

Ageing in place and dementia: A scoping review identifying preconditions and Gerontechnology participation domains

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Abstract

Background: Ageing in place (AiP) is a concept whereby older people can continue to live in their own homes as they age despite changes to their health and mobility. The term home does not refer only to living unit itself but goes beyond, such as the community, social network, and other physical spaces that a person occupies and considers as significant.

Objective: The aim of the scoping review is to identify ageing in place initiatives that can benefit people with dementia around the world and, specifically in Brazil.

Method: A scoping review as well as an expert consultation were executed to give answers to: 1. What are the ageing-in-place initiatives for people with dementia around the world? 2. What are the ageing-in-place initiatives for people with dementia in Brazil? This scoping review followed the methodological framework proposed by Arksey and O'Malley and complemented by Levac, Heather Colquhoun & Kelly K O'Brien. Included articles have to be coming from the last five years (2017-2022), published in Dutch, English, or Portuguese, and addressed the theme of ageing in place and dementia. Furthermore, all types of factors were listed and categorized to factors that appeared in each article and, if necessary, subcategorized what was found in each category. In addition, studies are categorized by applying the Gerontechnology matrix to get an overview of which participation domains are covered regarding ageing-in-place with dementia. Consultation took place online with six experts in gerontology and gerontechnology.

Results: A total of 73 articles were eligible. Most publications were published in 2019 and came from Europe and North America. No publications were found in the databases searched in African or Central and South American countries. During the process of categorizing the studies, it was possible to identify Preconditions for ageing in place and these were subdivided into seven subcategories (Health Policies for people with dementia, care policies, ageing in place policies; Usability and acceptance; Age friendly cities and spaces; Research; Development, participatory and co-design; Economy/finance/economic disadvantage/wealth; Education/training program). In addition to the category Preconditions articles could be placed in so called Main Categories. The main categories are organized and aligned with the participation domain in Gerontechnology Matrix. The consultation phase with experts was carried out to help the authors better describe and understand the study categories.

Conclusion: Although Ageing in place for dementia has been reported world-wide, it is not offered as such in Brazil. Those articles from other countries described initiatives categorized into preconditions and main categories to realize ageing in place for people with dementia.

Keywords: ageing in place, dementia, gerontechnology

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INTRODUCTION

In accordance with the Global Action Plan on the Public Health Response to Dementia 2017 - 2025 from the World Health Organization (WHO), the prediction is that by 2030 dementia affect 75 million people worldwide, 28 million more than in 2015 (WHO, 2017). Another fact to be highlighted is that most new cases occur in low- and middle-income countries where a 330% increase in cases between 2019 and 2050 is predicted, particularly in areas with low socio-demographic index (WHO 2015, Prince, Wimo, Guerchet, Ali, Wu Yutzu, Prina, 2015, Global Burden of Disease Study, 2019).

Suemoto and colleagues (2022), report in their study that a higher number of cases of dementia is observed in Latin America (LATAM). It is estimated that 4.5 million people living with dementia in LATAM of which 40% are Brazilian and, between 2019 and 2050, Brazil and LA are expected to see a 200% increase in cases, while in the US the expected increase is 100% (Global Burden of Disease Study, 2016).

Considering the progressive character of the dementia syndrome, over time people with dementia become more and more dependent to do activities, and the need for others' support increases (Thoma-Lürken, Bleijlevens, Lexis, de Witte, et al., 2018). On the other hand, studies and public policies show that the majority of people with dementia want to keep living at home, and concomitantly the importance of favoring ageing in place, quality of life, and wellbeing (Carnemolla, 2018; Thoma-Lürken et al., 2018, Brasil, 2003).

To Carnemolla (2018) *“ageing in place is a concept whereby older people can continue to live in their own homes as they age despite changes to their health and mobility”*. It is worth mentioning that the term home does not refer only to the living unit itself but goes beyond, such as the community, social network, and other physical spaces that a person occupies and considers significant (Oladinrin et al., 2021, Wiles et al., 2012).

In addition, the World Health Organization (2015, p. 7) adds that *“to enable successful ageing in place, under the broader goal of maximizing functional ability and person–environment fit, we collectively need to innovate in the following areas: People – involving and training the people to support and care for older people in new community- and home-based models of care and support; Person-centred services – integrating and improving health and social care services that older people can access; Places – creating age-friendly environments in which older people can evolve safely; Products – adapting, creating and assess-*

ing technology solutions to support older people; Policies – implementing policies to scale and facilitate change.”

However, for older people with dementia to age in place, it is necessary to use different initiatives that support this process and consider some aspects and challenges such as cognitive decline, behavioral changes and emotional challenges, social isolation, mobility, and physical difficulties (Mayo et al., 2021).

With regard to Gerontechnology, ageing in place encompasses several domains of application, especially when we talk about the Gerontechnology Matrix. For Kort et al. (2014, p.328) *“Gerontechnology Matrix, which is based on Maslow’s Hierarchy of Needs, provides a framework to guide researchers, designers, and engineers in their effort to seek solutions that support older adults to age graciously”*. In this research, the focus will be on the Gerontechnology Impact Matrix which is composed of five life domains and four objectives directed to ageing (life domains: health and self-esteem; housing and daily living; mobility and transport; communication and governance; work and leisure/ Goals: enrichment and satisfaction; prevention and engagement; compensation and assistance; care support and care organization) (Bouma et al., 2009; Kort, 2022).

This scoping review is based on the hypothesis that ageing in place initiatives can help people with dementia, their family, and caregivers, but factors such as income, country of residence, access to technology, digital literacy, community, and social support can influence it. The aim of the scoping review is to identify ageing in place initiatives that can benefit people with dementia around the world and, specifically in Brazil.

METHODOLOGY

This scoping review followed the methodological framework proposed by Arksey and O’Malley (2005) and complemented by Levac, Heather Colquhoun & Kelly K O’Brien (2010), composed of six stages:

- Stage 1 – identifying the research question;
- Stage 2 – identifying relevant studies;
- Stage 3 – study selection;
- Stage 4 – charting the data;
- Stage 5 – collating, summarizing, and reporting the results;
- Stage 6 – consultation (optional)

For greater research rigor we have chosen to follow the most up-to-date guidelines from the JBI methodology for scoping reviews (Peters et al., 2020) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) extension for scoping reviews (Tricco et al., 2018).

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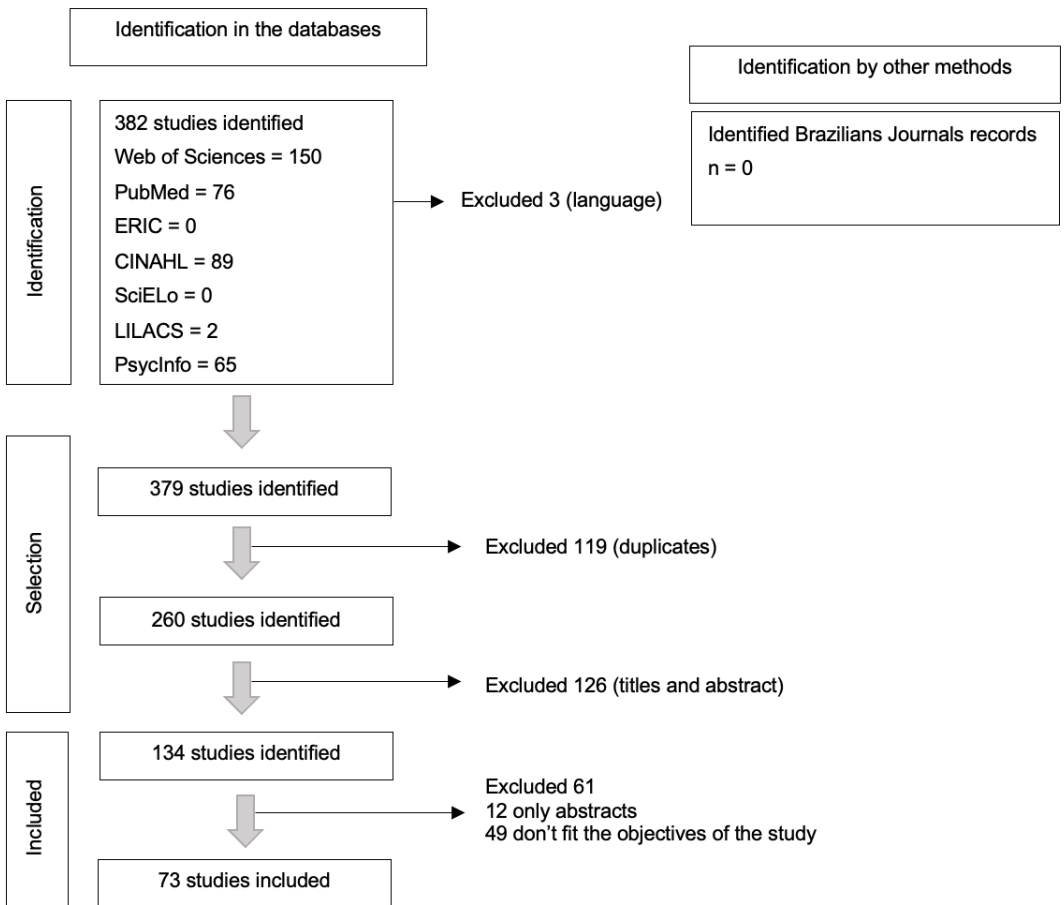


Figure 1. Flowchart of study identification, selection, and inclusion

To develop the research questions, the PCC strategy, which means Population, Concept, and Context, was used. The research questions are:

1. What are the ageing-in-place initiatives for people with dementia around the world?
2. What are the ageing-in-place initiatives for people with dementia in Brazil?

The searches were executed in seven different databases - Web of Science, PubMed, Education Resources Information Center (ERIC), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scientific Electronic Library (SciELO), Latin American and Caribbean Health Sciences Literature (LILACS), PsycInfo, between May and June of 2022. Two searches were conducted between the databases using the descriptors and Boolean operator: 1. "ageing in place" AND "dementia"; 2. "aging in place" AND "dementia".

Specific Brazilian journals directed to the older people population were also consulted (Revista Brasileira de Geriatria e Gerontologia, Kairós Gerontologia, and Estudos Interdisciplinares sobre o Envelhecimento). These searches were carried out

using the terms "ageing in place" and "dementia"; "ageing in place" and "dementia"; "envelhecer no lugar" AND "demência". The decision to conduct more comprehensive research is because many journals in Brazil are not indexed in databases.

Included articles have to be coming from the last five years (2017-2022), published in Dutch, English, or Portuguese (languages the authors speak), and that addressed the theme of ageing in place and dementia. All kinds of published articles were included, including quantitative, qualitative, and mixed-methods study designs. The studies may or may not be published in scientific journals but are available in their full version. The authors of the articles were contacted to request missing or additional data as needed.

Study/source of evidence selection

All records generated by this search, according to the complete search strategy developed, were exported to the Microsoft Excel 2016 and Zotero programs. Before the categorization of the studies, a brainstorming session about ageing in place was held to help define the categories proposed in this study.

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Table 1. Subcategories and references related to the Pre-conditions of Ageing in Place initiatives for dementia

Subcategories	Quantity	References
Health Policies for people with dementia, care policies, ageing in place policies; relates to the critical life transitions and ageing in general to understand how they conceptualize and capitalize the involvement of place in critical life transitions and the implementation of a home safety toolkit (HST) in United States for Veterans living with dementia.	2	Hebert et al., 2020 Urbaniak & Walsh, 2021
Usability and acceptance; concern the acceptance of technology in the perception of older persons, caregivers, family members, and professionals.	4	van Boekel et al., 2019 Jiancaro et al., 2017 Holthe et al., 2018 Guisado-Fernandez et al., 2019
Age friendly cities and spaces; concerns cities that enable older people to live independently, and actively and offers opportunities for social and civil participation.	2	McLaughlan et al., 2018 van Hoof et al., 2018
Research related to how to involve people with dementia when carrying out projects in ageing in place and dementia	1	Kort et al., 2019
Development, participatory and co-design; is placed as a separate subcategory in the Preconditions because it refers to the participation of older people in the initiatives that precede the development of products or solutions.	3	Tsertsidis, 2021 Thoma-Lürken et al., 2018 Morrissey et al., 2017
Economy/finance/economic disadvantage/wealth; concerns the cost of technology and the different conditions of access and the possible existence of economic and social disparities	3	Wagner, 2021 Guo et al., 2019 Czarnuch et al., 2019
Education/training program; comprises education support tool for family caregivers facilitate caregivers' self-reflection of their caregiver experience, identify education priorities and preferences and result in a recommendation of an evidence-based caregiver education program and a dementia-specific educational staff training program	2	Guariglia, 2019 Samarin, 2018

In the second step, eight experts in the Gerontechnology field, most of them Brazilians (six), read the articles in their entirety, reported whether they agreed or disagreed with the author's pre-categorization, and suggested new categories when they deemed it necessary. Each paper was read by two experts and if in doubt, a third expert was consulted.

A total of 382 articles were found. After the removal of duplicates, this number was reduced to 260. After the first reading of titles and abstracts, 134 articles were included. Of these, 12 articles were excluded by the experts for not having the full text and 49 for not being in accordance with the study's theme. The final sample was composed of 73 articles (Figure 1).

A charting table was constructed in an Excel table and the studies were classified based on the JBI guideline suggestions: Author(s); year of publication; title; origin/country of origin; type of study; initiative of Ageing in Place; Main results relate to the scoping review question/s; category(ies) (Peters et al., 2020).

Quantitative data are described narratively and analyzed using absolute and relative frequency, percentage, and average. To verify the factors, reviewers conducted an inductive thematic

analysis of qualitative data. Constant comparisons were used to refine emerging conceptual categories, including a search for deviant cases. Furthermore, all types of factors were listed and categorized into factors that appeared in each article and, if necessary, subcategorized what was found in each category. In addition, studies are categorized by applying the Gerontechnology impact matrix (Bouma et.al, 2009; Kort et al., 2014). The Gerontechnology impact matrix comprises a combination of four goals (Enrichment Satisfaction; Prevention Engagement; Compensation Assistance; Care support Care organization) and five life domains (Health Self-esteem; Housing Daily living; Mobility Transport; Communication Governance; Work Leisure) (Bouma et.al, 2009). This was done to get a better overview of which participation domains are the most or less covered regarding the topic of ageing-in-place with dementia.

Finally, at Stage 6, a group Consultation took place online with six experts in gerontology and gerontechnology. The consultation began with a presentation of its objectives, followed by a presentation of the results already achieved with the project. The experts were asked about their agreement or disagreement with the categories delimited in the study, their descriptions, using the Gerontechnology matrix and, finally, they

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Table 2. Categories and subcategories based on Gerontechnology Matrix, the number in brackets shows the number of articles while the symbol refers to the articles identified to a subcategory.

Gerontechnology matrix	Categories	References	
Domains			
Life Domains	Health & self-esteem	Care <ul style="list-style-type: none"> Interventions <ul style="list-style-type: none"> Music sessions (2) * Use of AT (not connected to a home network) (1) # Home care (6) - 	* Elliott & Gardner, 2018 * Elliott et al., 2020 # Gibson, G, Dickinson, C, Brittain, K, Robinson, L, 2019 - Sandberg et al., 2019 - Köhler et al., 2021 - Luker et al., 2019 - Olsen et al., 2021 - Mazurek et al., 2019 - Smith et al., 2022
	Housing & Daily Living	Home environment <ul style="list-style-type: none"> Active and Assisted Living (AAL) solutions (9) * Smart Homes (1) # Home design (1) - Sustainable and affordable housing (1) + 	* Gettel et al., 2021 * Muchagata et al., 2020 * Malmgren Fänge et al., 2020 * Lussier et al., 2020 * Gaugler et al., 2021 * Boumpa et al., 2019 * van Hoof et al., 2018 * Procter et al., 2018 * Olsson et al., 2018 * Wrede et al., 2021 # Haidon et al., 2020 - O'Malley et al., 2017 + Boumpa et al., 2019
	Mobility & Transport	Home environment <ul style="list-style-type: none"> Infrastructure/environment (6) * Home Design (1) # Sustainable and affordable housing (1) - Neighborhood (3) +	* Soilemezi et al., 2017 * Soilemezi, Drahota, et al., 2017 * Boumpa et al., 2019 * van Hoof & Boerenfijn, 2018 * Calkins, 2018 * Smith et al., 2022 # O'Malley et al., 2017 - Boumpa et al., 2019 + Sturge et al., 2021 + Chen et al., 2022 + Guo et al., 2019
	Communication & Governance	Care <ul style="list-style-type: none"> Models of care <ul style="list-style-type: none"> Village model of care (1) * Connected Health (CH) (1) # Social network (5) - Family (2) + Caregivers <ul style="list-style-type: none"> Formal (1) • Informal (4) ♦ 	* Benbow, B, 2019 # Guisado-Fernandez et al., 2019 - Riekkola et al., 2019 - Luker et al., 2019 - McCallion & Ferretti, 2017 - Wagner, 2021 - Finlay et al., 2021 + Malmgren Fänge et al., 2020 + Wagner, 2021 • Wagner, 2021 ♦ Wagner, 2021 ♦ Suwa et al., 2021 ♦ Guisado-Fernandez et al., 2019 ♦ Mazurek et al., 2019
	Work & Leisure		

were invited to list three keywords referring to each main category of the study for the construction of word clouds. The Consultation round took place on December 6th (2022) using the Microsoft Teams platform and lasted one hour.

RESULTS

General characteristics of the included studies

An increase in publications over the years 2017 (13.7%), 2018 (19.2%) and 2019 (27.4%) is ob-

served. In the year 2020 (9.6%) there was a drop in publications, which may be related to the COVID-19 pandemic. In the year 2021 (23.3%) publications increased, almost reaching the 2019 mark. In 2022 (6.8%) since the searches ended in June of this year, the number of publications was low. The largest number of publications occurred in the year 2019 (27.4%).

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Table 2. Categories and subcategories based on Gerontechnology Matrix, the number in brackets shows the number of articles while the symbol refers to the articles identified to a subcategory. (cont.)

Gerontechnology matrix	Categories	References
Applications	Architecture & building	Digital Assistive Technologies
		<ul style="list-style-type: none"> e-Health/m-health (10) * Internet of things (IoT) (2) # Health and activity monitoring (7)
		* Collier et al., 2018 * K. Kim et al., 2017 * Sanchez et al., 2017 * Leinonen et al., 2019 * Levine et al., 2018 * Pappadà et al., 2021 * Alexandru & Ianculescu, 2017 * Zander et al., 2021 * Tsertsidis, 2021 * Astell et al., 2019 # Klemets et al., 2019 # Fattah et al., 2017 - Hackett et al., 2022 - Chimamiwa et al., 2019 - Fattah et al., 2017 - Collier et al., 2018 - K. Kim et al., 2017 - Olsson et al., 2018 - Resnick et al., 2021
Information & Communication	Digital Assistive Technologies	
	<ul style="list-style-type: none"> Everyday technology use (4) * Decision support app (4) # 	* Koo & Vizer, 2019 * K. Kim et al., 2017 * Albers et al., 2022 * Tsertsidis, 2021 # Thoma-Lürken et al., 2019 # Thoma-Lürken, Bleijlevens, Lexis, & Hamers, 2018 # Thoma-Lürken, Lexis, Bleijlevens, & Hamers, 2018 # Lindquist et al., 2021
Mechatronics & Robots	Robots	
	<ul style="list-style-type: none"> Social robot (3) * 	* J. Kim et al., 2021 * Clabaugh & Matarić, 2019 * Arthanat et al., 2020

Papers were published in 20 different countries. When categorized by continent, 39 articles were published in Europe (53.5%), 27 in North America (37.0%), 5 in Asia (6.8%), and 2 in Oceania (2.7%). No publications were found in the databases searched in African Central and South American countries.

Among the publications were found papers (87.7%), book chapters (1.4%), thesis (4.1%), trade publications (1.4%), and proceedings papers (5.4%). The materials found presented diverse methodologies, among which we can highlight Qualitative research (13.7%), Systematic reviews (9.6%), and Case studies (8.2%).

Pre-conditions to ageing in place

Preconditions for Ageing in Place were identified and these were subdivided into nine subcategories (Development, participatory, and co-design; Usability and acceptance; Age-friendly cities and initiatives; Research; Education; Economy/finance; Home care services; Health Policies; Ageing process). After the consultation round, three subcategories were updated (Education/training program; Economy/finance/economic

disadvantage/wealth; Health Policies for people with dementia, care policies, ageing in place policies) and two were deleted (Ageing process and Home care services). Finally, the category Preconditions was divided into seven subcategories which are represented in Table 1.

Main categories relevant for realizing Ageing in Place

The main categories are organized and aligned with the participation domain in Gerontechnology. Some articles were categorized into more than one category/subcategory (Table 2).

About the publications and initiatives regarding ageing in place for dementia, the majority were aimed at the Home environment category, specifically, the subcategories Active and Assisted Living (AAL) solutions and Infrastructure/environment and the Digital Assistive Technologies category, specifically the subcategories e-Health/m-health and Health and activity monitoring.

Regarding Active and Assisted Living solutions the ageing in place initiatives were: AAL focused on home monitoring systems, wearable devices,

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exergame/walking applications, care robots and digital calendars (Gettel et al., 2021); Socio-technical risk-adaptable access control model (Muchagata et al., 2020); Sensor-based technology for safety and independence in the homes to reduce the need for supervision among family members of people with dementia (home-leaving sensors, smoke and water leak sensors, door and window sensors and motion-based bed sensors and automatic lights) (Malmgren Fänge et al., 2020); sensors integrated into the home environment to monitor sleep, outing, low activity, cooking activities, and hygiene (Lussier et al., 2020); Remote Activity Monitoring (Gaugler et al., 2021); system that addresses the need of people suffering from dementia to recognize their familiars and have better interaction and collaboration (Boumpa et al., 2019); Global Positioning System (GPS) tracking devices intended to support the independent living of people with cognitive impairment (Alexandru & Ianculescu, 2017); sensor technology with individually prerecorded voice reminders as memory support (Olsson et al., 2018); Unobtrusive contactless in-home monitoring technologies that allow caregivers to remotely monitor the lifestyle, health, and safety of their care recipients (Wrede et al., 2021).

Regarding infrastructure/environment, the ageing-in-place initiatives were: the meanings of home (Soilemezi, Drahota, et al., 2017); barriers and facilitators (Soilemezi, Kallitsis, et al., 2017); system that addresses the needs of people suffering from dementia to recognize their familiars and have better interaction and collaboration (Boumpa et al., 2019); social and technological innovations that can be integrated into the retrofitting of existing real estate for older people (van Hoof, J, Boerenfijn, P, 2018); consider that the designed environment is a resource that can support functional abilities, meaningful relationships, and high quality of life for individuals living with dementia (Calkins, 2018); supported housing settings that utilized a flexible, person-centred approach with a good staffing ratio and dementia-specific training (Smith et al., 2022).

On the other hand, the initiatives related to e-Health/m-health were: Provision of Digital technologies for AiP - electronic calendars, electronic planning systems, adjustable and user-friendly mobile phones, adjustable and user-friendly mobile phone applications, electronic clocks with the option of recording personal messages (Tsertsidis, 2021); diagnosis, assessment and monitoring, maintenance of functioning, leisure and activity and caregiving and management (Astell et al., 2019); technological innovations that may improve care for older adults with mental illness and neurocognitive disorders through the measurement and assessment of physical motion

(wearable sensors) such as smart watches and Fitbits, passive motion sensors, and smart home models that incorporate both active and passive motion technologies (Collier et al., 2018); digital devices for remote monitoring and assisted living (K. Kim et al., 2017); human activity and behavior recognition in Smart Houses (Sanchez et al., 2017); Facilitators and barriers that influence the implementation of welfare technology (Zander et al., 2021); Conceptual Model for a Platform of Integrated Services based on Cloud for Home Monitoring of Seniors affected by Dementia (Alexandru & Ianculescu, 2017); monitoring and security purposes, sustaining daily life, and therapeutic interventions. The interventions for caregivers were classified as informative, psycho-education programs, psychosocial-supportive, therapeutic, and cognitive/physical training (Pappadà et al., 2021); digital health and everyday technology use (Levine et al., 2018); remote caregivers of senior citizens with an isometric view of living environment (Leinonen et al., 2019).

The initiatives related to Health and Activity monitoring were: Smartphone-based reminder application (the Smart Prompt) (Hackett et al., 2022); habit recognition solution which extracts features from data to enrich the representation of the user's habits (Chimamiwa et al., 2019); Medication compliance and implement a prototype service which could give old adults medication reminders appropriately at the right time (Fatah et al., 2017); technological innovations that may improve care for older adults with mental illness and neurocognitive disorders through the measurement and assessment of physical motion (wearable sensors) such as smart watches and Fitbits, passive motion sensors, and smart home models that incorporate both active and passive motion technologies (Collier et al., 2018); incorporating digital devices for remote monitoring and assisted living (K. Kim et al., 2017); sensor technology with individually prerecorded voice reminders as memory support (Olsson et al., 2018); MotionWatch 8 to evaluate physical activity among older adults (Resnick et al., 2021).

Consultation stage

The consultation stage concerned the experts' agreement or disagreement about the category Preconditions for Ageing in Place and almost all experts agreed with it. One expert suggested merging some categories. After discussions, it was decided to reread the articles and fit them into new categories, and only one article remained linked to this category, because it is directed to research projects only about how to involve people with dementia in testing or evaluating projects on Ageing-in-Place.

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Two experts suggested adding the following sentence to the description of the Digital assistive Technology category: digital technologies that aim to promote functionality, related to the activity and participation of the older person. Furthermore, a division between formal and informal caregivers was suggested.

The next block was about identifying the keywords by using the World Cloud application, describing a category to get an understanding of the reference frame for a category. The experts had to describe at least three words for each main category.

DISCUSSION

This scoping review focuses on identifying ageing-in-place initiatives that can benefit people with dementia around the world and, specifically, in Brazil, resulting in the findings that most of the research as described in the scientific literature describing AiP initiatives are outside Brazil. The findings showed that preconditions and main categories are relevant in realizing AiP. Preconditions were related to taking into account user perspectives (e.g., acceptance & education), how to involve users (research), infrastructure, and policy regarding AiP.

In the Netherlands, for example, there are government initiatives aimed at Living independently for longer. Thus, as long as people are relatively healthy, not have a complex care demand, they can live independently without the need for much care. But if they need care, the government will assist (Government of Netherlands, 2022). In Canada there is a document called "Thinking about Aging in Place": if you are like many Canadians, you want to age in place in your own home and community (Federal/Provincial/Territorial Ministers Responsible for Seniors, 2016). In the United States, various ageing-in-place policies are put in place in different states. The initiatives are aimed at Personal care; Household chores; Meals; Money management; and Health care (National Institute on Aging, 2017). In Sweden, for example, a government report from 1984 already indicated that it costs less to invest in ageing in place than in institutionalising the elderly. In addition to being an ideological and political idea, the concept of ageing in place is a reality in Swedish municipalities and older people in Sweden in several municipalities have started to receive some form of help or services in their homes (Henning, Åhnby & Österström, 2009).

To organize the nine main categories the gerontechnology matrix was used. This matrix is generally used to raise awareness and to educate and train novices in Gerontechnology. The ma-

trix was used though because when applied it provided a nice overview of the initiatives in AiP around the domains, moreover, the participants in the consultation workshop favored using this matrix instead of others. AiP is only been studied as such for about the last two decades. In these decades a transition did occur regarding society's view on people with dementia, namely from taking care of people with dementia towards empowering people with dementia and supporting them and their social networks so that they can take care of themselves. That is why it is not surprising that no articles could be identified in the domain of work & leisure because the focus was on the demand for care of people with dementia. Furthermore, articles describing technological solutions for AiP with dementia were from 2017 onwards and it increased every year except for the COVID-19 period.

The number of publications directed to AAL may be related to the fact that since 2008 there has been in Europe the AAL program that aims to improve the quality of life of older people, not miscarry focusing on people with dementia though, and to favor the industry in the field of technologies and innovations for healthy ageing (AAL programme, 2022). As described above policy regarding AiP is developed mainly in the western part of the world, although other parts of the world such as Asia and South America, especially Brazil are facing the ageing of the population as well. Challenges that they are facing is that policy is still lacking for AiP in general as well as for AiP with dementia. Preconditions needed to realize AiP are not present or formalized. Although a call in the chat group of the Brazilian Society for Gerontechnology resulted in identifying some initiatives for AiP with dementia, however, none of them was related to dementia. One is a project that aims to analyze the 5P model (People, Place, Products, Personalized Services, and Social Support Policies) to understand the concept of Ageing-in-place from the perception of the older person. The other initiative is a company that has been in-home care for more than 25 years and in 2010 became the first company in Brazil to offer radiological exams with digital technology performed in the home environment.

As well as publications directed at AAL, many others were related to infrastructure/environment, e-health and m-health, and Health and Activity monitoring, mostly assistive technologies such as electronic calendars, electronic, planning systems, adjustable and user-friendly mobile phones, adjustable and user-friendly mobile phone applications, electronic clocks with the option of recording personal messages, sensors, and environmental adaptations that favour ageing in place. According to Lansley, McCreadie

& Tinker (2004), environmental adaptations (environmental improvement) as well as assistive technologies favour the maintenance and independence of older people in their own homes and increase their quality of life. In their study, the authors present three categories of assistive technology and adaptations that can be associated with the technologies found in this scope review, which are the Basic (designed environment), Care reducing (digital devices for remote monitoring and assisted living), and Good practice (medication compliance and implementation of a prototype service which could give old adults medication reminder appropriately at the right time) (Lansley, McCreddie & Tinker, 2004). It is worth highlighting that besides favouring the older people themselves, assistive technologies, adaptations and the use of equipment such as sensors also serve as support to caregivers.

In economic upcoming regions in the world, less research is executed on AiP for people living with dementia. This is probably because policy on AiP is still lacking. Policy is one of the pre-conditions to realize AiP initiatives for people with dementia, next to others. Most focus on AiP studies were in the domain of Health.

Study limitations

It was possible to identify ageing in place initiatives in the databases and other sources around the world, however, no initiatives were identified in Brazil, which may be related to several factors, one of them being the non-use of the term 'ageing in place' in the publications and its transla-

tion into Portuguese 'envelhecer no lugar'. The non-identification of studies in the country may also be related to the limitation of the searches to specific databases and journals and not to the gray literature as is the case of Google Scholar. Finally, the lack of publications may be related to the lack of public policies aimed at 'ageing in place' in Brazil, which differs from the countries where more publications were found. Furthermore, ageing-in-place sometimes also refers to independent living. This term was not used as a search term because it only captures a single aspect of the umbrella term ageing-in-place. Moreover, cultural differences and values about ageing-in-place for dementia could also have influenced the findings. Therefore, these findings should not be generalized to other regions.

CONCLUSION

The scoping review resulted in identifying zero initiatives on ageing-in-place for dementia in Brazil, while several initiatives were described in articles selected in the databases, coming from other parts of the world. Those articles described initiatives that could be categorized into preconditions and main categories to realize ageing in place for people with dementia. In Brazil, ageing-in-place initiatives for older people do exist as was identified via a chat call in the Brazilian Society for Gerontechnology, but these do not include people with dementia. Therefore, future studies should focus on people with dementia, for a better understanding of how to realize ageing-in-place, since this group of older people is increasing tremendously by 2030.

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