Counseling"[Mesh] OR “motivational interview*” OR “collaborative goal setting” OR “occupation-focused goal*” AND “Patient-Centered Care"[Mesh] OR “Professional competence Mesh]” OR “Professional-patient relations“[Mesh] OR "Clinical Competence"[Mesh] OR "Social Skills"[Mesh] OR “Empathy”[Mesh] OR "Attitude of Health Personnel"[Mesh] OR "Respect"[Mesh] OR "Codes of Ethics"[Mesh] OR Ethics, Professional OR “occupation based” OR “occupation-based” OR “context based” OR “context-based“ OR “evidence-based” OR “evidence-based” OR “technology based” OR “technology-based" OR “population based” OR “population-based” OR “professional competence” OR “use of self” AND "Occupational Therapy"[Mesh]
C	/	
O	Doelen die outcome bij oudere en/of sociale context	"Activities of Daily Living"[Mesh] OR “Self-Management"[Mesh] OR "Physical Functional Performance"[Mesh] OR "Social Participation"[Mesh] OR "Community Integration"[Mesh] OR "Community Participation"[Mesh] OR "Social Integration"[Mesh] OR "Social Capital"[Mesh] OR "Human Activities"[Mesh] OR “Healthy Lifestyle"[Mesh] OR "Quality of Life"[Mesh] OR "Sense of Coherence"[Mesh] OR "Quality-Adjusted Life Years"[Mesh] OR "Leisure Activities"[Mesh] OR “ Health Literacy"[Mesh] OR “patient compliance”[Mesh] OR "Anxiety"[Mesh] OR "Sedentary Behavior"[Mesh] OR “occupational performance” OR “occupational competence” OR “accidental falls” OR “fear of falling” OR “Workload"[Mesh] OR “Psychological Burnout”[Mesh] OR "Social Support"[Mesh] OR "Social Capital"[Mesh] OR “Respite Care"[Mesh] OR “Stress, Psychological"[Mesh] OR “Adaptation, Psychological”[Mesh] OR "Sense of Coherence"[Mesh] OR "Physical Functional Performance"[Mesh] OR “caregiver burden” OR “caregivers burden” OR “overload” OR “overcharge”

Databases consulted:

Cochrane Database of Systematic Reviews, Medline (via Pubmed), Cinahl (via EBSCO), OTDbase

Methodological inclusion criteria

- Design: Systematic reviews and meta-analyses, RCTs, observational studies and qualitative studies
- Methodologically of sufficient quality measured with SIGN or JBI critical appraisal tool
- Search period: conception of database until 30 June 2022

Content inclusion and exclusion criteria:

Inclusion:

- the physically frail older adult and/or the informal carer
- Purpose determination

Exclusion:

/

Clinical sub-question 4: Which multifactorial occupational therapy interventions are appropriate in the home-based physically frail older adults and/or their context?

Concepts search strategy

4a focus prevention functioning and social participation older adult

4b focus curation functioning and social participation older adult

4c focus maintenance functioning and social participation older adult

4d focus balance load-carrying capacity context of older adult

4e focus attitude and competences therapist

	Description	Search terms
P a b c f	Older aadults	“Frail Elderly”[MeSH] OR “Aged, 80 and over”[MeSH] OR "Frailty"[MeSH]
P d	Social context/informal caregiver	"Social Environment"[MeSH] OR ‘’Social Support’’[MeSH] OR ‘’Social Capital’’[MeSH] OR ‘’Social Networking’’[MeSH] OR ‘’Friends’’[MeSH] OR ‘’Family’’[MeSH] OR ‘’Caregivers’’[MeSH] OR “Patient Care”[MeSH] OR ‘’Nuclear Family’’[MeSH] OR ‘’Spouses’’[MeSH] OR “Home Nursing”[MeSH] OR “Foster Home Care”[MeSH]
I a b c	Occupational therapy intervention on the elderly population (prevention, curation, maintainance)	“Occupational Therapy” [MeSH] OR “Therapeutics"[Mesh] OR “Activities of Daily living"[Mesh] OR “Exercise Therapy”[MesH] OR “Exercise"[Mesh] OR "Primary Prevention"[Mesh] OR "Secondary Prevention"[Mesh] OR "Tertiary Prevention"[Mesh] OR "Teaching"[Mesh] OR "Mentoring"[Mesh] OR "Social Learning"[Mesh] OR "Self-Management"[Mesh] OR "Rehabilitation"[Mesh] OR "Psychosocial Support Systems"[Mesh] OR "Recreation Therapy"[Mesh] OR "Animal Assisted Therapy"[Mesh] OR "Computer User Training"[Mesh] OR "Physical Conditioning, Human"[Mesh] OR "Pain Management"[Mesh] OR "Patient Positioning"[Mesh] OR “Ergonomics"[Mesh] OR “Community Integration"[Mesh] OR "Directive Counseling"[Mesh] OR "Counseling"[Mesh] OR “Education”[Mesh] OR “problem solving strateg*” OR “training” OR “guiding”

		OR "Sensory Aids"[Mesh] OR "Hearing Aids"[Mesh] OR "Communication Aids for Disabled"[Mesh] OR "Audiovisual Aids"[Mesh] OR "Housing for the elderly"[Mesh] OR "Mobile Applications"[Mesh] OR "Protective Devices"[Mesh] OR "Self-Help Devices"[Mesh] OR "eating aid*" OR "walking aid*" OR "washing aid*" OR "cooking aid*" OR "dressing aid*" OR "leisure aid*" OR "sitting aid*" OR "home modification*" OR "home adaptation*" OR "environmental adaptation*" OR "activity adaptation*" OR "Distance Counseling"[Mesh] OR "Telerehabilitation"[Mesh] OR "Telemedicine"[Mesh] OR "Education, distance"[Mesh] OR "Internet-Based Intervention" [Mesh] OR "online therapy"
I d	Occupational therapy intervention on social context/informal caregiver with scope on balance of capabilities	"Occupational Therapy" [MeSH] OR "Teaching"[Mesh] OR "Mentoring"[Mesh] OR "Social Learning"[Mesh] OR "Self-Management"[Mesh] OR "Psychosocial Support Systems"[Mesh] OR "Computer User Training"[Mesh] OR "Physical Conditioning, Human"[Mesh] OR "Ergonomics"[Mesh] OR "Community Integration"[Mesh] OR "Directive Counseling"[Mesh] OR "Counseling"[Mesh] OR "Education"[Mesh] OR "problem solving strateg*" OR "training" OR "guiding" OR "Distance Counseling"[Mesh] OR "Telerehabilitation"[Mesh] OR "Telemedicine"[Mesh] OR "Education, distance"[Mesh] OR "Internet-Based Intervention" [Mesh] OR "online therapy"
I e	Attitude – therapeutical skills – therapeutical basic attitude	"Patient-Centered Care"[Mesh] OR "Professional competence"[Mesh] OR "Professional-patient relations"[Mesh] OR "Clinical Competence"[Mesh] OR "Social Skills"[Mesh] OR "Empathy"[Mesh] OR "Attitude of Health Personnel"[Mesh] OR "Respect"[Mesh] OR "Codes of Ethics"[Mesh] OR "Ethics, Professional"[MesH] OR "occupation based" OR "occupation-based" OR "context based" OR "context-based" OR "evidence-based" OR "evidence-based" OR "technology based" OR "technology-based" OR "population based" OR "population-based" OR "professional competence" OR "use of self"
C	/	
O a b c e f	Functional performance and social participation of elderly adult	"Activities of Daily Living"[Mesh] OR "Self-Management"[Mesh] OR "Physical Functional Performance"[Mesh] OR "Social Participation"[Mesh] OR "Community Integration"[Mesh] OR "Community Participation"[Mesh] OR "Social Integration"[Mesh] OR "Social Capital"[Mesh] OR "Human Activities"[Mesh] OR "Healthy Lifestyle"[Mesh] OR "Quality of Life"[Mesh] OR "Sense of Coherence"[Mesh] OR "Quality-Adjusted Life Years"[Mesh] OR "Leisure Activities"[Mesh] OR " Health Literacy"[Mesh] OR "patient compliance"[Mesh] OR "Anxiety"[Mesh] OR "Sedentary Behavior"[Mesh] OR "occupational performance" OR "occupational competence" OR "accidental falls" OR "fear of falling" OR "Safety"[Mesh]
O d e	Capabilities of informal caregiver/social context	"Workload"[Mesh] OR "Psychological Burnout"[Mesh] OR "Social Support"[Mesh] OR "Social Capital"[Mesh] OR "Respite Care"[Mesh] OR "Stress, Psychological"[Mesh] OR "Adaptation, Psychological"[Mesh] OR "Sense of Coherence"[Mesh] OR "Physical Functional Performance"[Mesh] OR "Self-Management"[Mesh] OR "caregiver burden" OR "caregivers burden" OR "overload" OR "overcharge"

Databases consulted:

Cochrane Database of Systematic Reviews, Medline (via Pubmed), Cinahl (via EBSCO), OTDbase

Methodological inclusion criteria

- Design: Systematic reviews and meta-analyses, RCTs, observational studies and qualitative studies
- Methodologically of sufficient quality measured with SIGN or JBI critical appraisal tool
- Search period: conception of database until 30 June 2022

Content inclusion and exclusion criteria:

Inclusion:

- the physically frail older adult and/or the informal carer
- primary health care
- occupational therapy intervention of intervention about functional performance of social participation

Exclusion:

Interventions on people with dementia or with markedly impaired cognitive functioning

Clinical sub-question 5: How can the occupational therapist who is working with the home-based physically frail older adults and/or their social context, contribute to disciplinary, integrated and/or transmural care?

Concepts search strategy

	Description	Search terms
P	Older adult, socail context and informal caregiver	(“Aged”[MeSH] OR “Frail Elderly”[MeSH] OR “Aged, 80 and over”[MeSH] OR "Frailty"[MeSH] OR “Homebound Persons”[MeSH]) AND Primary Health Care"[MeSH]
I	Kinds of collaboration people and services to collaborate with	("Occupational Therapy"[Mesh] OR "Physicians"[Mesh] OR "General Practitioners"[Mesh] OR "Physical Therapists"[Mesh] OR "Nurses, Community Health"[Mesh] OR "Licensed Practical Nurses"[Mesh] OR "Nurse Clinicians"[Mesh] OR "Community Health Nursing"[Mesh] OR "Home Health Nursing"[Mesh] OR "Geriatric Nursing"[Mesh] OR "Family Nurse Practitioners"[Mesh] OR "Family Nursing"[Mesh] OR "Geriatricians"[Mesh] OR "Allied Health Personnel"[Mesh] OR "Community Health Workers"[Mesh] OR "Patient Care Team"[Mesh] OR "Community Medicine"[Mesh] OR "Community Health Services"[Mesh] OR "Delivery of Health Care"[Mesh] OR "Home Health Aides"[Mesh] OR "Delivery of

		Health Care, Integrated"[Mesh] OR "Case Managers"[Mesh] OR “Disease management"[Mesh] OR “Social Workers"[Mesh] OR "Home Care Services"[MeSH] OR ""Community Health Centers"[Mesh] OR "Ambulatory Care"[MeSH] OR “Ambulatory Care Facilities"[Mesh] OR “Home Care Services, Hospital-Based”[MeSH] OR “Home health nursing”[MeSH] OR “Home nursing” [MeSH] OR “Respite care”[MeSH] OR "Foster Home Care"[Mesh], "Adult Day Care Centers"[Mesh] OR "Hospitals, Community"[Mesh] OR “Health Services for the Aged"[Mesh])
C	/	
O	Information transfer	("Referral and Consultation"[Mesh] OR "Patient Handoff"[Mesh] OR refer* OR handover OR transmission OR assignment OR "Information Dissemination"[Mesh] OR "Health Information Exchange"[Mesh])

Databases:

Cochrane database of systematic reviews, Medline (via Pubmed), Cinahl (via EBSCO), OTDbase

Methodologic inclusion criteria

- Design: Systematic reviews and meta-analyses, RCT’s, observational studies an qualitative studies
- Methodologisch van voldoende kwaliteit gemeten met critical appraisal tool
- Zoekperiode: begin databank tot 30 juni 2022

Content in- and exclusion criteria:

Inclusion:

- the physically frail older adult and/or the informal caregiver
- collaboration within primary health care and between primary and secondary healthcare

Exclusion:

/

Supplement 2: Point of Care version of the guideline

Occupational therapy for maintaining the functional performance and social participation of the home-based physically frail older adults



1. GENERAL

1.1. Description of topic

About 20% of over-70s and 50% of over-85s report having problems with carrying out activities of daily living.

Although the older adult living at home wants to continue living in his familiar environment, adherence to therapy regarding advice received is often low.

The occupational therapist aims to enable people to participate in activities of daily living and to empower their environment. As a result, occupational therapy has an impact on both the preservation of autonomy, as well as on the quality of life of the older adult and his caregiver.

1.2. Target population and prevalence

The physically frail elderly population living at home concerns that group of elderly people who become vulnerable due to complex age-related disorders and have an increased risk of loss of

function. ‘Frail’ and ‘vulnerable’ describes a condition characterized by reduced physiological reserve and reduced resistance to stressors, leading to greater vulnerability to adverse outcomes, such as hospitalization.

Frailty increases with age. It occurs in 15.7% of 80–84 year olds and rises to 26.1% in +85 year olds.

The target population of this guideline is located under levels 4 to 6 of the clinical frailty scale (CFS).

- People with CFS 4 are vulnerable or very mild frail. ‘Vulnerable’ or ‘Risk of vulnerability’ means limitations due to age-related disorders, but not being dependent on third parties for daily help. A common complaint in older people with ‘risk of vulnerability’ is being slow and/or tired during the day.
- ‘Mildly frail’(CSF 5, slightly vulnerable) occurs when there is at least a clear delay and help is needed with instrumental activities of daily living (IADL), such as with finances, transport, heavy housework or use of medication.
- ‘Moderate frail’ (CFS 6) refers to needing help with household activities and for all outdoor activities. Indoors, these individuals have problems taking the stairs, taking a bath, and they need minimal help getting dressed. (Rockwood et al., 2005; Mitnitsky et al., 2001)

Adverse features of frailty include increased risk of falls, fractures, hospitalization or nursing home, and decrease in quality of life. An increase in the burden of the informal carer is an indirect consequence of the increasing vulnerability of the older person. The caregiver himself often has a respectable age. Because of the complexity of the problem, independence decreases and interprofessional home care becomes necessary.

1.3. Definitions

There are several operational definitions of frailty. Fried (2001) and Rockwood (2005) are the most

frequently cited. The Clinical Frailty Scale (CFS) of Rockwood ranks individuals by degree of fitness. There are 9 categories, ranging from very fit (CFS 1) to terminal (CFS 9). People who are in category 1 to 3 vary from fit to still being able to cope well despite medical problems. Individuals who are in category 7 to 9 range from completely dependent for personal care to terminally ill. (Rockwood et al., 2005)

Functional performance is understood to mean all actions that the person takes in the context of self-reliance in the field of basic activities of daily living (ADL) and IADL.

Mobility is described within the International Classification of Daily Functioning (ICF) as “changing body position and maintaining it, walking and moving”. Participation is represented as “involvement within a life situation”.

2. CLINICAL QUESTIONS WITH RECOMMENDATIONS

2.1. Screening

2.1.1. Clinical question

How can the physically frail older adult be detected (case finding)? How can the physically frail older adult and/or their social context be referred to an occupational therapist efficiently and effectively?

2.1.2. Recommendations

Case finding

- Detecting frailty in older people living at home as young as 75 should be considered. (Grade 2C)
- GPs and all other primary care providers should consider performing high-risk detection of frailty during their regular home visits. Systematic preventive home visits at the population level are not recommended. (Grade 2C)
- Occupational therapists present themselves as experts in screening problems in functioning in daily life. (GPP = Good Practice Point)

Screening tools

- Use valid assessment tools in the form of self-report, clinical observation, or a combination of both to detect frailty. (Grade 1C)
- Determine the choice of frailty assessment tool by the purpose one has in mind and the context in which the instrument will be used. (GPP)

Interdisciplinary collaboration

- The primary care occupational therapist presents themselves clearly as experts in functional performance in daily life and the environment in which this functional performance takes place (GPP). The occupational therapist makes his accessibility known both within a primary care area, and to the geriatric’s services of the second line in their care region to pursue a streamlined referral and provide integrated client-centered care. (GPP)
- Train all health and welfare workers who come into direct or indirect contact with older individuals, within their primary care area to detect frail elderly adults and high- risk individuals

on frailty, and refer them to relevant health care providers, including occupational therapists. (GPP)

- Occupational therapists detect frail elderly and high-risk individuals on frailty, and as part of an interdisciplinary approach, they also refer to the relevant caregivers. (GPP)
- Establishing a procedure within a primary care area that includes how the detection and referral of high-risk individuals for vulnerability proceeds should be considered. (Grade 2C)
- Appointing a coordinator within a primary care area to monitor this process should be considered. (Grade 2C)
- Keeping all health and wellness professionals up-to-date on the search and referral process in their primary care area should be considered. (Grade 2C)

2.2. Performance diagnosis

2.2.1. Clinical question

Which multifactorial occupational therapy evaluation is appropriate for the physically frail older adult living at home and/or his context?

Recommendations

Methodology for evaluation

- Keep the time between the detection of the high-risk person, the occupational therapy assessment and the implementation of the recommendations as short as possible. (Grade 1C)
- For the occupational therapist:
    - Assess meaningful occupational performance in the familiar environment of the older person, or in an environment that simulates the familiar environment as closely as possible. (Grade 1C)
    - In assessments, focus on identifying both the weaknesses and the possibilities within the occupational performance. (GPP)
    - Question the interests, needs, preferences and perception of the older adult about his actions at the functional performance and participation level. (GPP)
    - In addition to clinical expertise, use assessment tools at all stages of the therapeutic process, if relevant. (GPP)
    - When conducting the assessment, pay attention to the lifestyle and balance in meaningful performance of the older adult and, where relevant, of their caregiver. (GPP)

Division of tasks in evaluation

- Work together in a interprofessional way to perform a comprehensive geriatric assessment (CGA) on the older adult living at home, where a division of tasks must be considered in the context of expertise and cost-effectiveness. (Grade 1C)
- In the context of feasibility, decide according to the context whether an assessment at discharge is carried out by an occupational therapist working in the hospital or in home care. (Grade 1C)
- Occupational therapists contribute to the interdisciplinary team by considering standardized assessment tools with predictive value according to home care needs. (Grade 1C)

Fall prevention

- A healthcare professional screens for fall risk and, if necessary, refers to an occupational therapist and vice versa. (GPP)
- The occupational therapist:
    - uses a reliable assessment tool to map the 'behaviour' component as a risk factor for fall prevention. (GPP)
    - have the older adult and/or their caregiver take a self-assessment tool with a clear manual about fall risk factors in the living environment. (GPP)
- Healthcare providers refer to occupational therapists for home modification in the context of fall prevention. (Grade 1C)

Cognition

- In addition to the regular cognitive assessment instruments, the occupational therapist also uses functional tests to map cognition. (Grade 1C)

ADL and IADL

- The occupational therapist:
    - provides sufficient time to map the functional performance in the field of activities of daily living (ADL and IADL) using a standardized assessment tool (observation, interview or self-assessment tool by older adult or informal caregiver). (Grade 1C)
    - adapts the choice of instrument to the person and their context, considering, among other things, possible floor and ceiling effects. (Grade 1C)
    - spread the testing over time if this is desirable. (GPP)
- When interpreting the scores of ADL and IADL measurements, not only the total score is considered, but also the sub-scores. (Grade 1C)

IADL - fitness to drive

- The occupational therapist:
    - in his position as a driving expert, can substantiate the decision process whether or not to drive back, considers helping to determine the assessment of driving suitability and can support the person in realistically estimating the driving risks in his specific situation. (Grade 2C)
    - considers identifying the following aspects when assessing fitness to drive:
        - the driver's behaviour,
        - executive functions (row-specific and ADL/IADL), and
        - the general cognitive, and visual and visuo-motor skills. (Grade 2C)
    - consider whether to use a driving simulator in the context of predicting driving suitability. (Grade 2C)
    - guides the person who was not assessed as fit to drive, in finding and using alternative means of transport, and coaches in other consequences in terms of participation. (GPP)
    - refers to the national competent authority CARA for the legal decision to be fit to drive. (GPP)

Content evaluation: IADL - technology

- In addition to assessing ADL, IADL, mobility and leisure activities, the occupational therapist also considers assessing the skills to use technology and any applications. (Grade 2C)

2.3. Purpose determination

2.3.1. Clinical question

Which methodology is appropriate to determine goals together with the physically frail older adult living at home and/or his context?

2.3.2. Recommendations

- Include setting personal and achievable goals for the older adult living at home in the process of client-centered work. (Grade 1C)
- Go through the four phases in the target determination. (Grade 1C)
- Share the occupational therapy goals, and discuss this within the interprofessional team and across different settings (e.g. hospital – home). (GPP)

- Consider encouraging the older adult living at home to discuss their treatment wishes with their family, anticipating a possible future situation in which the person needs support to make treatment decisions. (Grade 2C)

2.2. Treatment

2.2.1. Clinical question

Which multifactorial occupational therapy interventions are indicated for the physically frail older adult living at home and/or his context?

2.2.1. Recommendations

General

- Perform the occupational therapy interventions in physically frail older adults from a client-oriented attitude with attention to empowerment. (Grade 1A)
- Apply decision support to determine the choice of intervention. (Grade 1C)
- Offer the interventions tailored to the frail older adult as part of an interprofessional approach. (Grade 1B)
- If no occupational therapist is involved, do not consider offering an interprofessional intervention program in the context of functional performance or social participation. (Grade 2A)
- Perform individual home interventions consisting of a combination of:
    - increasing health literacy,
    - advice on method change when performing daily operations,
    - advice on aids and practice in their use,
    - advice on home modification including lighting,
    - advice on ergonomics,
    - practicing functional performance,
    - learning self-management strategies,
    - learning fall prevention strategies,
    - advice on the possibilities of providing services. (Grade 1B)
- Limit these interventions over time and conclude with a follow-up session. (Grade 1B)
- Health promotion and prevention to improve physical, social, cognitive and mental functioning
- As part of health promotion, consider strengthening interventions that improve physical, social, cognitive, and mental functioning. (Grade 2B)
- In the context of health promotion, in addition to home interventions, consider strengthening group interventions to promote social participation. (Grade 2B)

- Especially in older individuals with depressive symptoms, consider lifestyle-oriented interventions that, on the one hand, encourage more activities that lead to social contacts, and on the other hand, facilitate activities that have a meaning for the person. (Grade 2B)

Functional performance and social participation

- Learn tailor-made evidence-based physical exercises that encourage movement and that can be integrated into daily functioning and this in addition to performing regular daily activities. (Grade 1B)
- Let the frail older person gain experiences that are meaningful by, among other things, taking care of something, or stimulating intergenerational collaborations. (GPP)
- Add a motivational component and/or supporting tools when training physical functioning. (Grade 1B)
- Consider not using robotics to support mobility or self-care. (Grade 2C)
- Learn behaviour change strategies in addition to offering evidence-based physical exercises. (Grade 1B)
- Consider providing individual cognitive interventions that train working memory and problem-solving abilities, and may or may not be related to everyday situations. Consider additionally providing a follow-up session to increase the transfer to problem-solving ability in IADL. (Grade 2C)
- Consider training off-road skills and/or strengthening computer-based simulation training – including processing speed – in the context of driving skills. (Grade 2B)
- Raise awareness of personal driving skills, encourage bargaining choices about future means of transport, and train the use of alternative means of transport. (GPP)

Cooperation

- Consultation in the context of decision support with the informal carer or family of the frail older adult, if they wish. (Grade 1C)
- Support the informal caregivers in empowerment by engaging short psycho-educational telephone, internet-based and/or technology-based interventions in addition to regular support. (Grade 1C)
- Address the functional needs of the frail older adult that have not yet been met upon discharge from the hospital, and implement client-centered, integrated home interventions in consultation between the hospital and primary care from primary care. (Grade 1C)
- Pay sufficient attention to planning and to communication, information and education of the older adult and his caregiver. (Grade 1C)

2.3. Practice

2.3.1. Clinical question

How can the occupational therapist, who works with the physically frail older adult living at home and/or his social context, contribute to high-quality disciplinary, integrated and/or transmural care?

2.3.2. Recommendations

Care coordination

- Appoint a care coordinator in complex situations. (Grade 1C)
- In care coordination, the care coordinator is part of a more general integrated structure and this in function of continuity in terms of care coordination in terms of health care, welfare and services. (Grade 1C)
- If care coordination is applied, this coordinator is a member of the older adult's treatment team. (Grade 1B)
- Within the care coordination, in addition to the client-oriented goals for the older adult and the organizational expectations, the needs of informal care about optimizing care are also included, and tailor-made training with a interprofessional approach is provided (e.g. on nutrition, ergonomics, etc.). (GPP)

Transmural cooperation

- Provide collaboration between the hospital and primary care. The hospital occupational therapists or the discharge team contact a primary care occupational therapist to have home interventions carried out upon discharge and this in the context of completeness of occupational therapy advice. (Grade 1C)
- Do not have home interventions performed before discharge by hospital occupational therapists. (Grade 1C)

Confidentiality

- Record agreements about sharing confidential information in writing. (Grade 1B)

Health Information Technology

- As a healthcare provider, use Health Information Technology (HIT) to exchange information with each other. (GPP)
- When enabling HIT (Grade 2C):

- consider involving older persons and/or their caregivers in the health goals of the older adult,
- consider verifying how they perceive the confidentiality and security of the HIT,
- verify that there are no technical failures, and
- verify that the information is reliable.

Reference

De Coninck L., Bouckaert L., Cordyn S., De Schutter F., Gielen E., Guisset ME., Kos D., Ledoux A., Aertgeerts B. (2023) Occupational therapy for maintaining functionality and social participation of the physically frail older person living at home. Guideline developed within Evikey network with support of FPS Healthcare Belgium. (www.EBPnet.be)

8. General discussion

8.1. Main findings in the scope of current literature

The world is facing a continuing increase in the number of older people with disabilities. Older adults living with frailty have enhanced risk of mortality, increased incidence of falls, and higher rates of care home admissions. They also experience increased feelings of loneliness compared to people who are not frail. (Kojima et al., 2016) Despite this, older adults still want to live at home and participate in their habitat for as long as possible. (Wiles et al., 2012) Governments in welfare states also promote aging in place to prevent older adults from expensive institutionalization and to reduce healthcare costs. (Zimmer et al., 2021)

Complex conditions, such as frailty, require the support of interprofessional primary care teams for the provision of comprehensive and coordinated care. Occupational therapists are part of such interprofessional primary care team. (Somé et al., 2020; Adekpedjou et al., 2020) The goal of occupational therapy is to enable people to participate in the activities of everyday life. The profession occupational therapy promotes health and wellbeing through occupation. (WFOT, 2012)

Therefore, the overall aim of this research project was to evaluate the impact of home-based occupational therapy on the functional performance and social participation of frail older adults. We applied a systematic sequential approach to establish an evidence-based occupational therapy intervention. First, we conducted a systematic review and two qualitative studies. The outcomes of these studies were employed to write a roadmap of an evidence-based occupational therapy intervention.

8.1.1. Systematic review on the impact of OT

We conducted a systematic review with meta-analysis to obtain evidence on the effectiveness of occupational therapy in home-based frail older adults and to identify the factors contributing to the success of these interventions. The research question of this systematic review was "*What is the effectiveness of occupational therapy interventions, whether mono-disciplinary or as part of a multidisciplinary approach, for community-dwelling physically frail older adults?*" (De Coninck et al., 2017) Primary outcomes showed a significant improvement, with a pooled standardized mean difference of -0.30 (95% CI -0.50 to -0.11; P = .002) for functioning in daily living activities, -0.44 (95% CI -0.69, -0.19; P = .0007) for social participation, and -0.45 (95% CI -0.78 to 0.12; P = .007) for

mobility. All secondary outcomes indicated positive trends, with fear of falling being significant. No adverse effects of occupational therapy were observed.

Our results are consistent with those of recent studies wherein a significant effect of OT interventions has been shown, among which a scoping review of Donnelly et al. (2023) , a Cochrane review of Clemson et al. (2023) and a systematic review of Kim et al. (2022).

Donnely et al. (2023) highlight that primary care is a relatively new practice setting for occupational therapy. The review predominantly focuses on adult and older adult populations. This study states that OT assessment in primary care focuses on the person (36%) with the most frequency, followed by the occupation (32%), the environment (26%) and a combination of all three (6%). The most frequent interventions offered by occupational therapists were referring to, advocating for, coordinating, linking to and navigating community services (n = 36 articles), chronic disease management (n = 34 articles)/self-management education (n = 28 articles), health promotion (n = 30 articles) and falls prevention (n = 27 articles). The scoping review emphasizes that occupational therapists in primary care promote patients' engagement in occupations by addressing the person, the occupations, and the home and community environments. The outcome of our systematic review on the impact of OT on home- based frail older adults is in line with the scoping review of Donnely and takes a closer look at the older population. We described the OT approach as client-centered, improving empowerment, educating and informing embedded within meaningful activities. We also found that OT interventions in frail older adults consisted of assessment, educating and providing information, prevention strategies, exercises, use of assistive technology, home hazard modification, advice on aids and services, coaching, and/or follow up session. A component we described and did not find in Donnely et al., is collaboration. Interprofessional collaboration and collaboration with the informal caregiver are important factors for successful care for home-based older adults.

Clemson et al., (2023) focus in a Cochrane review on the impact of environmental interventions for the prevention of falls in older people living in the community. They found clear evidence of home fall-hazard interventions being effective in reducing the rate of falls and the number of fallers in a high fall risk older population. Fall incidents are an important cause of reduction of functional performance and social participation. Home modification is part of the task of an occupational therapist. The outcome of the Cochrane systematic review by Clemson aligns with our systematic review, indicating the effectiveness of occupational therapy in maintaining or improving occupational performance and social participation, and in reducing fear of falling. Our systematic review states that home hazard reduction is one of the components of a high-quality occupational therapy intervention.

A systematic review by Kim et al. (2022) emphasizes that multicomponent interventions, among which occupational therapy may be beneficial to improve dependence on ADL and IADL. The application of home visits or home-based occupational therapy interventions can ameliorate the difficulties of ADL. The outcomes of our systematic review are in line with the findings in the review by Kim. Moreover, Kim suggests developing a framework for designing multicomponent interventions to improve ADL and IADL effectively. With the ProMOTE-intervention, we developed an evidence-based occupational therapy intervention which addresses this need.

8.1.2. Qualitative study on the perspectives of the older adults on their functioning, social participation and health.

Our first qualitative study investigated the perspectives of home dwelling older adults on their functioning, social participation and health, and on the factors influencing these capacities and their health. Insight into these determinants may assist improving therapy adherence. The research question was “What are the perspectives of home-dwelling older adults on their functioning, social participation and health, and on the factors influencing these capacities and their health?” We assume that assistive devices, the older adult’s living environment, professional and informal support, and medication are important determinants for maintaining functioning and social participation. The attitude, social influence, and personal effectiveness of an individual impact their engagement in activities. For instance, the coping strategies adopted by older adults influence their behavior in engaging in activities. Notably, the participating older adults often employed problem-focused coping strategies, positively affecting their level of autonomy. (De Coninck et al.2021) This aligns with Nielsen et al.'s (2023) systematic review, suggesting that strengthening older adults' problem-solving skills may improve their occupational performance. The content analysis of the studied interventions emphasizing problem solving showed that the participants were involved in problem identification, problem analysis, strategy development and implementation. The included studies had low risk of bias. However, the quality of the evidence must be downgraded due to inconsistent and imprecise results.

Shin et al. (2023) investigated the relationship between various factors (technological context factors, health contexts and abilities, and attitudinal factors) and the behavioral intention of pre-frail and frail older adults to use daily living assistive technologies. This is in line with our study which observed that contextual factors, self-efficacy and attitude influence the functional performance of the older adult. Shin observed that self-efficacy and self-reported health conditions had a significant relationship with behavioural intention to use these technologies in pre-frail older adults

(*r*=0.331; *P*<.001 and *r*=–0.169; *P*=.01). Attitudinal factors such as attitude toward use affected both groups (pre-frail group: *r*=0.235; *P*=.006; and frail group: *r*=0.526; *P*=.002). Self-reported health conditions had a significant relationship with behavioural intention to use these technologies in the pre-frail group (r=–0.169; P=.01). Both our qualitative study and the study of Shin highlighted the importance of attitude, self-efficacy and contextual factors regarding functional performance of frail older adults. A positive attitude towards a behavior can increase adherence. Higher levels of self-efficacy are associated with improved adherence to treatment plans..

Hajek et al. (2022) investigated whether changes in social support are associated with functional decline among the oldest old. Their study shows that a decrease in social support is associated with functional decline (IADL: $\beta = 0.03$, $p < 0.05$; ADL: $\beta = 0.27$, $p < 0.05$) in men but not in women. In our qualitative study, it was not possible to draw conclusions on gender due to the nature of the study. Nevertheless, we were able to assess the influence of peers on the motivation to stay active and on the frequency of social participation. The most important peer in this matter was the partner.

8.1.3. Qualitative study on the perspectives of primary care professionals on inter – professional collaboration

Our research investigated the perspectives of primary care professionals, on interprofessional collaboration, and the barriers and facilitators they perceived in the care of the frail older population. The research question was “What are the perspectives of primary care professionals, in particular general practitioners, registered nurses, physiotherapists, and occupational therapists, on interprofessional collaboration, and the barriers and facilitators they perceived in the care of the frail older population?” According to healthcare professionals, additional problems identified during their exploration, often appeared to be the primary problem rather than the initial reason for older individuals seeking healthcare. They also observed insufficient interprofessional collaboration in managing complex chronic issues, and a lack of shared vision on collaboration, primarily limited to established professions. The use of health information technology can facilitate interprofessional collaboration, support evidence-based practice, and improve patient education. Success factors and barriers to sustainable collaboration were identified on multiple levels, including innovation, individual and professional factors, patient and social context, organizational, economic, and political factors. Consequently, this qualitative study sheds light on the willingness and barriers for collaboration among healthcare professionals in primary care for older adults. We concluded that in primary care in Belgium, interprofessional collaboration is insufficient despite the willingness of healthcare professionals to collaborate. (De Coninck,2023)

Doornebosch et al. (2022) discovered themes that provoked many barriers and facilitators on interprofessional collaboration in older adults residing in institutional long-term care and geriatric rehabilitation. Three interdependent themes regarding facilitators of and barriers to IPC emerged in the review: team performance, organizational conditions, and sharing information. The outcome of Doornebosch's study on older adults in long term care and geriatric rehabilitation is in line with our qualitative study with older people in primary care. Both studies emphasize the importance of team performance, among which solid relationships with good connection between team members, having a shared vision and goals, having knowledge about the other professions, recognizing the roles and expertise of each unique team member and valuing other team members. Availability to make time to bring team members together, availability of resources such as an electronic data sharing system, and a supporting interdisciplinary coordination are organizational conditions that improve interprofessional collaboration. The importance of sharing information is the third theme that surface in both studies. Insufficient communication among health care professionals and between the health care professional and the older adult or his caregiver is an important barrier for efficient and effective elderly care.

8.1.4. Roadmap and the content of the ProMOTE-intervention

We used the outcome of our three previous studies and an additional literature review to develop the 'ProMOTE-intervention'. ProMOTE is the acronym for 'Promoting Meaningful activities with Occupational Therapy in Elderly'. There is a growing understanding that the development of an intervention protocol should be more transparent. So, we described in depth, both the development of the ProMOTE-intervention and the intervention itself.

We described the development and feasibility of our evidence-based, high-adherence-to-therapy OT intervention. The research question of this development project is "How to develop a high-adherence-to-therapy and evidence-based OT intervention to optimize functional performance and social participation of home-based physically frail older adults and improve wellbeing of their informal caregiver?" The study question of the ProMOTE-intervention itself is "What are the components of a high-adherence-to-therapy and evidence-based OT intervention that aims to optimize functional performance and social participation of home-based physically frail older adults and wellbeing of their informal caregiver?"

The roadmap for the development of ProMOTE-intervention follows the phases of the MRC-framework supplemented with components of the Intervention Mapping approach. The intervention emerged as the product of the first two phases of the MRC-framework. The last two phases served to

inform on the quality measurement of the protocol and the implementation of the OT intervention. (De Coninck, Submitted b) The ProMOTE-intervention follows a process in which components are executed iteratively as needed. In our study, each step of the intervention describes in detail the goal (why), action (what), approach and communication (how), resources (what and how), collaboration (who and how), timeframe (when) and quality indicator (outcome, process and structure indicator) of each component of this intervention. (De Coninck, Submitted c)

The Cochrane systematic review of Clemson (2023) describes the effect of environmental interventions for preventing falls in older people living in the community. This is in line with our ProMOTE-intervention which includes environmental interventions among others. The review of Clemson states that further research is needed to examine the impact of intervention components, the effect of awareness raising, and participant-interventionist engagement on decision-making and adherence. The components of our newly developed ProMOTE-intervention consider awareness raising, shared decision making and adherence.

8.1.5. Describing the process and content of a clinical guideline

This paper outlines the development process and content of a clinical guideline for primary health care occupational therapists working with home-based frail older adults. The central question guiding this guideline's creation was ‘How to develop an evidence-based occupational therapy clinical guideline to optimize functional performance and social participation of home-based physically frail older adults?’. Validated by the national committee for guideline validation at the Centre for Evidence-based Medicine in March 2023, the guideline adheres to the Belgian Working Group Guideline Development in Primary Care (WOREL, 2021) and follows the manual 'Developing NICE guidelines' from the National Institute of Health Care and Excellence (Nice, 2020).

A multidisciplinary team, including occupational therapists, a general practitioner, a geriatrician, a registered nurse, and a physiotherapist, participated in the guideline development. Patients and their representatives were also actively involved in the process. The recommendations are structured based on clinical reasoning steps (case finding, assessment, goal setting, and intervention), with an additional emphasis on collaboration.

In response to Hwang and colleagues' (2022) suggestions for more inclusive and ageing-relevant guidelines in The Lancet ‘Improving clinical practice guidelines for older people’, our development process included considerations such as increasing the inclusion of older people and those with multi-morbidity in clinical studies, developing evidence search strategies and outcomes for distinct

cohorts of older people, using cross-referencing and vignettes for clinical decision-making in multimorbidity, and adopting a patient-centered approach with supported decision-making.

To ensure relevance and informativeness, older adults and their caregivers were included in the stakeholders committee, with recommendations adjusted based on their feedback. The guideline defines its intended population based on functional performance rather than age, recognizing the diversity within the defined range of functional performance. Cross-referencing with another guideline on falls prevention aims to break down silos and emphasizes the need for nuanced clinical decision-making in the context of multi-morbidity. Our guideline has been developed in an evidence-based manner, balancing scientific, patient-driven, and expert-driven considerations while considering the broader context.

8.2. Methodological considerations

8.2.1. Procedure

We used triangulation to enhance the validity and credibility of our study, providing a more in-depth understanding of the research problem and mitigating research biases. We integrated three of the four types of triangulations as proposed by Denzin (1970), namely methodological triangulation, investigator triangulation and theory triangulation.

Methodological triangulation involves using multiple methods to study a phenomenon. In our study, we combined a structured literature review and qualitative research methods to identify the necessary components of an evidence-based occupational therapy intervention in home-based physical frail older adults. The purpose of the systematic review was to assess the effectiveness of occupational therapy interventions in physically frail older people in primary care and to identify the factors that lead to the effect. The qualitative semi structured interviews were conducted with both older adults and health care professionals. These had as purpose to analyze in-depth two of the determinants of success in the approach of complex chronic diseases, namely therapy adherence in the older adult and collaboration between the health professionals.

Investigator triangulation refers to the use of more than one researcher in the field to gather and interpret data. Investigator triangulation was applied in particular in the systematic review and qualitative studies. For the systematic review, two investigators independently assessed titles and

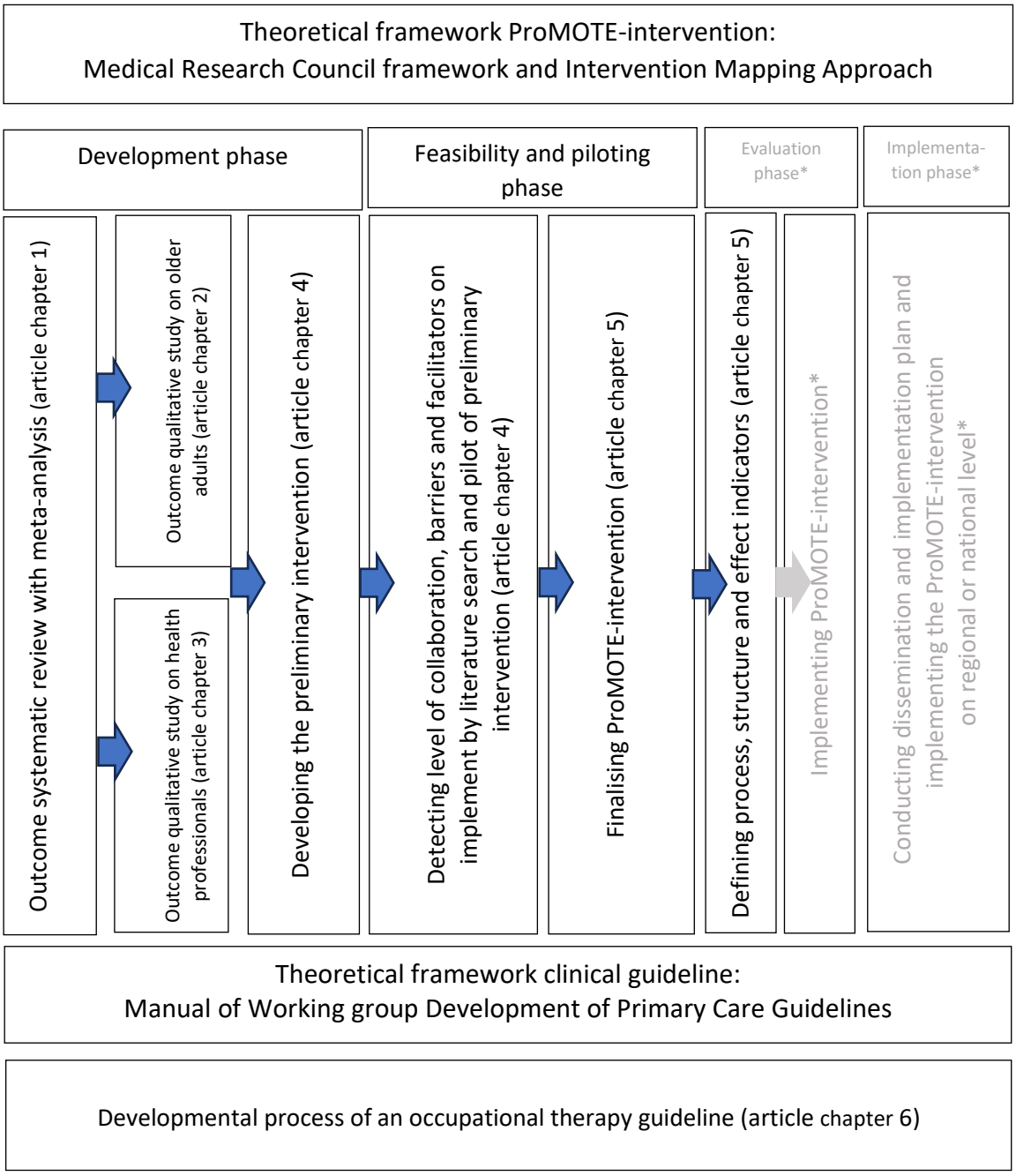
abstracts of the records identified from the electronic searches, and excluded irrelevant studies. Subsequently, the authors assessed the full text of all remaining studies and screened their eligibility based on the inclusion and exclusion criteria. The investigators of the qualitative studies had diverse backgrounds. The two investigators who independently analyzed the transcriptions had a double degree, namely a bachelor in occupational therapy and a master in gerontology. The other authors, who gave feedback on the analysis, were a general practitioner, sociologist and another occupational therapist. This way of working provides breadth to the phenomenon of interest and tries to avoid bias.

Theory triangulation involves using multiple theoretical models to study a phenomenon. Our research project is based on the Medical Research Council and National Institute for Health Research (NIHR) complex intervention research framework (MRC framework) in combination with the Intervention Mapping approach. (Skivington et al., 2021; Bartholomew et al., 2016) The MRC framework, which we used as a basis, is intended to assist researchers in choosing appropriate methods to improve research quality. It weighs up the available evidence in the light of methodological and practical constraints. The MRC framework consists of four phases, namely development (phase I), feasibility and piloting (phase II), evaluation (phase III) and implementation (phase IV).

We added elements of the Intervention Mapping approach, which is an approach for developing effective behavioral change. The intervention mapping approach consists of six steps, which are: (1) Conducting a needs assessment or problem analysis, (2) creating matrices of change, (3) selecting theory-based intervention methods, (4) integrating methods and the practical applications into an organized program, (5) planning for adoption, implementation and sustainability of the program in real-life contexts and (6) generating an evaluation plan.

To describe the development of our occupational therapy intervention protocol, we integrated the MRC framework with the Intervention Mapping approach.

The strengths and limitations of each individual study have been discussed per chapter. Overarching, the systematic sequential approach to establish an evidence-based occupational therapy intervention substantiates the rigor of development of the final elaborated ProMOTE-intervention.



Flowchart procedure doctoral study

*: Proposal for further research

8.2.2. Methodological considerations related to the study population

The frail older population is a diverse population with unique characteristics and needs. The diversity can be found in components such as age, health status, functional abilities and socio-economic status. In our study, we included older adults aged 75 and older. Due to increasing life expectancy, age variation is significant, including centenarians. Frailty is a complex syndrome resulting from various underlying health conditions and diseases. The functional ability of the frail older population can vary widely, even within the included population with levels 4 to 6 of the Clinical Frailty Scale. The frail older population comprises individuals with diverse socio-economic status and social support, highlighting the need for a tailor-made approach for each frail older adult, and this is one of the causes of the heterogeneity in the care of frail older adults.

8.2.3. Methodological considerations related to the outcomes

The main outcome of our study is the provision of a high-adherence-to-therapy and evidence-based intervention called the ProMOTE- intervention. Adherence is a critical precondition to increase functional performance and social participation in the frail older adult. Adherence to the ProMOTE intervention can lead to meaningful improvements in functional abilities, greater independence, increased social contacts, and a higher quality of life for older adults.

Measuring adherence to a multimodal, tailored intervention involving both behavioral change and contextual factors presents challenges. Adherence is often not a binary outcome measure; one can also have partial adherence. Another challenge in measuring adherence is selecting a reliable measurement instrument. Older adults must implement the knowledge and skills in daily living activities in their own context, which makes direct observation not feasible because it is very time consuming to observe in the day to day situation at a relevant point in time. Self-report measures are more feasible but may be subject to social desirability bias and may not provide an accurate reflection of actual adherence. Electronic monitoring can provide objective data on adherence but may be expensive and is subject to ethical concerns.

Measuring functional performance and social participation seems more feasible but has other challenges. There are numerous tests available for measuring functional performance in older adults. Each test has its own characteristics, ranging from required time, required cognitive skills, over ceiling and bottom effect for a certain population, up to clinometric characteristics such as specificity and sensitivity, and inter- and intra-rater reliability. We suggest the use of the BelRAI Home Care

assessment instrument as preferred option in Belgium because it allows to assess the capacity and assistance and care needs of a person as a whole, considering the context in which that person lives.

BelRAI is the Belgian implementation of the interRAI assessment tools. Since 2020 BelRAI screener is obligatory in Flanders. The social supplement has been implemented since June 2022 and the BelRAI Home Care and the Long Term Care Facilities since June 2023. These instruments are primarily used for care planning and care quality, but the Screener is also used for the right to the healthcare budget for those in serious need of care. (Kwaliteitscentrum diagnostiek vzw, 2023)

BelRAI is accessible to accredited practitioners of a healthcare or social care profession in Belgium. The data is recorded electronically by the providers. A free BelRAI online platform is offered for this purpose. To unnecessary burden neither the elderly person nor the caregiver, the BelRAI Screener can be used to determine whether a more thorough assessment of a person's abilities and needs with the BelRAI Home Care is appropriate.

8.2.4. Methodological considerations related to the study designs

As mentioned previously, the systematic sequential approach to establishing an evidence-based occupational therapy intervention substantiates the rigor in the development of the final, elaborated ProMOTE-intervention. The performance of a mixed-method study and the chronological structure, in which each study gradually builds on the previous ones, holds fundamental value.

An additional benefit of the systematic review with meta-analysis is the analysis of the components of interventions that showed a significant effect. This provided us with the opportunity to identify the factors contributing to the success of the interventions and to incorporate them into our ProMOTE-intervention. Subsequently, these findings prompted a deeper exploration of the perceptions of the older adults, the willingness of the health professionals, and the barriers and facilitators to collaboration.

8.3. Reflection on the overall purpose of this study

The ProMOTE-intervention aims to improve adherence to occupational therapy, thereby promoting functional performance and social participation among older adults. In order to achieve this goal, we have taken several preparatory steps.

(1) Through a systematic review and meta-analysis, we explored the existing literature to investigate the impact of occupational therapy on the older population, with a primary focus on functional

performance, social participation, and mobility. Additionally, we examined secondary outcomes, including fear of falling. Our findings revealed a significant positive effect across all evaluated outcomes.

Concurrently, to gain a deeper understanding of the factors contributing to success, we conducted an analysis of the intervention components and key factors of the included studies that demonstrated a significant impact on outcome measures. The identified components of the occupational therapy intervention align with the comprehensive geriatric assessment. These components encompass case finding, functional assessment, goal-setting for functional performance and social participation, development and implementation of the intervention plan, ongoing monitoring to achieve set goals, and evaluation of goal attainment. The characteristics of successful interventions include client-centeredness, empowerment, health education/information, embedding within meaningful activities, and collaboration.

Several of these characteristics have been identified as conditions for increasing adherence, for instance, 'Using strategies to empower older adults, such as improving health literacy' (Collado-Mateo et al., 2021; Taylor et al., 2019; Cumming et al., 2001). The ProMOTE-intervention seeks to enhance adherence by paying attention to the level of health literacy during the functional assessment phase. Spending more time on improving health literacy will increase adherence to the related therapy.

(2) The characteristics of successful interventions 'client-centeredness and empowerment' discovered during the performance of the systematic review prompted conducting a qualitative study. To gain a more comprehensive understanding of the experiences, preferences, and perceptions of older adults, we surveyed older adults. The insights of this survey resulted in a conceptual model determining factors influencing functionality, social participation, and health.

Elements of this conceptual model are integrated into the ProMOTE-intervention to increase adherence, for instance In the implementation and monitoring phase, attention is given to reminding the older adult to seek help and encouragement from their context (informal caregiver, peers, and family).

(3) In our systematic review, collaboration was identified as a hallmark of a successful intervention. 'Fluid interprofessional communication and collaboration' (Collado-Mateo et al., 2021) is also a determinant of adherence to therapy. Therefore, our second qualitative study investigated the perspectives of primary care professionals, including general practitioners, registered nurses, physiotherapists, and occupational therapists on inter-professional collaboration.

Belgian healthcare professionals express a willingness to collaborate. However, barriers need addressing. Some barriers require regional initiatives from individual healthcare professionals, while others necessitate structural changes at the policy-making level. The ProMOTE-intervention includes actions to facilitate interprofessional collaboration on micro- and meso-levels, including building a professional network on the local level by stimulating communication with involved healthcare providers.

(4) Despite evidence-based practice being the gold standard, obstacles hinder its implementation on the healthcare provider's side. Lack of time to study scientific literature is one of the most cited factors for not working in an evidence-based manner (Ehrenbrusthoff et al., 2022). To overcome this challenge, we used the outcomes of our research to develop an actionable plan to improve adherence to occupational therapy interventions, utilizing the MRC-model and Intervention Mapping approach.

(5) At the same time, we developed a clinical guideline with concrete recommendations with an indication of the level of evidence and the strength of each recommendation to inform occupational therapists about which therapeutical actions are evidence-based.

The ProMOTE-intervention and the additional clinical guideline provide a systematic and structured approach to decision-making for occupational therapists seeking to impact the functional performance and social participation of the physically frail older adult. The concept ‘Aging in place’ is of great importance in current society. Older adults prefer to experience old age independently in their own homes and living environments as long as possible. (Fernández-Carro et al., 2014)

The ProMOTE-intervention and clinical guideline should support successful aging in place for older adults.. The ProMOTE-intervention serves as a framework, assisting occupational therapists in employing evidence-based clinical reasoning for the treatment of physical frail older adults. Concurrently, the guideline offers recommendations that can be selected and implemented tailored at the unique needs of the older adult and this at various stages of the clinical reasoning process. The occupational therapist works to establish a new equilibrium for the older adult, navigating the challenges of physical decline and environmental pressures. This involves enhancing the older adult's capacities while simultaneously adapting the physical surroundings and reinforcing the social environment. With this objective, the ProMOTE-intervention and clinical guideline must enable the older adult to engage in daily activities safely and independently, thereby freeing up energy for executive functioning skills such as planning and problem-solving. Improved proficiency in executive functioning allows to plan social engagement which acts as a preventive measure against social isolation.

Although we expanded our study carefully to optimally pursue the central research question and contribute substantively to the field of occupational therapy for physically frail older adults, there are still factors to address.

An intervention is only valuable when implemented, and its effect has been studied in the clinical context. A future study should focus on the implementation of the intervention and guideline, assessing both its effectiveness and cost-effectiveness. Additionally, the intervention needs promotion among occupational therapists, allowing them to convince the government of the need for a wider recognition of occupational therapy in primary care. Structural changes must occur at the macro level.

8.4 Together we change?

In 2014, four Flemish professors in general practice outlined a vision for the future of primary healthcare, aligning with international advancements in the document titled 'Together We Change.' Fast forward to 2022, a subsequent publication titled 'Together We Make Change Happen' builds upon this vision. The articulated vision in these documents incorporates contemporary concepts for primary care, encompassing integrated care models for managing patients with chronic diseases, the establishment of multidisciplinary primary care networks to address diverse healthcare needs, the implementation of quality systems, and the strategic positioning of primary healthcare in the realms of innovation, research, and education. The document goes beyond abstract vision statements, providing concrete and actionable recommendations for progression. Despite the document being a decade old and primary healthcare in Flanders undergoing a transformative phase, its content remains pertinent and applicable.

Navigating change within a framework rooted in predominantly monodisciplinary primary healthcare practices, driven by compensation per performance, poses inherent challenges. The remuneration model tied to service performance tends to obstruct the adoption of a self-management approach. Shifting towards integrated care, with a focal point on self-management, emerges as a challenging task in addressing the complex needs of individuals with multiple chronic conditions.

The transition to a care paradigm that promotes self-management represents a paradigm shift. However, relinquishing the role of a caregiver by fostering the autonomy of the individual may be perceived as a potential loss of employment opportunities. Yet, persisting with the service-oriented

model often sustains limitations in functional performance, even when there exists untapped potential for the growth of self-management.

Concurrently, a prevailing concern persists regarding delayed access to services for those in need, a consequence of staffing shortages. This underscores the critical imperative for providing timely support to individuals necessitating these services and emphasizes the urgency of addressing workforce limitations.

A key inquiry posed in the document 'Together We Make Change Happen' is: How can we ensure that care providers allocate more of their time to core tasks? A more judicious utilization of care resources stands to benefit the older adult, potentially enhancing job satisfaction and presenting professional challenges for healthcare professionals. Executing profession-specific tasks has the potential to elevate the overall quality of care, shifting from a routine, fast-paced approach to a more qualitative, client-oriented one.

It is well-established that adhering to evidence-based practices, a cornerstone of high-quality care, not only enhances job satisfaction but also guards against burnout (Thwaites et al., 2023). The incorporation of the findings from our study, coupled with engaging occupational therapists in policy discussions, holds the promise of significantly contributing to the correct and expeditious implementation of integrated care.

8.5 Future perspectives

8.5.1. Further research

The target of the ProMOTE-intervention is improving the therapy adherence of home-based physically frail older adults. If therapy adherence is high, then the ProMOTE-intervention will improve occupational performance and social participation of older adults and will reduce the burden on informal carers. A randomized controlled trial can prove if this hypothesis can be accepted or must be rejected.

To evaluate the effect of the ProMOTE-intervention, a pragmatic prospective multi-centric cluster Randomised Controlled trial (RCT) must be conducted in primary care in Belgium in accordance with the Consolidated Standards of Reporting Trials 2010 (CONSORT 2010) statement extended to cluster RCTs. The primary outcome of this RCT must be the older adult’s level of adherence on the ProMOTE-intervention. Secondary outcomes must be the short- and long-term effects of the ProMOTE-

intervention on occupational performance and social participation of the older adult, among which mobility, and functioning in daily activities and leisure activities, and the level of burden of the older adult's informal caregiver.

Frail older adults often require complex care. Healthcare resources are limited and there is a need to prioritise interventions that are most effective and efficient in achieving positive health outcomes.

Beside measuring the effectiveness of the ProMOTE-intervention, a cost-effectiveness study must deliver insight in the costs of the ProMOTE-intervention compared with the health benefits that result from it.

8.5.2. Implementation in practice

Occupational therapists possess the competence to implement the ProMOTE-intervention in their clinical practice. To achieve sustainability, occupational therapists can unite in occupational therapy inter-vision committees. By sharing insights and discussing challenging cases, occupational therapists can improve their professional skills, gain new insights and learn alternative strategies. The value of occupational therapy inter-vision lies in its ability to provide a safe and supportive environment to reflect on one's own professional handling and learn from the experiences of others.

Interprofessional meetings are also facilitators to achieve sustainability. The value of Interprofessional meetings lies in its ability to promote collaboration and a team-based approach to care. Interprofessional meetings facilitate in gaining a better understanding of each other's roles and perspectives, and work together more effectively to provide patient-centered care.

Overall, professional inter-vision and interprofessional meetings are a powerful tool for enhancing patient care and promoting ongoing learning in healthcare.

8.5.3. Implementation in education

Implementing clinical guidelines and evidence-based intervention protocols in occupational therapy higher education, such as the ProMOTE-intervention, affects the qualification of the young graduated occupational therapist. Promoting the use of interventions that have been proven through rigorous scientific research contributes to better education. In addition, the students serve as intermediaries to spread new evidence-based knowledge more quickly in the work field.

Implementation of evidence-based data leads to better health outcomes, increased satisfaction amongst patients and their families, and reduced healthcare costs.

The care for older adults is a shared responsibility. Therefore, education on elderly care should not only be provided within each professional educational program but should also be provided in an interprofessional way. The ProMOTE-intervention emphasizes the importance of collaboration in each phase of the intervention, to wit the case finding, functional assessment, goal setting, developing the intervention plan, implementing the intervention and evaluating. The better primary care health professionals are informed on occupational therapy and vice versa, the more streamlined the collaboration will be.

8.5.4. Policy recommendations

Occupational therapy contributes to living safely at home for longer, which benefits both the elderly person and their environment, as well as society. Considering the insights we have gained from this research and the societal challenges that contemporary care for the elderly entails, a number of policy recommendations can be formulated.

Recommendation 1: *Occupational therapists must play a substantial role in shaping the future of elderly care.*

In the current structure of primary care, responsibilities often fall on individual caregivers who face significant pressures. Therefore, optimizing the use of available staff capacity, expertise, and fostering interprofessional collaboration is crucial.

Currently, the focus remains predominantly on service-based care provision, with insufficient attention to self-management support. It is desirable to encourage productive interactions between well-informed patients actively participating in their care and fostering interprofessional collaboration.

Granting occupational therapists a more significant role in envisioning the future of elderly care will not only reinforce the development of self-management support in primary care but also provide an opportunity for occupational therapists to establish themselves as health professionals working on evidence-based, occupation-based, client-centered, and context-based principles.

These foundational principles of occupational therapy closely align with those of goal-oriented care, a concept introduced in 1991 by Mold and colleagues and widely accepted as a precondition for

integrated care. Goal-oriented care involves eliciting patient-identified goals to guide care planning and decision-making, representing a more meaningful and holistic approach to care and decision-making. The occupational therapist may play a fundamental role in disseminating and implementing goal-oriented care. Individuals perceived as credible, likeable and trustworthy are likely to be persuasive agents of behavioural change and can be opinion leaders. With their basic competences on the topic, occupational therapists can profile themselves and play a key role as opinion leader in implementing goal-oriented care.

Recommendation 2: *It is essential to allocate funds within the basic care budget for the inclusion of occupational therapy for older adults.*

By fostering the independence of older adults and empowering both the individual and their context, the occupational therapist strives to render their own role redundant. Moreover, the enhancement of independence can positively influence the utilization of other forms of care and services. Therefore, we propose an annual provision wherein an older individual, along with their informal caregiver, can benefit from a specified number of occupational therapy interventions addressing issues related to functionality and social participation. The effectiveness of a maximum of ten interventions for the older adult, complemented by ten interventions for the informal caregiver as currently implemented in the Netherlands, has been well-established.

Recommendation 3: *It is essential to incorporate the presence of an occupational therapist in interprofessional consultations.*

In order to bolster self-management, older adults are actively encouraged to establish goals, recognize barriers and challenges, and monitor their own conditions.

Proficiency in the core principles of occupational therapy, namely evidence-based, occupation-based, client-centered, and context-based, equips the occupational therapist with the skills to adopt a holistic perspective on the individual. Sharing this comprehensive viewpoint with other healthcare providers involved will not only facilitate but also enhance the quality of integrated care. Thus, the occupational therapist becomes a valuable partner within the interprofessional team.

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9. Conclusion

Improving the functional performance and social participation of the growing group of older adults with multimorbidities and functional problems is a societal challenge. This study contributes to autonomy and the quality of life of the home-based physical frail older adult, and to the actual needs of Western society.

Our ProMOTE-intervention intends to deliver tailored made care that effects the older adults, the social context of the older adult and the community. The availability of an evidence based tool can also benefit the profession occupational therapy.

9.1. Benefits for the older adult

1. Living as independently as possible allows frail older adults to maintain a sense of autonomy and control over their lives. They can make decisions about their daily and social activities. Pursuing their interests and engaging in activities brings joy and fulfilment to the older adult.
2. Being able to take care of oneself can help older adults maintain a sense of dignity and self-respect. Older adults who can manage their own health and take care of themselves often report a higher quality of life. They feel a greater sense of purpose and meaning in their lives. This can help improve their overall mental health and well-being.
3. Older adults with a certain level of functional performance have an advantage in maintaining social connections with friends and family members, as they are not restricted by availability of others. This can help prevent social isolation and improve overall well-being.

9.2. Benefits for the social context of the older adult

1. Older adults who can take better care of themselves are less likely to require assistance from third parties such as informal caregivers. This can help to reduce the burden on informal caregivers which leads to an improvement in their quality of life.
2. The informal caregivers, often older persons themselves, can benefit from the ProMOTE-intervention because the occupational therapist also pays attention to the balance of capacity-load of the informal caregiver.

3. Healthcare professionals may experience enhanced productivity by allocating more time to deliver discipline-specific evidence-based interventions. This, in turn, has proven to contribute to increased job satisfaction and mitigated burnout.

9.3. Benefits for the community

1. When they can manage their own health and take care of themselves, older adults are less likely to appeal on services. It can contribute to a more targeted use of healthcare professionals, which becomes a relief for the healthcare system that is now under pressure due to scarcity.
2. Due to improved functional performance, there will appear a certain redistribution of care assignments among primary care providers. By providing the right care in the right place there will be a substitution from inefficient expensive care to efficient and effective cheaper care, which avoids overconsumption.
3. When older adults can independently manage their health and have a higher level of functional performance, they are better equipped to avoid falls and accidents. This, in turn, helps prevent unnecessary hospitalization and reduces expensive healthcare costs.
4. Due to improved functional performance and social participation, older adults are more likely to remain active and engaged in their communities. This can help reduce social isolation and improve overall community health.

9.4. Benefits for the profession occupational therapy

1. This study benefits occupational therapists by being able to deliver occupational therapy interventions which are evidence-based. The implementation of evidence-based practices has yielded superior outcomes, as compared to non-evidence-based approaches.
2. In addition, delivering evidence-based care also leads to higher job-satisfaction and less burn out among health care providers, in this case the occupational therapist.
3. Finally, being able to justify that the occupational therapy intervention is evidence-based profiles the profession occupational therapy in primary care as equivalent to other primary care professions. Implementation of an evidence-based approach has the potential to enhance collaboration, thereby improving overall health care delivery.

In conclusion we can state that the developed evidence-based occupational therapy intervention for home-based frail older adults, the ProMOTE-intervention, has potential to affect the frail older adult by making it possible to improve their functional performance and social participation, the informal caregivers by improving their quality of life, the community by increasing community engagement and reducing healthcare costs, the primary care health professionals by creating more time to deliver discipline-specific interventions.

10. Summary

This doctoral study investigates the impact of home-based occupational therapy and its components on promoting the functional performance in daily living activities and the social participation of physical frail older adults residing at home. We also seeks to get insight in the therapy adherence of frail older people and the willingness to collaborate of the involved healthcare professionals.

The technique of triangulation is employed to enhance the validity and credibility of our study, providing a more in-depth understanding of the research problem and mitigating the presence of biases.

Chapter one serves as the introduction, delving into the background of the problem statement.

Frailty is a complex age-related clinical condition characterized by reduced physiological reserve and reduced resistance to stressors, leading to greater vulnerability to adverse outcomes. These outcomes include a higher risk of falls, fractures, hospitalization, early admission to nursing homes, and a decrease in quality of life.

Addressing this multifaceted issue requires an interprofessional collaborative approach, with occupational therapists playing a crucial role in improving the health and well-being of the older population.

Occupational therapy in primary care supports independent living, offering training and coaching for the coping skills of informal caregivers. It encompasses various aspects, including emergency response, hazard removal, assistive device provision and training, and ensuring safety in daily activities.

Chapter two delves into the effectiveness of occupational therapy interventions, as a mono-disciplinary approach or as part of an interprofessional strategy, for home-based physically frail older adults. This is accomplished through a systematic review with meta-analysis of randomized controlled trials.

Nine studies of reasonable quality with low risk of bias were included. There was a significant increase in all primary outcomes, namely functional performance in daily living activities, social

participation and for mobility. All secondary outcomes showed positive trends, with fear of falling being significant. No adverse effects of occupational therapy were found.

Chapter 3 presents our first qualitative study which investigates the perspectives of home-based older adults on their functioning, social participation and health, and on the factors influencing these capacities and their health. Having insight into these determinants might assist in improving therapy adherence.

Older adults identified barriers and facilitators affecting their functioning and social participation. Attitude, social influence and personal effectiveness were found to influence whether a person performs or participates in an activity. The type of coping strategy that the older adult adopts, has an influence on their behavior. The participating older adults often used remarkable problem-focused strategies, which had a positive effect on their level of autonomy.

These findings facilitated the creation of a framework for maintaining and increasing therapy adherence, which may be helpful in facilitating occupational therapists and other healthcare professionals to detect determinants of therapy adherence.

Chapter 4 focuses on our second qualitative research, investigating the perspectives of primary care professionals on interprofessional collaboration and the perceived barriers and facilitators in the care of the frail older population.

Healthcare professionals noted that exploring problems complementary to the reasons for older people to seek healthcare often revealed additional primary issues. Insufficient interprofessional collaboration and a lack of a shared vision on collaboration were identified as challenges. Collaboration is still limited too much to contacting established professions. Health information technology can support both, interprofessional collaboration and working on an evidence-based manner. It can also be a facilitator to inform patients.

Success factors and barriers for sustainable collaboration were identified on several levels, namely innovation, individual, professional, patient, social context, context of the organization, economic and political context.

Chapter 5 addresses the development and feasibility of our high-adherence-to-therapy and evidence-based occupational therapy intervention to optimize functional performance and social participation

of home-based physically frail older adults and wellbeing of their informal caregiver, the ProMOTE-intervention.

Following the phases of the MRC-framework supplemented with components of the Intervention Mapping approach, the intervention emerges as a product of the first two phases of the MRC-framework. The last two phases inform on the quality measurement of the protocol and the implementation of the occupational therapy intervention. These last two phases are not elaborated within this study.

Chapter 6 provides an in-depth description of the contents of the ProMOTE-intervention, suggesting quality indicators to measure the implemented intervention. The ProMOTE-intervention, consisting of six steps, details evidence-based components transparently described for both practice and research. The study emphasizes the 'why' and 'how,' making the concept of 'therapeutic use-of-self' operational throughout the six steps of the OT intervention.

Chapter 7 outlines the developmental process of a de novo clinical guideline for primary health care occupational therapists working with physically frail older adults.

The clinical guideline was developed de novo din accordance with the guideline development manual of the Belgian Working Group Development of Primary Care Guidelines (WOREL) and the Appraisal of Guidelines for Research and Evaluation II (AGREE-II), underpinned by the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) framework.

The clinical guideline provides 52 recommendations mapped in five clinical sub-questions. The scope of the sub-questions follows the clinical reasoning process namely: case finding, assessment, goal setting and intervention and the topic collaboration. The recommendations are clustered in themes per sub-question. Each recommendation is followed by an information section, the literature syntheses of the studies on which the recommendation is based and the stakeholder’s opinion that is considered to adapt the preliminary recommendation to the local context, where relevant implementation tools are recommended.

Improving the functional performance and social participation of the growing group of older people with multimorbidity and functional problems is a societal challenge. With this study, we contribute to autonomy and the quality of life of the home-based physical frail older adult, and to the actual needs of Western society.

Chapters 8 and 9 critically reflect on the main findings, present methodological considerations, and offer future perspectives within the context of the current literature.

The ProMOTE-intervention delivers tailored care that affects older adults, the social context of the older adult, and the community, offering benefits for the occupational therapy profession. Additionally, the developed clinical guideline provides recommendations to help make evidence-based choices when implementing the steps of the ProMOTE-intervention.

The ProMOTE-intervention is poised to contribute to community well-being by reducing healthcare costs and increasing community engagement. It offers primary care health professionals an opportunity to deliver higher-quality work, eases the burden on informal caregivers, improves the functional performance and social participation of frail older adults, and contributes to the profiling of the occupational therapy profession.

Justification of front page photo

Finding the way out of a labyrinth, making choices in treating older adults and conducting a doctoral study may seem like totally different activities. Although there are more similarities than thought at the first glance. The three different activities require similar skills, among which complex decision-making, flexibility, and patience and persistence.

- **Complex decision-making:**

In finding the way out of a labyrinth, you need to consider various possible paths, dead-ends, and other obstacles to find the correct way out.

In working with older adults, also multiple options are available. Healthcare professionals need to view a person from a bio-psycho-social perspective, what makes that each person is seen as a unique human being.

In conducting a doctoral study, critical decisions must be made during the entire research process. The ability to manage and navigate complexity is essential to ensure a robust method, and valid and reliable study outcomes.

- **Paying attention to detail:**

In finding the way out of a labyrinth, you must pay close attention to details such as twists, turns, and dead-ends.

In working with older people, to increase the likelihood of adherence, healthcare professionals must be attentive to details related to the behavior of the older adult, the needs of the caregiver, the environment, …

In conducting a doctoral study, paying attention to details is essential for enhancing reproducibility of the research.

- **Flexibility:**

In finding the way out of a labyrinth, you may need to backtrack or try a different approach if you encounter a dead-end or realize that your current path isn't working.

In working with older adults, healthcare professions cannot implement a fixed treatment plan. Interventions must be tailored at the person.

In conducting a doctoral study, flexibility is essential as for unexpected obstacles, solutions must be sought within the framework of the research project.

- **Patience and persistence:**

In finding the way out of a labyrinth, it's important to keep trying different paths even if you encounter setbacks or dead ends.

In working with older adults, healthcare professionals need to be patient and persistent in empowering older adults to deal with the consequences of chronic conditions and age-related changes.

In conducting a doctoral study, patience and persistence are crucial for coping with delays, setbacks and staying focused on the research objectives.

- **Collaboration and communication:**

In finding the way out of a labyrinth, success may be improved by collaborating and communicating with others.

In working with older adults, providing effective care for older adults requires collaboration and communication between the older adult, healthcare professionals, caregivers and family members to ensure coordinated and comprehensive care.

In conducting a doctoral study, collaboration and communication gains in depth insights into the problem to investigate. Constructive dialogue and critique enables to improve the rigor of the research.

Acknowledgement

Scientific acknowledgement

I want to acknowledge following people:

Dr. Bert Vaes and Mrs. Marleen Michels for their support on the search strategy and literature search of the systematic review.

Mrs. AB, Mrs. JF, Mr. JL and Mr. JP who were willing to share their expertise on becoming older.

All older adults who shared their experiences by participating voluntary at the interviews.

The health professionals for their contribution by accepting the interview.

Prof. Daphne Kos, Mrs. Anne Ledoux and Mr. Marc-Eric Guisset for participating at the guideline development group.

Mrs. Denise Bester, Mrs. Juanita Bester and Miss Maatje Kloppers for their linguistic feedback on the manuscript.

And last but not least, Mrs. Martine Goossens for editing this manuscript.

Personal contribution

I certify that this manuscript is novel. This study has been performed by the doctoral fellow Leen De Coninck under supervision of Prof. Bert Aertgeerts, prof. Anja Declercq and prof Maud J.L. Graff.

Conflict of interest statement

All authors stated to have no conflict of interest.

The conflict of interest statements are declared per article.

Professional summary Leen De Coninck

Leen De Coninck embarked on her professional journey as an occupational therapist within a rehabilitation centre dedicated to children with developmental and learning disabilities. The challenges encountered in this setting motivated her to pursue a course in orthoptics, which led her to employment with adults and older adults with visual impairments. Armed with this dual qualification, she was subsequently invited to contribute her expertise to higher education.

Her experience in teaching ignited a passion for scientific research and evidence-based practice, leading her to pursue a master's degree in gerontology and to undertake several advanced courses in scientific research. These endeavours culminated in a doctoral study.

Leen investigates her knowledge and skills in EBP not only for knowledge dissemination within educational settings, among which the Master of Science in Occupational Therapy at KU Leuven, but also for the development of EBP tools, such as clinical guidelines. These competencies play a pivotal role in her work at WOREL and Cebam, partners of the Belgian EBP-network Evikey. Furthermore, she actively participates in the editorial board of Minerva, also a partner of Evikey.