



Research article

Health-related outcomes of structured home-based rehabilitation programs among older adults: A systematic literature review

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ARTICLE INFO

Keywords:

Aging
Health-related outcomes
Home care services
Rehabilitation nursing
Self care

ABSTRACT

The aging population reveals the need to develop self-care interventions that promote autonomy and well-being. The current systematic review aimed to assess the association between the implementation of structured home-based rehabilitation programs to promote self-care in older adults and health-related outcomes among people aged 60 years or older. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, a systematic literature review was performed. Three electronic databases (MEDLINE, CINAHL and Psychology and Behavioral Sciences Collection) were searched. Randomized experimental studies, that implemented a home-based rehabilitation program to promote self-care in older adults, and were published between 2019 and 2024, were retrieved. Data on health-related outcomes were collected. Eight studies were included; all eight studies implemented a monitored, progressive and customized rehabilitation program. The studies varied greatly regarding the sample size, the duration of the intervention, the rehabilitation program implemented and the instruments used. The implementation of structured home-based rehabilitation programs may contribute to improve physical and psychological health-related outcomes among older adults by promoting functional capacity, self-care and knowledge.

1. Introduction

The increase in average life expectancy at birth, due to the decrease in the birth rate and mortality rate, conducted to an increase in the older adult population [1]. The World Health Organization (WHO) has identified the need to address the phenomenon of aging societies and address this change in demographics by implementing health policies at the societal level that promote healthy aging and meet the needs of the population [2].

Healthy aging is defined as the process of developing and maintaining the functional capacity that allows for well-being in old age [3,4]. Thus, this concept is defined not only by aging without the presence of disease but also by the implementation of health

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promotion strategies, the adoption of healthy lifestyle habits and disease prevention to avoid or delay disease onset [5]. However, what has been observed in most cases is not healthy aging but an increase in the prevalence of chronic and/or persistent diseases, which can lead to functional disability [6]. In 2020, on average, 36 % of people aged 65 years or older in European Union countries reported having at least two chronic diseases [7]. In the same year, in Portugal, approximately 70 % of people aged 65 years or older had a chronic disease or persistent health problem [8], emphasizing the need for intervention in this population.

A decrease in the physical and mental capacity of older adults has a negative impact on societies, and it is important to invest in promoting functional capacity to enhance the abilities of this population [9–11]. In this context, expenditures on the functional training of older adults should be understood not as an added cost but as an investment, thus promoting the maximum capacity of older adults, their well-being, their autonomy and their dignity throughout life [2].

With the aging of the population and the increase in the prevalence of chronic diseases, health education should be provided through self-care interventions based on functioning and the promotion of people's autonomy and well-being [12–15]. In this context, Fonseca (2013) developed a model of self-care for older adults based on three fundamental concepts: functional capacity, self-care and knowledge [16,17]. Functioning can be defined as a dynamic interaction between environmental or personal factors [18,19] and the health conditions allowing people to perform activities of daily living (ADLs) and instrumental activities of daily living (IADLs), which are essential for self-care [20]. Additionally, learning, communication, mental functions and the application of knowledge are directly associated with the ability of individuals to meet their self-care needs [17,21].

Health professionals, especially rehabilitation nurse specialists, play a key role in the assessment of self-care deficits, the determination of goals appropriate for an individual and the involvement of an individual in their rehabilitation plan [20]. Systematic and intentional interventions comprising these components maximize individuals' potential and empower them in performing self-care, promoting their autonomy and quality of life [12,22]. Quality of life is a complex and multifactorial concept associated with autonomy and independence in the performance of ADLs and is associated with the ability to age safely and independently at home and in the community, a concept known as aging in place [23]. In this context, the implementation of exercise training programs is crucial, as they may improve the quality of life of older people and guarantee healthy aging [24]. Additionally, socioenvironmental and contextual factors related to a greater quality of life, such as higher income and education levels, lead to greater physical activity in older people, with training on healthy lifestyle habits being one of the axes through which such habits are developed [25]. Thus, health teams must be able to mobilize adequate resources in the community to meet the needs of older people and their family members and/or caregivers, with the objective of maximizing the potential for rehabilitation, recovery, education and reintegration into the community [17,26]. This will allow for a better provision of care while promoting equity in health and more satisfactory health outcomes for each individual [27].

The implementation of structured rehabilitation programs, defined as those supported by the literature, based on well-established objectives, metrics and outcomes and provided by health professionals with work experience in rehabilitation [28,29] may contribute to more effective therapeutic planning, optimizing the use of resources in general. In fact, the literature seems to support that structured home-based rehabilitation programs can enhance self-care in older adults, leading to increased independence and autonomy in their daily lives [30–33]. In fact, previous studies have confirmed the effectiveness of exercise training for nursing home residents [34,35]. However, systematic reviews directly comparing the main health findings of implementing these home-based programs are lacking. Such systematic knowledge can play a crucial role in informing and enriching the development of sustainable and effective healthcare guidelines, centered on each person, to promote self-care empowerment for older adults. Additionally, the evidence provided would enrich clinical procedures, enhancing health management in the context of healthy aging.

The present systematic review aimed to contribute to the current empirical knowledge in the field of healthy aging by assessing the association between the implementation of structured home-based rehabilitation programs to promote self-care in older adults and health-related outcomes among people aged 60 years or older.

2. Methodology

This systematic literature review was performed according to the Preferred Reporting Items of Systematic Reviews and Meta-Analysis (PRISMA) [36] and registered in PROSPERO (the international database of systematic review protocols) under registration number CRD42023407831 [37]. Evidence was aggregated to obtain answers regarding the preestablished eligibility criteria and to answer the research question initially posed using explicit, reproducible and systematic methods, which contributed to reducing the risk of bias [38].

The research question was based on the Joanna Briggs Institute (JBI) guidelines and the PICO(D) mnemonic (P – Participants; I – Intervention; C – Comparison; O – Outcomes; D – Study Design), and inclusion and exclusion criteria were used to guide the selection of studies [39,40]. Thus, the definitions for this study were as follows: P – people aged 60 years or older; I – structured rehabilitation program; C – at-home/usual care; O – health-related outcomes; and D – randomized-controlled trial. According to these guidelines, we established the following question: What are the health-related outcomes of structured rehabilitation programs that aim to promote self-care performed at home in people aged 60 years and older compared to usual care?

This research was conducted on the EBSCO Host Research Databases platform in August 2022, and the following databases were selected: MEDLINE, the Cumulated Index to Nursing and Allied Health Literature (CINAHL), and the Psychology and Behavioral Sciences Collection. The following Medical Subject Headings (MeSH) were used: [nursing], [nursing interventions], [nursing care], [rehabilitation], [home care], [outcomes], and [randomized controlled trials]; additionally, the Boolean operators «AND» and «OR» were used to form the following search expression: ([nursing] OR [nursing intervention] OR [nursing care]) AND ([rehabilitation] OR [home care]) AND (outcomes) AND (randomized controlled trials). All articles published between 2019 and 2024 were eligible.

According to the WHO recommendations, an older adult was defined as a person who was over 60 years of age [3]. Home-based rehabilitation programs were defined as alternatives to hospital-based therapy rehabilitation programs and included home aid, home nursing, social support, home-based primary care (multidisciplinary physician groups), and novel models/methods (e.g., “transitional rehabilitation” or telemedicine) [41].

Studies that met the criteria defined for each element of the PICO(D) framework and that reported data on health-related outcomes as a result of the implementation of the rehabilitation program were included (Table 1). The following inclusion criteria were used: (1) had a target population with a mean age of 60 years or older; (2) were randomized experimental studies; (3) implemented a rehabilitation program to promote self-care in a community/household context; (4) were published between 2019 and 2022; and (5) were written in English, French, Spanish or Portuguese. The exclusion criteria were as follows: (1) nonexperimental randomized studies (observational studies); (2) nonoriginal studies (reviews, editorials, study protocols, scale validations, conference proceedings and abstracts, meta-analyses, reports, guidelines and gray literature, and journal articles); (3) studies focusing on adults with a mean age below 60 years; (4) studies that did not describe the implementation of home-base rehabilitation program interventions; and (5) studies describing home-base rehabilitation programs that did not report data on health benefits due to the implementation of the interventions.

The articles underwent an assessment of their methodological quality and level of evidence using the JBI Critical Appraisal Tools, and more than 70 % of the proposed quality criteria were met [39,40]. The JBI checklist score was determined based on adherence to each quality criterion and ranged from 0 (poorly conducted randomized controlled trial) to 13 (well-conducted randomized controlled trial). Two reviewers independently assessed the methodological quality of the studies included, with any disagreements being resolved through discussion. The sum of the points was classified as the percentage of the items present [42], with a score of 70–79 % indicating medium-high quality, a score of 80–90 % high quality, and a score greater than 90 % excellent quality.

Two evaluators (CG and CF) independently reviewed all papers, first based on the title and abstract and then considering the full text. Publications lacking sufficient details in the title and abstract to determine if they met the inclusion/exclusion criteria underwent a full-text assessment. In cases where consensus was not achieved, a third evaluator (EA) intervened to resolve the disagreement.

A data extraction sheet was developed and filled by two raters (CG and EA), working independently. Information was gathered to describe the studies regarding information on the authors and year of publication, the country where the study was conducted, the period and context of data collection, the participants and total sample size, the intervention program implemented, and the instruments used to evaluate the health outcomes of the interventions. Events resulting from the intervention implemented were considered as health-related outcomes [43]. These outcomes are a multidimensional concept and can be assessed through clinical measures (physical examination, laboratory testing, imaging), self-reports, or observations (such as gait or movement fluctuations observed by a healthcare provider or caregiver) made by the patient or healthcare professionals. Based on Fonseca’s self-care model, the specific interventions of each rehabilitation program were grouped into three dimensions: functional capacity, self-care, and knowledge capacity [16,17]. However, due to the overlap of interventions regarding functional capacity and self-care, these two dimensions were grouped for the analysis of the results as it is not possible to perform self-care without functional capacity. Data on health-related outcomes whose association with the intervention were tested were extracted and, for those with a significant statistical association with the interventions, the directions of the associations were recorded.

3. Results

The flowchart shown in Fig. 1 presents the results of the study and the screening process of this systematic review in a detailed and systematic manner. The search yielded a total of 1039 articles, and after removing duplicate results, 916 articles were reviewed. Out of these, 887 articles were excluded, mainly due to their lack of relevance to the theme of the study. Among the 29 articles selected for full-text analysis, 7 were excluded because they were not randomized controlled trials, 9 were excluded because they were not related to the research topic and another 5 was excluded because they were not conducted in the community/at home. Thus, a sum of 8 articles were included in the present systematic review [44–51].

Table 2 presents the main characteristics of the included studies. The studies were conducted in Asian (n = 6) and European (n = 2) countries, and the data collection took place between 2014 and 2020, ranging from 3 months [49] to 5 years [48]. The duration of the

Table 1
Eligibility criteria according to the PICO(D) strategy [36].

PICO(D)	Inclusion Criteria	Exclusion Criteria
P Population	(1) Population with a mean age of 60 years or older (2) Community/household setting	(1) Studies with patients with a mean age below 60 years (2) Studies focusing on informal/formal caregivers (3) Studies conducted in an institutional setting
I Intervention	(1) Rehabilitation programs to promote self-care	(1) Rehabilitation programs not addressing self-care promotion
C Comparison	(1) Intervention with a control group receiving standard care, no intervention, or placebo	(1) Intervention without a control group
O Outcome	(1) Health-related outcomes	(1) Studies that did not report data on health-related outcomes
D Study Design	(1) Randomized controlled trials	(1) Observational studies (2) Nonoriginal studies (reviews, meta-analyses, study protocols, commentary, editorials, journal articles, conference proceedings and abstracts, reports, guidelines and gray literature and scale validations)

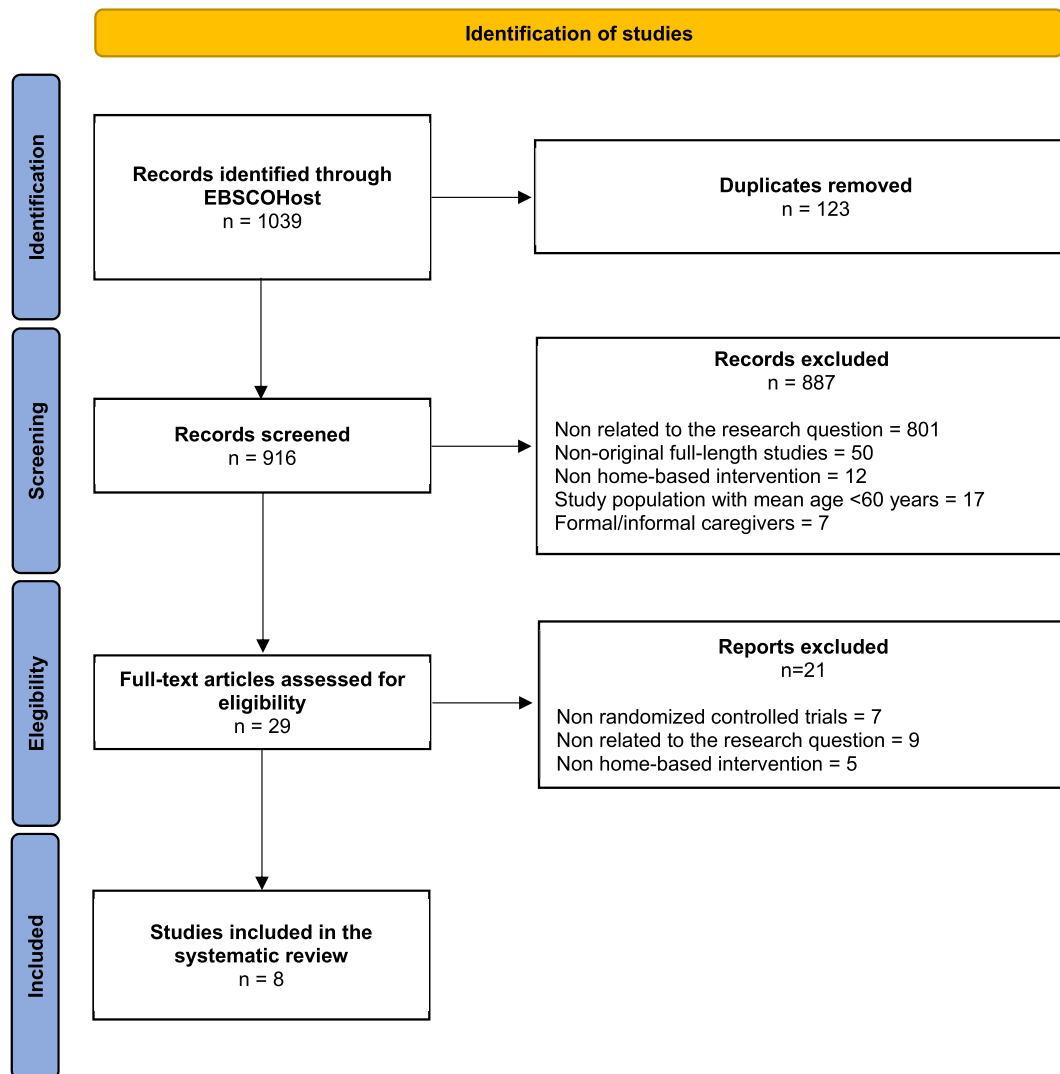


Fig. 1. Systematic literature review flowchart.

follow-up period varied between 3 and 24 months. All studies implemented supervised, personalized and progressive home rehabilitation programs according to the evolution of each person, his or her ability and/or the involvement of caregivers. Intervention programs included home visits by a nurse, physiotherapist or multidisciplinary team, with three studies adding motivational telephone calls as a way to encourage the participants to maintain their designated intervention schedules [44,45,50]. Only one study resorted to telerehabilitation strategies or apps [49]. The sample sizes varied between 60 (30 participants in the intervention group and 30 participants in the control group) and 319 (239 participants, divided into 3 intervention groups, and 80 participants in the control group) participants. The samples included participants with a mean age of more than 60 years who had a history of falls [45], general frailty [44], stroke [46], coronary artery disease [47] hip fracture [48], prostatectomy [50], cognitive impairment [51] or social isolation [49]. Most studies implemented a structured rehabilitation program rather than usual care. Only one study evaluated three different interventions (physical exercise, nutrition, and exercise with nutrition) compared to usual care [44], and another compared two different interventions (Baduanjin exercise training and brisk walking training) compared to usual care [51]. The instruments used to evaluate the effectiveness of the interventions showed significant variability, and the Short Form 36 Health Survey (SF-36) was the only scale used repeatedly in three studies [45,46,51].

Table 3 describes the specific interventions of the structured home rehabilitation programs that promoted self-care according to the dimensions of the Fonseca self-care model [16,17]. The dimensions included functional capacity and self-care (n = 13) or knowledge capacity (n = 11). The interventions focused on several areas, including motor, cardiorespiratory, neurological, cognitive, nutritional, emotional and social functions.

Table 4 presents the health-related results obtained after the implementation of the structured rehabilitation programs in the studies. None of the studies reported a negative association in the evaluation of the variables presented. In the functional capacity and

Table 2
Main characteristics of the included studies (n = 8).

Publication	Country	Period of data collection	Setting	Participants and sample	Intervention program	Health-related outcome assessment
Hsieh et al., 2019 [44]	Taiwan	October 2015–June 2017 (6-month follow-up)	Home-based	Prefrail or frail adults aged ≥ 65 years. Intervention group: Exercise group (n = 79); Nutrition (n = 83); Exercise plus nutrition (n = 77) Control group (n = 80)	Exercise intervention, nutrition intervention or an exercise intervention plus a nutrition intervention vs. regular medical care	- GDS - SF-12 MCS - Handgrip strength - 10MWT - Back Scratch Test - Chair Sit and Reach Test - Standing heel-rise test
Bjerk et al., 2020 [45]	Norway	February 2016–September 2017 (6-month follow-up)	Home-based	Adults aged ≥ 67 years, who experienced at least one fall during the past 12 months and were able to walk with or without a walking aid. Intervention group (n = 77) Control group (n = 78)	Fall prevention exercise program vs. usual care	- SF-36 - BBS - 4MWT - STS - FES-I
Deng et al., 2020 [46]	China	October 2018–March 2019 (4- and 8-week follow-up)	Home-based	People with acute cerebral hemorrhage or cerebral infarction (mean age: 61.4 years). Intervention group (n = 49) Control group (n = 49)	Rehabilitation at home with a multidisciplinary team vs. secondary stroke prevention	- SF-36 - Modified Barthel Index - CSI
Tok Yildiz & Kaşikçi 2020 [47]	Turkey	January 2015–February 2017 (6-month follow-up)	Home-based	Patients with coronary artery disease (average age ≥ 60 years). Intervention group (n = 51) Control group (n = 51)	Training program based on Orem's self-care deficit nursing theory vs. usual care	- Self-Care Agency Scale - MacNew - 15D
Soukkio et al., 2021 [48]	Finland	December 2014–December 2019 (24-month follow-up)	Home-based	Patients aged ≥ 60 years with operated hip fracture. Intervention group (n = 61) Control group (n = 60)	Supervised physical exercise twice per week vs. usual care	- Number of days lived at home - Mortality - END
Wong et al., 2021 [49]	China	May 2020–July 2020 (3-month follow-up)	Home-based	People aged ≥ 60 years who went outside less than once per week in the previous 6 months. Intervention group (n = 34) Control group (n = 34)	Telecare (weekly case management) vs. monthly social telephone calls	- General Self-Efficacy Scale - Barthel Index - Lawton instrumental activities of daily living scale - SF-12 - Geriatric Depression Scale
Gezginci et al., 2022 [50]	Turkey	October 2019–March 2020 (3-month follow-up)	Home-based	Patients undergoing open radical prostatectomy (average age ≥ 60 years). Intervention group (n = 30) Control group (n = 30)	Perioperative pelvic floor muscle training vs. usual care	- ICIQ-SF
Xia et al., 2022 [51]	China	May 2015–October 2017 (6-month follow-up)	Home-based	People aged ≥ 60 years with mild cognitive impairment Baduanjin exercise (n = 45) Brisk walking group (n = 45) Control group (n = 45)	Baduanjin exercise training vs. brisk walking training vs. 3 sessions of health education programs	- MoCA - SF-36

Notes: 4MWT, 4-m walking test; 10MWT, 10-m walking test; 15D, Quality of Life Questionnaire; BBS, Berg Balance Scale; CSI, Caregiver Strain Index; FES-I, Falls Efficacy Scale International; FIM, Functional Independence Measure; GDS, Geriatric Depression Scale; ICIQ-SF, International Consultation on Incontinence Questionnaire; MacNew, MacNew Heart Disease Health-Related Quality of Life Questionnaire; MoCA, Montreal Cognitive Assessment scale; SF-12 MCS, 12-Item Short Form Health Survey mental component summary; SF-36, Short Form 36 Health Survey; STS, 30-s sit-to-stand.

self-care dimension, all studies reported positive associations between the health outcomes assessed and the implementation of the rehabilitation program. Thus, improvements in physical performance [44–48] that promoted independence, mobility, balance, strength and flexibility in older people and the acquisition of self-care skills [47] were consistently reported as a result of the interventions implemented compared to the provision of usual care.

Data on interventions that assessed the association of health outcomes with the knowledge capacity dimension most frequently revealed inconsistent results across studies. Although the studies showed that the implementation of rehabilitation programs was associated with a better perceived quality of life [44–47,49,50], some studies lack statistical evidence on this topic. For example, the study by Bjerk et al. [45] reported a significant positive association of the implemented rehabilitation programs with the physical

Table 3
Promoting self-care interventions in structured home-based rehabilitation programs.

Functional capacity and self-care
Strength and muscle endurance training exercises [44–48,51]
Balance and flexibility training exercises [44–48,51]
Mobility training exercises [44–48,51]
Gait training [44–46,46]
Manual gripping strength training exercises [44]
Awareness and creation of automatisms of the movement associated with rhythm [45]
Techniques to improve visuospatial awareness of joint amplitude, movement quality and body posture [45]
Functional reeducation exercises and self-care and ADL training [45–50]
Maintenance of the appropriate breathing pattern for exercise [47]
Guidance in completing the task/demonstration of the task [45]
Cognitive communication strategies [45,47]
Maintaining proper weight [44]
Appropriate food intake [44,47]
Knowledge Capacity
Provision of educational material [44,45,47,49–51][]
Provision of planning documents and registration in sessions [44,45,47]
Education about self-management of the disease [46,47,50][]
Education about therapeutic regime management [46,47]
Education about the importance of adequate nutrition [44,47,48,51][,]
Education about the importance of adequate water intake [47]
Education about constipation [47]
Education about physical activity [46–48,51][]
Education on safety in physical exercise [45,47]
Education about risks associated with falls [45]
Education about the importance of socialization [47]

Table 4
Health-related outcomes of structured home-based rehabilitation programs.

	Positive association	Negative association	Not associated
Functional capacity and self-care			
Functional independence	✓✓✓ [46–48]	–	–
Functional mobility	✓✓ [47,48]	–	–
Equilibrium	✓ [45]	–	–
Handgrip strength	✓ [44]	–	–
Strength of limbs and lower extremities	✓✓ [44,45]	–	–
Flexibility	✓ [44]	–	–
Walking speed	✓✓ [44,45]	–	–
Reduction in the risk of falls	✓ [45]	–	–
Self-care skills	✓ [47]	–	–
Knowledge capacity			
Health-related quality of life	✓✓✓✓✓✓ [44–47 ^{ab} ,49–51]	–	✓✓ [45] ^c [44], ^d
Depressive symptoms	–	–	✓ [49]
Cognitive function	✓ [51]	–	–
Adoption of healthy lifestyles	✓✓✓ [44,45,47]	–	–
Disease self-management	✓✓ [] [47,50]	–	–
Self-efficacy	✓ [49]	–	–
Decreased level of frailty	✓ [44]	–	–
Decreased burden of disease	✓ [46] ^e	–	✓ [46] ^f

^a SF-36 physical component.

^b SF-12 MCS (nutritional intervention group).

^c SF-36 mental component.

^d SF-12 MCS (exercise intervention and exercise with nutrition groups).

^e 8-weeks follow-up.

^f 4-weeks follow-up.

component of quality of life but not with the mental component. In the study by Hsieh et al. [44], a statistically significant association with the mental component of quality of life was described only for the nutritional intervention group compared to the control group. The study by Deng et al. [46] reported a simultaneous decrease in disease *burden* after eight weeks of follow-up but not after four weeks. The positive effect of the interventions was significantly associated with the adoption of healthy lifestyles, disease self-management, cognitive function, self-efficacy, and a decrease in the frailty level of older adults [44,45,47,49,51].

4. Discussion

This systematic review of the literature found the majority of the health-related outcomes assessed were positively associated with the implementation of structured rehabilitation programs provided at home to enhance self-care among older adults in terms of functional capacity, self-care and knowledge capacity. None of the studies reported a negative association between the health-related variables and the implementation of rehabilitation programs. The findings underscore the diverse array of interventions implemented, along with the exploration of a broad spectrum of associated health outcomes.

All studies implemented a systematic, monitored, gradual, and customized rehabilitation program based on the current skills and progress of each person and/or his or her caregivers. Such attributes appear to contribute to the achievement of positive health outcomes, namely, the maintenance of functionality and independence in older adults, as previously reported [52,53]. The literature shows that the involvement of older adults and caregivers in rehabilitation programs enhances the understanding of their personal preferences and abilities [54], encouraging the adoption of healthy lifestyle habits and actively participate in their rehabilitation [21].

The interventions implemented essentially aimed to promote motor, cardiorespiratory, cognitive, nutritional, emotional and social functions by providing training in performing ADLs for older adults [10,23]. According to the previous literature, this training contributes to the empowerment of older adults, promoting their autonomy and well-being [55,56]. In this context, nurses play a key role in providing adequate support, instruction and/or guidance to help each person make the best health choices [21]. Previous studies emphasize the need to include an educational component and a physical component in healthy aging programs in the community, utilizing health education, health literacy, physical exercise and cognitive training strategies [52,57].

Functionality plays a key role in the aging process, as it involves a dynamic interaction between health conditions and environmental and personal factors. Such interaction ultimately determines the level of dependence or independence of each person [18,19]. The positive health benefits described in this review, namely, the promotion of independence, mobility, balance, strength and flexibility; the adoption of healthy lifestyle habits; disease self-management; and the reduction of the frailty level of older adults, address the recommendations of national and international studies associated with active and healthy aging [2,58,59] that advocate for the implementation of strategies that allow older people to remain at home and maintain their independence while having access to clinical and social support whenever necessary [60]. Additionally, a previous study in this field revealed that a multicomponent exercise program that is feasible, simple to implement and easy to adjust to the different needs of participants can improve overall physical functioning in older adults [35], although there is uncertainty about the effect of exercise on fall prevention [61].

The literature argues that older people living in their own homes have better functional and cognitive profiles than those who are institutionalized, showing a lower risk of physical and social deficits, a lower probability of developing mental disorders and a better quality of life [62,63]. In the present review, data on quality of life revealed inconsistent results between studies. Although the majority of the articles supported a positive association between the interventions and perceived quality of life in older adults, for some dimensions, no evidence was found regarding this conclusion. The diverse evaluation of quality of life, especially in terms of the heterogeneity of the instruments used, hinders the comparability of findings across the studies included. "Consequently, the performance of a meta-analysis of the effect of structured home rehabilitation programs on the quality of life of older people is also limited, and this may partially explain the contradictory results among the studies. Additionally, the studies used generic instruments to assess well-being, health-related quality of life and general health as indicators of quality of life. Thus, the literature in this field might overlook specific dimensions of older adults' quality of life that may not be covered by instruments designed for the general population or those that assess other constructs than quality of life. Therefore, the extensive utilization of reliable and valid instruments specifically designed and developed to evaluate the quality of life of older adults may contribute to understanding their perceptions of quality of life and help researchers and health professionals to understand the mechanisms behind the contradictory findings.

One of the included studies reported a significant decrease in the perception of disease burden after eight weeks of follow-up but not after four weeks [46]. This discrepancy is probably due to the follow-up time of the studies, which underscores the importance of ensuring that the intervention and follow-up period of older participants is adequate for the acquisition of skills; conditions for the establishment of a therapeutic relationship, including safe and reliable relationships between nurses and older adults and/or their caregivers, should also be ensured to enhance adherence to rehabilitation programs, promote participants' training and contribute to changing habits and behavior [21,64]. Thus, it is crucial to perform longitudinal research studies when possible to evaluate not only the achievement but also the maintenance of health benefits not only at short, but also at medium and long term.

4.1. Strengths and limitations

Despite the innovativeness of this systematic review, some limitations should be acknowledged. Significant methodological heterogeneity was observed among the studies, especially regarding the sample size, the data collection period and duration of the intervention, the participants selection criteria, the rehabilitation program implemented, the diversity of health outcomes assessed ($n = 17$) and the variety of scales used ($n = 25$). These facts, together with the low number of health-related variables assessed in more than one study (8/17) and the recurrent use of different instruments to collect data on the outcomes assessed in more than one study, hinder the performance of a meta-analysis. Specifically, regarding the duration of the intervention, the variability described hampers the direct comparison of results regarding the duration of the intervention, preventing any conclusion on the optimal duration of a program. Nevertheless, the methodological robustness of the current systematic review regarding the databases selection, the thoughtful search strategy and the objective inclusion and exclusion criteria definition ensure the adequate collection of the largest number of studies within the theme. Although all intervention programs included home visits or motivational telephone calls performed by nurses, physiotherapists or a multidisciplinary team, the specific nursing role in each program was not described, hampering

the assessment of the association between particular nursing roles and health-related outcomes in older people. Also, the lack of data stratified according to age prevents the analysis of health-related outcomes by age group. Such an analysis could enhance comprehension on the specific benefits of each intervention throughout the life course and should be considered in future studies. Finally, to access the most up-to-date data on this topic the literature search was restricted to papers published between 2019 and 2024. Previous literature suggests that the conclusions of most systematic reviews might be valid for nearly five years [65], advocating that systematic literature reviews should consider evidence from this time frames [66], in order to reflect the current knowledge in the field.

5. Conclusion

With the aging of the population and the increase in average life expectancy, the needs of the older population have changed [2]. Thus, there is an urgent need for a paradigm shift in the care provided to older individuals to promote their autonomy and independence through a care process that meets the objectives of reintegration, rehabilitation, the maintenance of autonomy and independence or the delay of their loss, and the promotion of well-being and quality of life [67]. Given the reliance on health professionals as the main providers of adequate support, instructions and/or guidance during rehabilitation [21], nurses may play a key role in improving self-care at home through the promotion of health education, health literacy, physical exercise and cognitive training [52, 57].

This review supports the conclusion that structured rehabilitation programs performed at home to promote self-care in older adults enhance physical and mental health outcomes by improving functional capacity, self-care and knowledge. This knowledge is crucial for developing and implementing person-centered care policies and practices, namely, that promote health coproduction, shared decision-making and care provision during rehabilitation, contributing to empowering older adults in performing self-care.

6. Future directions

The main results of this systematic review emphasize the importance of performing qualitative and mixed-method studies in different countries and cultures to assess health-related outcomes in the short, medium and long term after the implementation of personalized home interventions using validated scales for this population, and accepted internationally. Such an approach can optimize the involvement of older adults, informal caregivers and health and social professionals in maintaining and improving the general well-being of older individuals through the promotion of self-care.

Funding

This research was funded by Fundo Europeu de Desenvolvimento Regional (FEDER) through the Program Interreg V-A España-Portugal (POCTEP) 2014–2020, Instituto Internacional de Investigação e Inovação em Envelhecimento–Capitaliza “0786_CAP4-ie_4_P”, and by national funds through the Foundation for Science and Technology (UIDP/04923/2020).

Institutional review board statement

“Not applicable”. This systematic literature review aggregated the results of primary studies, so there was no involvement of people, the public or animals.

Informed consent statement

“Not applicable.” There was no involvement of people, the public or animals in this study.

Data availability statement

The will be available from Elisabete Alves (elisabete.alves@uevora.pt) upon reasonable request.

CRedit authorship contribution statement

Elisabete Alves: Writing – review & editing, Writing – original draft, Validation, Supervision, Methodology, Formal analysis, Conceptualization. **Cátia Gonçalves:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis. **Henrique Oliveira:** Writing – review & editing, Investigation, Conceptualization. **Rita Ribeiro:** Writing – review & editing, Formal analysis. **César Fonseca:** Writing – review & editing, Validation, Supervision, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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