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Review

Outdoor-Based Care and Support Programs for Community-Dwelling People Living with Dementia and Their Care Partners: A Scoping Review

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Abstract

Background/Objectives: How to best assist people living with dementia (PLWD) and their care partners to maximize quality of life and quality of living, through appropriate and effective non-pharmaceutical approaches, remains a focus of dementia societies and organizations worldwide. This scoping review explored the types, opportunities, benefits and challenges of outdoor-based care and support programs for community-dwelling PLWD and their care partners. **Methods**: The methodological framework proposed by Arksey & O'Malley (2005) and modified by Levac et al. (2010) was followed. Four research databases were searched from January 2000 to November 2024; 2817 articles were retrieved and 20 met inclusion criteria and underwent data extraction. **Results**: Program types included the following: nature-based, care farm, green care farm, and farm-based dementia care programs, representing more than half of the included articles; health walks; and outdoor horticulture/garden/gardening programs. The number of PLWD participants ranged from 4 to 136. The total number of care partner participants was 151 and the total number of service provider participants was 87. The essence of, and connections with, nature and the outdoors had notable relevance and value for PLWD. Reported benefits, assessed quantitatively and qualitatively, were numerous and those in the social domain were reported most often. Identified challenges and barriers were related to risks and safety and program development, and implementation and delivery. **Conclusions**: The noteworthy potential of outdoor-based care and support programs to promote and enhance the quality of life and quality of living of community-dwelling PLWD and their care partners was elucidated. As most PLWD prefer to, and do, continue to reside in their homes, including those with advancing symptoms, the findings have significant relevance and implications for real-world practice and policy. Future research addressing current gaps will strengthen this growing field of dementia research.

Keywords: scoping review; dementia; care partners; community-dwelling; outdoor-based care; outdoor-based support; program; benefits; opportunities; challenges

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1. Introduction

With 55 million people diagnosed with dementia globally, a number that is increasing by nearly 10 million cases per year [1], the effective care and management of those living

with the condition is paramount. Globally, there has been an increase in focus on how to best assist people living with dementia (PLWD) and their care partners to maximize their quality of life and quality of living. Socially isolated older adults, whether isolated because of their health condition (e.g., dementia diagnosis), physical and mobility limitations, where they live (e.g., in a rural town), or circumstances (e.g., government restrictions due to the COVID-19 pandemic) are vulnerable and have poorer health, and higher care needs and health care system utilization [2].

Community-dwelling PLWD often express feelings of depression, loneliness, and isolation [3]. Additional challenges experienced by those living with dementia include, but are not limited to, disempowerment, a loss of social identity, and an internalization of the stigma that is experienced which, in turn, contributes to feelings of shame and a lack of self-worth [4]. Access to meaningful activities, community services, and opportunities for continued engagement is critical for PLWD to maintain independence and to enhance well-being, a sense of autonomy, and quality of life [5]. It is not just the PLWD that are affected. Care partners have reported high levels of loneliness, social isolation, and high levels of anxiety [6,7], and physical, emotional, and logistical support needs and care provision can negatively impact the care partner's quality of life, health, and well-being [8].

Guidelines have long emphasized the importance of physical activity and remaining mentally and socially engaged [9]. Diverse social networks and social activity have been found to have a positive impact on the health and the well-being of PLWD [10]. Non-pharmacological interventions are often recommended and preferred for the behavioral and psychological symptoms experienced by those living with dementia [11], as they have few or no side effects, result in positive outcomes, and have been found to be cost-effective [12].

Published systematic and coping reviews have typically examined interventions for PLWD residing in assisted living or long-term care, but rarely include outdoor-based care programs, structured outdoor activities [13–16], or community-dwelling PLWD. A 2023 scoping review examined psychosocial interventions used in day care services for older PLWD and included six papers describing nature-based interventions (green care farm, farm-based activities, garden-based activities) that examined experiences, and understanding and meaning of the natural world [17]. Findings were broadly reported across the nine categories of the interventions, and not necessarily focused on outdoor-based care. Additionally, we found only one published review of the literature [18] specifically related to outdoor-based care for PLWD; this paper used a scoping review methodology to examine the types of formal outdoor nature-based activity provision for people aged 65 years and older individuals living with cognitive impairment, including dementia, and the range of outcomes assessed. The included studies mainly comprised participants residing in formal care settings, with activities falling into three groups: green day care, equine-assisted interventions, and community nature-based activities. Outcome domains reported included the following: connection with nature, activity engagement, impacts on clinical symptoms, functional ability, physical, psychological, and social health, and quality of life.

Taking this previous work into consideration, we sought to address the existing gaps in the literature by specifically focusing on PLWD residing in their homes in the community. The purpose of this current paper was to explore, map, and synthesize the available literature of the types, benefits, opportunities, and challenges of outdoor-based care for community-dwelling PLWD and their care partners, using the scoping review methodology.

2. Materials and Methods

We chose to conduct a scoping review because the body of literature, types of available evidence, related concepts, and how the research has been undertaken had not been previously delineated or confirmed collectively. A scoping review is a type of knowledge synthesis that follows a systematic approach to broadly map what exists in the literature and the extent of evidence on a topic and identify main concepts and knowledge gaps [19].

The methodological framework proposed by Arksey & O'Malley [19] and modified by Levac et al. [20] that was utilized included the following steps: (1) clarification and linking the purpose and research question to identify the research question(s); (2) identifying relevant studies; (3) selecting studies using an iterative approach based on the selection criteria; (4) extracting the data; (5) charting the data using numerical summaries and qualitative thematic analysis; and (6) collating, summarizing, and reporting the results. We did not include a consultation exercise, which is an optional step. A protocol was developed by the team members with research, clinical experience, and expertise in dementia care and scoping review methodology, and was reviewed by a research librarian. The study was registered with the Centre for Open Science (https://osf.io/4hnvs (accessed on 12 June 2025); Registration DOI: https://doi.org/10.17605/OSF.IO/4HNVS), and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIMSA) Extension for Scoping Reviews (PRISMA-ScR) were used to guide our reporting [21].

2.1. Identifying the Research Question

The aim of this review was to answer the following research question: what are the types, opportunities, challenges, and benefits of outdoor-based care and support programs for community-dwelling PLWD and their care partners?

The following descriptors and definitions were used to guide our work: (1) outdoor-based care was defined as an organized, non-clinical activity conducted in a natural or built outdoor environment; (2) community-dwelling was considered as living independently in one's home in the community, e.g., not living in a congregate care setting; (3) benefits and opportunities referred to potential or realized prospects, facilitators, or circumstances; (4) challenges referred to potential or realized barriers or concerns that may prevent PLWD and their care partners from participating in outdoor-based care and support programs at any level, e.g., individual, program, organization.

2.2. Identifying Relevant Studies

The search strategy was developed in consultation with an experienced research librarian who provided feedback and recommended relevant databases; these comprised general and more discipline-specific databases focused on health; health care; life, medical, psychological and social sciences; education; and the humanities and would provide breadth and comprehensiveness when searching the available evidence. The Ovid® [Allied and Complementary Medicine Database (AMED); Health and Psychosocial Instruments; Ovid Medline®; Ovid Healthstar; Ovid Emcare]; EBSCOhost [Ageline, Cumulative Index to Nursing and Allied Health Literature (CINAHL)]; Scopus; and ProQuest Central (APA PsycInfo®, Applied Social Sciences Index and Abstracts, International Bibliography of the Social Sciences (IBSS), Nursing and Allied Health Premium, Sociology Collection) databases were searched from 1 January 2000 to 30 November 2024. We chose the year 2000 as our search start year to capture the available evidence related to outdoor-based care, a relatively new concept in the literature at the time, and overlapping with the increased interest in non-pharmacological approaches which also began at this time, with both aspects gaining traction in the dementia literature over the past few decades. Broadly, our search terms included the following: dementia, outdoor activities, nature, caregivers/care partners,

and community-dwelling (see Table A1 in Appendix A for a sample search query). We also hand-searched [22] the reference lists of articles selected for inclusion and recent and relevant scoping and systematic reviews for additional articles.

2.3. Selecting the Studies

Retrieved citations were imported into Covidence (Veritas Health Information, Melbourne, Australia) and duplicates were removed. Title and abstract screening and full-text screening were conducted independently by two research team members, using a priori determined inclusion and exclusion criteria, see Table 1. Any disagreements were first resolved between the reviewers. If the two reviewers could not come to agreement, discussions with the research team took place, and one of the senior researchers also served as a third reviewer, if necessary, to reach consensus.

Table 1. Inclusion and exclusion criteria.

Inclusion Criteria	Exclusion Criteria
Population Related	
Alzheimer's disease Lewy body dementia Frontal temporal dementia Vascular dementia Multiple etiology (mixed) dementia, e.g., Alzheimer's disease and vascular dementia Degenerative neurologic health condition related to dementia, e.g., Parkinson's disease Disease severity: mild, moderate, severe Young onset dementia Adult population Living status of PLWD: community-dwelling	Cognitive impairment due to other health condition, e.g., traumatic brain injury Mild cognitive impairment Under 18 years of age (children, pediatric population) Living status of PLWD: long-term care; congregate care facility; hospital; hospice
Activity and Intervention Related	
Outdoors—built or natural environment Nature, parks, gardens, horticulture Outdoor activities Outdoor-based care, nature-based care	Animal-based activities, animal-assisted therapy Indoor activities Indoor leisure/recreation/sports/exercise
Concept(s) and Outcome(s) Explored/Examined/Evaluated	
Type of outdoor-based care Benefit(s)—psychological, social, physical, mental, emotional, health- and wellness-related Opportunity/Opportunities—e.g., prospects, facilitators, favorable circumstances at any level, e.g., individual, care partner, organization, community, policy Challenge(s)—e.g., barriers, risk(s) at any level, e.g., individual, care partner, organization, community, policy	Other concept(s) or outcome(s)
Document Type and Study Related	

Table 1. *Cont.*

Inclusion Criteria	Exclusion Criteria
Full text available, peer-reviewed	Unable to obtain full text
Any study design, e.g., quantitative, qualitative, mixed methods, multi-methods	Non-peer-reviewed papers
Ability to delineate and extract data related to purpose, e.g., if mixed populations (community-dwelling versus long-term care) or (mixed interventions outdoor-based versus indoor-based)	Grey literature, e.g., dissertations, editorials, book chapters, book reviews, letters to editor, position papers, conceptual discussions and commentaries, news articles, reports
Published in the English language	Unable to delineate/separate data in order to extract data related to purpose
	Published in languages other than English

2.4. Extracting and Charting the Data

A data extraction form was developed, pilot-tested, and revised as required in consultation with the research team. The data, extracted independently by two research team members and compared, were as follows: author(s), year of publication, country where study was conducted, participants, sample size, study design, methods, aims of the study, and findings, as related to the purpose of our scoping review. Any discrepancies that could not be resolved by discussion between the two team members were discussed with a third research team member. As a final check, all extractions were reviewed for completeness and accuracy by a senior research team member. The methodological quality or risk of bias of the included articles were not assessed, which is in keeping with the scoping review processes [23].

2.5. Collating, Summarizing, and Reporting the Results

The extracted data were reviewed and collated independently by two research team members and reviewed by a senior research team member. Data and findings were summarized using descriptive statistics, e.g., frequency counts, percentages, and by categories, themes, and sub-themes in alignment with the purpose.

3. Results

We identified 2817 citations through database searches and hand searching. After removing duplicates, 2348 underwent title and abstract screening. We were able to retrieve 67 articles for full-text screening, and 20 articles were included in this review, Figure 1.

3.1. Characteristics of the Included Studies

Table 2 summarizes the characteristics and study aims of the included studies, and Table 3 summarizes the study findings. Included studies were conducted in Canada (n = 3, 15%), the Netherlands (n = 6, 30%), Norway (n = 6, 30%), Scotland (n = 2, 10%), Sweden (n = 1, 5%), and England (n = 2, 10%). Two studies were published between 2000 and 2009, eight were published between 2010 and 2019, and ten were published between 2010 and 2024.

Three studies did not report a study design. Reported study designs comprised the following: (1) secondary analysis (n = 1); (2) quantitative (n = 7)—four cross-sectional, two observational, and one observational cohort; (3) qualitative (n = 5)—interpretative phenomenological analysis (n = 1); qualitative descriptive (n = 2); specific design not stated (n = 2); (4) multi-method (n = 1); (5) mixed methods (n = 3).

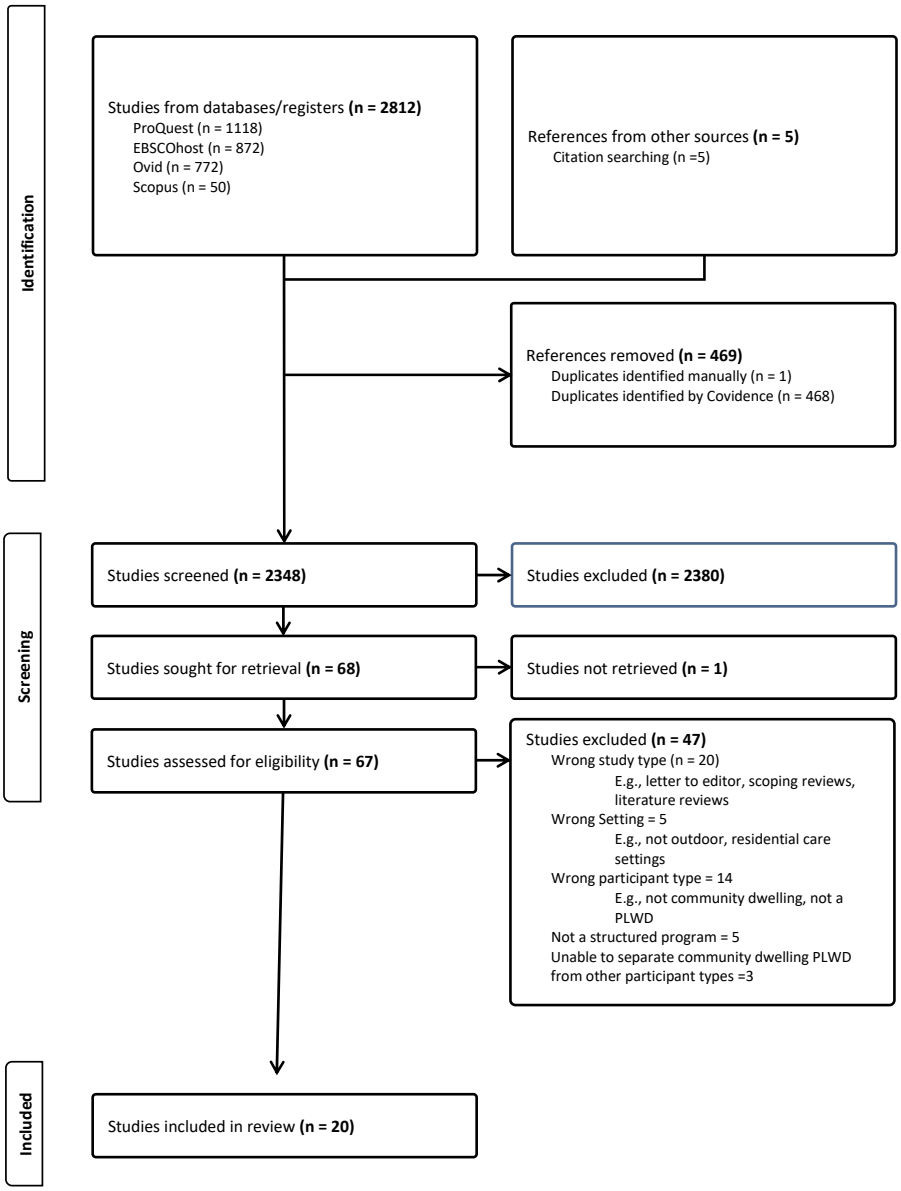


Figure 1. Scoping review PRISMA flow chart.

Twelve studies included community-dwelling PLWD participants, with two specifically concerning people with young onset dementia (YOD) [24,25]. Other participants included PLWD and their care partners/dyads (n = 4), PLWD, care partners and service providers (n = 2), PLWD and service providers (n = 1), and service providers and organizations (n = 1).

Table 2. Characteristics and study aims of included studies.

Author(s), Year Country	Aim(s) Setting/Context Study Design	Participants	Methodology, Methods
de Bruin et al., 2009 [26] Netherlands	Study 1: to inventory the types of activities organized in each type of day care facility and determine the location of the activities organized and the degree of group participation in these different activities. Study 2: to gain insights into the activities performed by PLWD in both settings by looking at the types and locations of the activities and the physical effort required. 11 GCFs predominately receiving PLWD and older adults without dementia; 12 RDCs located close to the GCFs. Cross-sectional studies.	Study 1: PLWD and older people without dementia; participants characteristics not reported. Study 2: 30 PLWD attending GCF: 5 females, 25 males Age, mean—years: females = 80.4; males = 77 MMSE, mean: females = 19.0; males = 19.4 25 PLWD attending RDC: 18 females, 7 males Age, mean—years: females = 82.9; males = 80.9 MMSE, mean: females = 18.2; males = 20	Study 1: group level observation, 3.5 to 5 days per facility; average 6 h per facility Study 2: individual level observation level, 1 or 2 days per person; average 6 h per person. Activity classification: (1) physical effort classification using method of Van Raaij et al. (1990); (2) other classifications completed after observations were completed.
de Bruin et al., 2012 [27] Netherlands	To compare longitudinal change in functional performance in community-dwelling PLWD who attend GCFs or RDCFs. 15 GCFs offering day care to groups of 5 to 15 people per day; 22 RDCFs mostly located in the same region as the GCFs. Observational cohort study.	GCF participants—47 PLWD Cohort A: 5 females, 23 males: Age, mean (SD)—years: 77.7 (5.2) Dementia type: n = 10 AD; n = 3 VD; n = 4 Other; n = 11 unspecified Dementia duration, mean (SD)—years: 3.1 (1.8) MMSE, mean (SD): 19.5 (5.6) n = 2 widowed; n = 26 married or cohabitating Cohort B: 3 females, 10 males: Age, mean (SD)—years: 75.4 (7.5) Dementia type: n = 5 AD; n = 1 VD; n = 1 Other; n = 3 unspecified Dementia duration, mean (SD)—years: 4.7 (2.5) MMSE, mean: 20.2 (7.1) n = 0 widowed; n = 10 married or cohabitating	(1) Primary caregiver interviews at their homes—at study entry, six- and 12-month follow-up; (2) BADL using Barthel Index; (3) IADL using the IDDLD; (4) co-morbidity; (5) medication use. Analysis: Fisher's Exact Test, chi square test for independence, Mann–Whitney U test, linear regression

Table 2. *Cont.*

Author(s), Year Country	**Aim(s) Setting/Context Study Design**	**Participants**	**Methodology, Methods**
de Bruin et al., 2012 [27] Netherlands	To compare longitudinal change in functional performance in community-dwelling PLWD who attend GCFs or RDCFs. 15 GCFs offering day care to groups of 5 to 15 people per day; 22 RDCFs mostly located in the same region as the GCFs. Observational cohort study.	Cohort C: 2 females, 7 males: Age, mean (SD)—years: 79.0 (4.6) Dementia type: n = 2 AD; n = 3 VD; n = 0 Other; n = 4 unspecified Dementia duration, mean (SD)—years: 3.8 (2.1) MMSE, mean (SD): 22.3 (4.3) n = 3 widowed; n = 6 married or cohabitating RDC participants—41 PLWD Cohort A 12 females, 2 males: Age, mean (SD)—years: 83.4 (5.8) Dementia type: n = 10 AD; n = 3 VD; n = 4 Other; n = 11 unspecified Dementia duration, mean (SD)—years: 3.1 (1.8) MMSE, mean (SD): 19.5 (5.6) n = 8 widowed; n = 6 married or cohabitating, Cohort B 7 females, 6 males: Age, mean (SD)—years: 82.0 (7.2) Dementia type: n = 5 AD; n = 1 VD; n = 1 Other; n = 3 unspecified Dementia duration, mean (SD)—years: 2.9 (2.0) MMSE, mean: 21.4 (4.0) n = 7 widowed; n = 6 married or cohabitating, Cohort C 5 females, 9 males: Age, mean (SD)—years: 82.8 (6.6) Dementia type: n = 4 AD; n = 1 VD; n = 1 Other; n = 8 unspecified Dementia duration, mean (SD) -years: 3.1 (1.8) MMSE, mean (SD): 20.6 (5.9) n = 8 widowed; n = 6 married or cohabitating.	(1) Primary caregiver interviews at their homes—at study entry, six- and 12-month follow-up; (2) BADL using Barthel Index; (3) IADL using the IDDLD; (4) co-morbidity; (5) medication use. Analysis: Fisher's Exact Test, chi square test for independence, Mann–Whitney U test, linear regression

Table 2. *Cont.*

Author(s), Year Country	**Aim(s) Setting/Context Study Design**	**Participants**	**Methodology, Methods**
de Bruin et al., 2015 [28] Netherlands	To explore the value of day services at GCFs in terms of social participation for PLWD. GCFs. Qualitative descriptive study.	21 PLWD attending day services at GCFs: 3 females, 18 males Age, mean (SD)—years: 71.0 (7.5) Dementia type (self-report): n = 11 AD; n = 4 VD; n = 2 PD dementia; n = 2 other dementia; n = 2 unknown Years with dementia (self-report), mean (SD): 5.7 (2.6) n = 21 married or living with a partner n = 9 had agricultural background Family caregiver: 18 females, 3 males Age, mean (SD)—years: 68.3 (8.3) --- 12 PLWD on waiting list for GCFs; 2 females, 10 males Age, mean (SD)—years: 76.1 (9.6) Dementia type (self-report): n = 4 AD; n = 4 VD; n = 2 other dementia; n = 2 unknown Years with dementia (self-report), mean (SD): 6.8 (8.3) 11 married/living with partner, 1 living with other family member n = 6 had an agricultural background Family caregiver: 10 females, 2 males Age, mean (SD): 72.5 years (8.9)	Semi-structured interviews with dyads of PLWD living at home and family caregivers. Analysis: Framework analysis method

Table 2. *Cont.*

Author(s), Year Country	Aim(s) Setting/Context Study Design	Participants	Methodology, Methods

de Bruin et al., 2021 [29]
 	
Netherlands
	To understand (1) the motivation of PLWD and family carers to choose nature-based ADSs in urban areas; (2) the value of nature-based ADSs in urban areas in terms of the health and well-being of PLWD and family carers from different perspectives, i.e., PLWD, family carers, providers of nature-based ADSs in urban areas.
	
	Nature-based ADSs in urban areas in different regions of the Netherlands.
	
	Qualitative study.
		21 PLWD; 8 females, 13 males
		Age, range—years: 51 to 90
		Type of ADS PLWD attending:
		n = 15 social entrepreneur;
		n = 2 nursing home;
		n = 1 social care organization;
		n = 3 hybrid type
		
		18 family carers:
		16 females, 2 males
		Age, range—years: 46 to 82
		Relationship with PLWD:
		n = 9 wife, n = 1 ex-wife, n = 1 partner, n = 5 daughter, n = 1 husband, n = 1 brother
		---------- 	
		15 providers of nature based ADSs. Provider types:
		(1) n = 7 social entrepreneur in a green environment, e.g., city farm, city garden, park; n = 2 South region, n = 3 Middle region, n = 2 North region.
		(2) n = 3 nursing home opening up its garden to community-dwelling PLWD living; n = 1 i Middle region, n = 2 North region.
		(3) n = 1 social care organization organizing green activities, e.g., green maintenance, children's farm, or city farm visits and walks in green environments; South region.
		(4) n = 1 citizen(s) with other agencies, offer ADS in a community garden; Middle region
		(5) n = 3 hybrid ADS, LTC institution jointly organizes nature-based ADS with other types of partners; n = 1 South region, n = 1 Middle region, n = 1 North region.
			40 to 60 min, face-to-face semi-structured interviews with the following:
			(1) PLWD and family carers in their homes or at the ADS [dyads; separately]; 2 participants together based on preference;
			(2) providers at their workplace.
			
			Framework analysis method to analyze the data.

Table 2. *Cont.*

Author(s), Year Country	**Aim(s) Setting/Context Study Design**	**Participants**	**Methodology, Methods**
Ellingsen-Dalskau et al., 2021 [30] Norway	To (1) compare aspects of the care environment between FDCs and RDCs; (2) investigate the types of activities taking place, engagement; physical effort, social interaction and mood. 10 FDC services at ordinary farms in the community with a varying degree of conventional farming activities. 7 RDCs, with their own staff, situated near, or within, residential nursing homes across different regions in Norway. Observational study.	42 participants from 10 FDCs 46 RDC participants No collection of demographic information.	(1) participant observation in random order for 1 min, three times per hour, for a total of 4 h (12 observations per participant); (2) MEDLO Analysis: mean percentage, SD, estimate of fixed effect, SE, 95% CI; linear mixed model.
Finnanger Garshol et al., 2020 [31] Norway	To investigate: (1) the potential of FDCs as services that can promote physical activity for PLWD by comparing the levels of physical activity between RDC and FDC attendees; (2) levels of physical activity for FDC attendees on the days they are at the farm and the days they are not. 15 FDC services across all of Norway; and 23 MDC in the south-eastern part of Norway. Secondary analysis of data collected in two separate studies [longitudinal study; cross-sectional study (Olsen et al., 2016)].	29 FDC participants: 9 females, 20 males Age, mean (SD)—years: 74 (7.22) 13.8% were living alone 20.7% had a college or university education CDR: 10.3% very mild; 65.5% mild; 20.7% moderate; 3.7% severe 107 RDC participants: 71 females, 36 males Age, mean (SD)—years: 84.3 (8.10) 54.3% were living alone 28.7% had a college or university education CDR: 2.9% very mild; 40.2% mild; 48% moderate; 4.9% severe	Actigraphy, CDR scale and TUG data Analysis: *t*-test, adjusted linear regression, mixed model regression.

Table 2. *Cont.*

Author(s), Year Country	**Aim(s) Setting/Context Study Design**	**Participants**	**Methodology, Methods**
Finnanger-Garshol et al., 2022 [32] Norway	In-depth comparison of the emotional well-being of FDC and RDC participants as related to care environment aspects. FDCs situated at commercial farms; RDCs situated at or near nursing homes, with their own staff. Part of a larger project investigating FDCs in Norway. Observational study.	42 participants from 10 FDCs 46 participants from seven RDCs No demographic information for participants	(1) participant observation in random order for 1 min, three times per hour, for a total of 4 h, 12 observations per participant; (2) MEDLO Analysis: *t*-test, linear mixed models.
Hall et al., 2018 [33] Canada	To assess if and how day program providers could (1) increase client engagement in horticultural activities on both a physical and emotional level by adopting an improved garden design and recreational programming built on client strengths (i.e., interest and past history with gardening); (2) promote client self-determination compared to more traditional and staff-directed day program activities. A 10-week, twice weekly structured horticultural therapy program in the dementia-friendly garden space at McCormick Home [Alzheimer Outreach Services]. Mixed methods	14 Alzheimer Outreach Services' clients: 4 females, 10 males Age—years: 61 to 96; average = 84 MMSE: average = 20; range = 8 to 30; Type of dementia: n = 5 AD; n = 3 non-specified dementia; n = 1 FTD; n = 3 VD, n = 1 PD-related dementia; n = 1 unknown diagnosis	(1) DCM Observational Tool; (2) recorded narrative notes underwent thematic analysis (Braun & Clarke 2006); (3) questionnaire, developed by previous director of Alzheimer Outreach Services, mailed to each caregiver to complete for each day their family member attended the garden project.

Table 2. *Cont.*

Author(s), Year Country	**Aim(s) Setting/Context Study Design**	**Participants**	**Methodology, Methods**
Hassink et al., 2019 [34] Netherlands	To (1) Provide insight into the characteristics of different types of nature-based ADSs in urban areas for PLWD living at home. (2) Explore common and specific challenges for the development and running of different types of nature-based ADSs in urban areas. Nature-based ADSs in urban areas. Two-phase mixed methods study.	21 representatives of nature-based ADS completed the online survey 17 initiators of nature-based ADS were interviewed	(1) national inventory of nature-based ADSs in urban areas; (2) semi-structured interviews with initiators of the ADSs identified in the first phase. Analysis: Inductive, iterative process (Strauss & Corbin, 1998)
Hewitt et al., 2013 [24] England	To (1) identify the possible benefits of a structured group gardening program for people with YOD; (2) identify potential changes in well-being and the mental state of participants and the perceptions of carers; (3) identify useful assessment scales and group activities to inform a larger research project. Two community sites: (1) Thrive Trunkwell Garden Project, Berkshire—a site developed for horticultural therapy for people with physical disabilities, learning difficulties, and older PLWD; (2) Barkham Day Hospital garden—a purpose- designed garden for PLWD, on the grounds of Wokingham Community Hospital, Berkshire.	12 PLWD: 8 females, 4 males Age—years: mean = 58.6; range = 43–65 Dementia type: AD n = 9; FTD n = 1; Mixed AD/VD n = 1; DLB, n = 1	Perceived benefits of the activities were assessed qualitatively using semi-structured interviews with carers and quantitatively with BWBP.

Table 2. *Cont.*

Author(s), Year Country	Aim(s) Setting/Context Study Design	Participants	Methodology, Methods
Hewitt et al., 2013 [24] England	46 sessions held weekly for 2 h. Each session included a group meeting to socialize and help plan the session; 1 h of structured gardening tasks targeted to each person's abilities; and, regroup after the gardening to reflect, discuss progress, and promote group belonging. Mixed methods.	12 PLWD: 8 females, 4 males Age—years: mean = 58.6; range = 43–65 Dementia type: AD n = 9; FTD n = 1; Mixed AD/VD n = 1; DLB, n = 1	Perceived benefits of the activities were assessed qualitatively using semi-structured interviews with carers and quantitatively with BWBP.
Ibsen et al., 2018 [35] Norway	To map available FDCs in Norway and describe services and participants' care environment. Farms throughout Norway offering day care services to PLWD. Cross-sectional survey.	32 FDCs: n = 6 providers (face-to-face interviews); n = 26 providers (telephone interviews)	Telephone and face-to-face interviews.
Ibsen et al., 2020 [36] Norway	To (1) describe PLWD who attend FDC in Norway; (2) explore whether the characteristics of participants and FDC are associated with QoL. FDC, 25 farms. Cross-sectional design. Study reported on data collected in a larger project (Eriksen et al., 2019).	94 dyads (PLWD and next of kin): 36 females (38.3%), 58 males (61.7%) Age—years: mean (SD) = 75.8 (8.3); range = 58 to 96 Married/cohabitant, n = 60 (63.8%); Alone (unmarried, divorced, widowed), n = 34 (36.2%) 84.9% had a dementia diagnosis, type not stated MoCA, mean (SD) = 11.5 (6.2) CDR Sum of boxes, mean (SD) = 7.4 (3.2) 54.3% had mild dementia, 26.6% had moderate dementia, 1.1% had severe dementia 38.3% had full awareness of their memory loss	(1) QoL-AD scale; (2) OSS-3; (3) MoCA; (4) CDR; (5) REED; (6) MADRS; (7) RAID-N; (8) NPI; (9) GMHR; (10) EQ-VAS; (11) Physical activity—participants and next of kin were asked about how many days per week participants were physically active for at least 20 min; (12) PSMS; (13) IADL. Analyses: multilevel regression analysis; univariate analysis; multivariate multilevel linear regression

Table 2. *Cont.*

Author(s), Year Country	**Aim(s) Setting/Context Study Design**	**Participants**	**Methodology, Methods**
Ibsen T.L, & Eriksen S., 2021 [37] Norway	To investigate how PLWD describe attending FDCs in Norway. Five FDC services in different parts of Norway. Qualitative descriptive study.	10 PLWD: 4 females, 6 males Age—years: 60 to 70, n = 5; 71 to 80, n = 2; 81 to 90, n = 3 7 lived with a partner, 3 lived alone 4 participants had previous experience with farm work	Semi-structured interviews with participants at the farm. Content analysis (Graneheim & Lundman 2004).
Innes et al., 2024 [38] Canada	To explore the understanding of outdoor-based activities from the perspectives of organizations providing outdoor opportunities, PLWD, and their care partners. Outdoor-based support/programming/ services in three target areas in Southern Ontario. Multiple-methods.	n = 29 organization workers; 22 females, 7 males Age—years: 21–30, n = 2; 31–40, n = 3; 41–50, n = 11; 51–60, n = 7; 61–70, n = 4; 71+, n = 0 Years of Service in Role, Organization—years: <1, n = 3; 1–3, n = 7; 3–5, n = 1; 5–10 years, n = 5; 10+, n = 11; No response, n = 2 21 PLWD * Years Since Diagnosis: <1, n = 2; 1–2, n = 4; 2–3, n = 6; 3+, n = 7; No response, n = 1 14 care partners * 19 older adults * * demographics by group not available	(1) 1–1 interviews; (2) focus groups; (3) walking focus groups. Thematic analysis
Morris et al., 2021 [39] England	To present the findings regarding the impact of attending the GLC on self-reported well-being for PLWD and care partners. GLC garden, at the front of the Dementia Hub building, within the campus of the University of Salford. Specific study design not stated.	4 PLWD, 4 current care partners, 6 former care partners: 11 females, 3 males Age—years: average = 68.5; range = 50 to 87	(1) Post GLC semi-structured interviews (30 to 60 min, telephone or video conference); (2) Unstructured observations; (3) Structured observations using DCM. Thematic analysis (Braun & Clarke 2006 approach).

Table 2. *Cont.*

Author(s), Year Country	Aim(s) Setting/Context Study Design	Participants	Methodology, Methods
Noone & Jenkins, 2018 [40] Scotland	To (1) deliver a community-based gardening program for PLWD; (2) explore participants' experiences of the gardening sessions; (3) explore the experience of the gardening program from the perspectives of those who care for PLWD, using qualitative semi-structured interviews. Community-based gardening program in a garden was located on the grounds of a community hall in Glasgow, which hosted a day center for PLWD. Weekly gardening sessions over six weeks. Specific study design not stated.	6 PLWD 3 professionals who had experience of working with PLWD in the garden—one OT, two community gardeners. 4 care staff from day center: n = 2 care workers, n = 1 care manager; n =1 care assistant	Pragmatist methodological perspective drawing upon elements of phenomenology and action research Data collection methods were guided by phenomenological principles: (1) Informal semi-structured interviews following each session; (2) researcher's observations documented after each session; (3) individual semi-structured interviews with carers and professionals Thematic analysis (Braun & Clarke 2006 framework).
Oher, Tingberg, & Bengtsson, 2024 [25] Sweden	To (1) explore the needs of individuals with YOD in a garden setting; (2) generate design-related knowledge for 'dementia-friendly' outdoor environments. An 8 week long nature-based program in Alnarp's rehabilitation garden on the campus of the Swedish University of Agricultural Sciences (Southern Sweden), a specifically developed garden based on research from landscape architecture, environmental psychology, and medical science. Qualitative.	6 people with YOD: 2 women, 4 men Age—years: mean = 61.5; range = 51–67 Type of dementia: AD, n = 5; VD, n = 1 Severity of dementia: mild cognitive decline, n = 3; mild–moderate cognitive decline, n = 1; moderate cognitive decline, n = 2 5 staff members—2 Memory Clinic staff, both nurses; 3 members of the Rehabilitation Garden team: an OT, a horticultural engineer, and a PT and ergonomist.	Semi-structured interviews. Content analysis (Elo & Kyngäs 2008).

Table 2. *Cont.*

Author(s), Year Country	Aim(s) Setting/Context Study Design	Participants	Methodology, Methods
Robertson et al., 2020 [41] Scotland	To investigate the experiences of people with and without dementia who attend a national 'dementia-friendly' walking group initiative. "Paths for All", a Scottish charity that supports National Health Service trusts, local authorities, and community organizations to run a range of free walking activities for local people. 'Dementia-friendly' walks, a subset of a wider group of free-at-the-point-of-delivery 'health walks' which aim to promote activity amongst people who live with long-term health conditions. Co-produced, participatory methodology drawing on an existing community research partnership.	Participant characteristics not reported.	(1) walking interviews conducted concurrently with two participants from each group, one person identified as having dementia alongside a carer, friend or relative (2) focus group following each walk—walkers, volunteers, and walk leaders were invited to discuss the key facilitators, barriers, and benefits of participating in each of the walking groups. Thematic analysis (Braun & Clarke 2006)
Schols, van der Schriek, & van Meel, 2006 [42] Netherlands	To (1) get a first impression of the effects of day care at a small dairy farm; (2) discern the most striking differences between patients in institutional day care and patients attending day care on the farm. Care Farm "Enjoying Life" (Den Hout), an existing dairy farm, with capacity to provide day care for elderly patients with physical disabilities and/or dementia who still live at home. Nursing home day care in Nursing Home de Riethorst (Geertruidenberg). Cross-sectional study.	13 Care Farm PLWD participants: Men:Women-2:1 Age, mean—years = 74 Farming background, n = 13 Dementia type: AD 77%; VD 8%; Other 15% Reported problematic behavior before start of day care: n = 10 (76%) Sundowning before start of day care: n = 10 (76%) 24 Day care at nursing home PLWD participants: Men:Women-1:1 Age, mean—years = 74 Farming background, n = 5 Dementia type: AD 71%; VD 13%; Other 16% Reported problematic behavior before start of day care: n = 22 (92%) Sundowning before start of day care: n = 21 (88%)	(1) activities of daily living (ADL, Barthel score); (2) reported "problematic behavior"; (3) # and types of medication; (4) active or inactive involvement in day care activities during the day; (5) therapeutic intervention; (6) family satisfaction

Table 2. *Cont.*

Author(s), Year Country	Aim(s) Setting/Context Study Design	Participants	Methodology, Methods
Smith-Carrier et al., 2021 [43] Canada	To explore (1) experiences of therapeutic gardening for PLWD; (2) perspectives on senses and emotions elicited in the gardening process that promote well-being. Therapeutic gardening program offered at an adult day center in Southwestern Ontario, conducted in a large outdoor garden outside the center building. The program is delivered over multiple waves and participants are involved in all aspects of the gardening cycle from spring clean-up, planting, garden maintenance, harvest, to clean-up in the fall. IPA	6 PLWD, early stages All of Caucasian descent.	(1) Observations with field notes. (2) Six waves of semi-structured interviews over the various planning, planting, tending, pruning, and harvesting seasons of the garden. Analysis: case-by-case using a systematic, qualitative analysis; transformed into narrative accounts reflecting the researchers' analytic interpretation.

Abbreviations: # = number; AD = Alzheimer's Disease; ADL = Activities of daily living; ADS = Adult day services; BADL = Basic Activities of Daily Living; BWBP = Bradford Well-Being profile; CDR = Clinical Dementia Rating; CI = Confidence interval; DCM = Dementia Care Mapping; DLB = Dementia Lewy Body; EQ-VAS = Euro-QoL Visual Analogue Scale; FDC = Farm-based dementia care; FTD = Frontotemporal dementia; GCFs = Green care farm; GLC = Good Life Club; GMHR = General Medical Health; IADL = Instrumental Activities of Daily Living; IDDLD = Interview for Deterioration in Daily Living in Dementia; IPA = Interpretative Phenomenological Analysis; MADRS = Montgomery Aasberg Depression Rating Scale; MDC = Municipal day care; ME = Mood and Engagement; MEDLO = Maastricht Electronic Daily Life Observation-tool; MMSE = Mini Mental State Examination; MoCA = Montreal Cognitive Assessment; NPI = Neuropsychiatric Inventory questionnaire; PD = Parkinson's disease; OSS-3 = Oslo Social Support; OT: Occupational therapy; PLWD = People living with dementia; PSMS = Physical Self-Maintaining Scale; PT = Physiotherapist; QoL = Quality of Life; QoL-AD = Quality of Life-Alzheimer's Disease scale; RAID-N = Rating Anxiety in Dementia Norwegian version; RDC = Regular day care; REED = Anosognosia Rating Scale; SE = Standard error; SD = standard deviation; TUG = Timed Up and Go; VD = Vascular dementia; YOD = Young onset dementia.

Sample sizes varied considerably, ranging from four [39] to one hundred thirty-six PLWD participants [32]; one study did not report the number of PLWD participants [41]. The total number of care partner participants was 151 and the total number of service provider participants was 87. Demographic variables, if reported and how they were reported, varied greatly across studies that provided this information. Six studies did not report PLWD demographics [30,32,34,40,41,43], and only stated early stage. One study reported PLWD demographics for one of the two sub-studies conducted [26]. We could not separate out all PLWD demographic variables in two studies [38,42]. Four (of five) studies did not report on service provider demographics [25,29,34,35]. Three of six studies with care partner participants did not report demographics and we could not separate out care partner demographics in one study [36,38,39]. Thus, demographics presented below are based on the reported/available data and as summary information. Specifics for individual studies that did report demographics can be found in Table 2.

Table 3. Included studies: Results.

Author(s) Year	Results
de Bruin et al., 2009 [26]	GCF activities included the following: (1) domestic activities [chopping vegetables, cooking, dish washing, and laying and clearing the table]; (2) farm- and animal-related activities and garden- or yard-related activities. More activities were organized outdoors at GCFs. GCFs: average = 2.0 activities daily, e.g., going for a walk, watching and feeding animals, painting fences, gardening; RDCs: average = 0.8 activities daily, e.g., going for a walk, shopping at the market. GCFs: the majority of activities were performed by individuals or one or more subgroups. RDCs: more activities were performed with almost the entire group. * Men (72.3% of observations) and * women (77.6% of observations) at GFCs participated more in organized activities compared to men (59.2%) and women (53.8%) at RDCs. Men and women at RDCs sat and pottered significantly ($p < 0.001$) more than men and women at GCFs. Men and women at GCFs spent significantly more time outdoors than counterparts at RDCs ($p = 0.003$ and $p < 0.001$). Men and women at RDCs were significantly more frequently involved in activities performed while sitting and requiring no movements or only minor hand and arm movements than men and women at GCFs ($p < 0.001$ for both comparisons). Activities that required sitting with arm movements were rarely observed at GCFs. Men at RDCs spent significantly more time lying down while resting than men at GCFs ($p < 0.001$). Activities requiring standing with/without arm movements were more often performed by the women at GCFs than those at the RDCs ($p = 0.002$). Standing activities involving whole-body movements were most frequently performed by men at GCFs who did these activities significantly more often than men at RDCs ($p < 0.001$). Women at RDCs hardly ever performed walking activities that required whole-body movements. These types of activities were done significantly more often by women at GCFs ($p < 0.001$). * study participant characteristics reported as male/female, but men/women used in the results section.
de Bruin et al., 2012 [27]	GCF: mean # of days of care per week (SD): Cohort A: 1.8 (0.7); Cohort B: 2.5 (1.3); Cohort C: 2.7 (1.1) RDC, mean # of days of care per week (SD): Cohort A: 2.1 (0.9); Cohort B: 1.9 (0.7); Cohort C: 2.4 (1.0) In all but one participant, BADL performance did not change significantly over time. Average rates of change in BADL did not differ significantly between groups within the three cohorts. In all but three participants, IDDLD Initiative nitiative scores did not change significantly over time. IDDLD Required Assistance scores did not change significantly. The average rates of change in IADL performance did not differ significantly between groups within the three cohorts. In all but one participant, # of diseases and medications did not change significantly over time. # of psychotropic medications did not change significantly. Average rates of changes in # of diseases and medications did not differ significantly between groups within the three cohorts.
de Bruin et al., 2015 [28]	Main Themes and sub-themes: *(1) Reasons for initiating services for PLWD:* (1.1) the most important reason was enabling social interactions; (1.2) stimulation of activities; (1.3) enabling participation in useful and meaningful activities. *(2) Reasons for initiating services for caregivers:* (2.1) reducing caregiver burden; (2.2) enabling own activities and social interactions; (2.3) increasing freedom *(3) Factors related to selecting GCF services setting:* A farm setting was a deliberate choice: (3.1) PLWD liked to be outdoors, be physically active, were fond of animals/gardening; (3.2) the presence of animals, the spacious and outdoor environment, and atmosphere; (3.3) disliked the RDC facilities, institutional environment, activities offered, expectation they would not connect with other participants. *(4) Value of GCF related to social participation:* (4.1) activities were socially relevant; (4.2) enabled social participation in other domains, specifically "paid employment" and "volunteer work"; (4.3) gave PLWD something to do, made them feel useful and meaningful, made them feel "part of something", e.g., made them feel able to contribute to something; (4.4) increased social interactions and gave PLWD a sense of belonging.

Table 3. *Cont.*

Author(s) Year	Results
de Bruin et al., 2021 [29]	Main Themes and sub-themes: (1) *Motivation to initiate nature-based ADSs in an urban area*: (1.1) possibility of being active; (1.2) possibility of spending time outdoors; (1.3) presence of green and natural environment; (1.4) opportunity to meet people of one's own age; (1.5) presence of a diverse range of stimuli; (1.6) relaxing atmosphere, staff were friendly; (1.7) short travel distance between one's home and the ADS location; (1.8) availability of a place at the ADS location. (2) *Value of nature-based ADS for PLWD*: (2.1) contact with nature and animals; (2.2) activity engagement; (2.3) different types of activities and jobs, and outdoor environment with different places to go to; (2.4) ADS provided structure; a fixed day structure, dedicated times for activities and jobs; seasons play a role in offering a certain structure; (2.5) social interactions were facilitated with other participants, staff, volunteers, other visitors; some considered social interaction the most valued aspect; interactions enabled PLWD to remain part of society and stimulated a sense of belonging; (2.6) communal dining stimulates social interactions between participants and healthy eating; (2.7) important and satisfying to do meaningful work, particularly for younger participants; (2.8) focus on normal daily life, a normal, non-institutional kind of place; no stigmatizing; sense of belonging; everyone is equal; can participate in society for as long as possible. (3) *Value of nature-based ADS for family carers:* (3.1) respite—could unwind . . . did not have to take care of or worry about their relative for the day; (3.2) maintaining carers' own activities and social contacts; (3.3) reassurance—relative was at the right place, which he or she liked to visit, therefore, did not feel guilty about shifting responsibilities to an ADS for some days a week; (3.4) practical and emotional support received from ADS professionals, which made family carers feel less alone in caring for their relative.
Ellingsen-Dalskau et al., 2021 [30]	No statistical differences between FDC and RDC groups for most commonly observed activities: (1) sitting (23.2% in total) ($p = 0.55$, SE 5.58); (2) joint meals (21.9% in total) ($p = 0.98$, SE 4.16). The three most common activities on FDCs following sitting and common meals were the following: (1) farming and working with animals (17.3%; only occurred at the farms); (2) walking outdoors (15.3%); (3) domestic and cooking activities (8.9%). Walking outdoors occurred significantly more often at FDC compared to RDC ($p = 0.007$, SE 4.15). No significant difference was found for domestic and cooking activities ($p = 0.10$, SE 4.64) between groups. The three most common activities in RDC following sitting and common meals were the following: (1) quiz, music, and spiritual activities (17.2%); (2) exercise and dancing (11.8%); (3) listening to staff reading (10.9%). FDC participants: (1) had higher levels of physical effort—39.4% observations of participants standing up or walking around at FDC versus 13.2% at RDC, $p < 0.001$, SE 4.36; (2) were outdoors more—42.3% observations of attendees being outdoors at FDC versus 2.6% at RDC, $p < 0.001$, SE 7.79; (3) experienced more social interaction—81.5% observations of social interaction taking place at FDC versus 64.3% at RDC, $p = 0.006$, SE 5.55; (4) had more positive mood—94.2% observations of positive or very positive mood at FDC versus 79.6% at RDC, $p = 0.004$, SE 4.4.
Finnanger Garshol et al., 2020 [31]	FDC participants spent 22.81 minutes more in moderate activity each day, equating to 159.67 minutes more for the entire week than RDC participants. On the days at the farm, FDC participants spent 25.85 minutes less in sedentary activity ($p = 0.012$), 40.37 minutes more in light activity ($p < 0.001$), 12.53 minutes more in moderate activity ($p = 0.032$), and took 1043.36 more steps ($p = 0.005$).
Finnanger-Garshol et al., 2022 [32]	Statistically significant difference in mood scores between groups for the activities sitting, eating/drinking and reading, with the FDC group having higher scores. Significantly higher mean mood scores in the FDC group compared to the RDC group for sedentary physical effort, no social interaction, interaction with another person, interaction with two or more people, being inside and being engaged in activity. Attending FDCs was statistically significantly associated with higher emotional well-being than attending RDCs. Increased physical effort, being outdoors, and farm-based activities were not associated with emotional well-being.

Table 3. *Cont.*

Author(s) Year	Results
Hall et al., 2018 [33]	DCM: (1) 60.42% of the time participants were either extremely engaged or in a state of extremely high well-being; (2) 17.00% of the time people were either very engaged or in a state of high well-being; (3) 5.53% of the time participants were in a state of visible ill-being. Four themes were identified as follows: (1) *Combining structured and unstructured activity*—Unstructured activity afforded autonomy to assume risks as participants saw fit; structured activities provided a degree of direction to enhance experiences; (2) *The importance of teamwork*—Participants took care of others' gardens when they did not attend, participants worked together to achieve common goals; (3) *Garden reminiscence*—Participants talked about their pasts with others, fostering a deep and meaningful rapport between the participants who frequently engaged with each other in an unstructured manner; (4) *Positive risk taking*—Risks and barriers noted were consideration related to falls, light sunburn, potential dehydration, the consumption of non-ripened food from the sensory pot, feeling too warm even when sitting in shade, and fatigue through overstimulation. Caregiver questionnaire findings: (1) participants frequently and spontaneously talked about their garden experiences on the day they participated and on days other than when they were in the garden; (2) emotional expression when talking about their gardening—'happy' and 'enthusiastic' most frequently reported emotions; (3) participants viewed their work in the garden as a personal accomplishment, being recognized by staff and others as good at gardening; (4) at times being 'upset' was expressed when an undesirable or unexpected event occurred; (5) attitude about gardening experience influenced emotional status for a period beyond the immediate discussion, oftentimes for hours after the discussion, sometimes for the entire day.
Hassink et al., 2019 [34]	Five main types of initiatives identified were as follows: (1) Social entrepreneurs offering nature-based ADS using their own facilities or with existing facilities; (2) Nursing homes opening their gardens to PLWD living at home; (3) Social care organizations setting up nature-based activities; (4) Community gardens set up by citizens; (5) Hybrid initiatives—care organizations initiating nature-based ADS with institutional partners or social entrepreneurs. There were differences in locations; nature-based activities; # and diversity of participants. The importance of quality of care was identified, but initiators had different ideas about this. Approaches included the following: (1) the medical approach, focusing on safety; (2) the community approach, focusing on participation in the community. Initiators from nursing homes and care organizations: (1) agreed on the importance of focusing on well-being rather than only medical care; (2) stressed the importance of quality control and providing quality care as their core business, which involved minimizing risks and employing professional personnel with a formal education, a systematic monitoring of the satisfaction of the care, and an acknowledgement that multidisciplinary consultation was needed. Issues included attention to poisonous plants, water hazards, and the risk of stumbling. Social entrepreneurs, social care, and the neighborhood initiative: (1) had little affinity with formal quality control issues and protocols; (2) emphasized the importance of freedom for clients and providing a setting that is as normal as possible. All initiators stressed: (1) entrepreneurial behavior as key in realizing an ADS in an urban area; (2) the importance of having knowledge about financing, dementia care, and running a project. Challenges: (1) scarcity of green spaces, especially in city centers; (2) persuading PLWD to participate in activities/go outside in bad weather; (3) funding was decreasing while support needed by PLWD was increasing. Some work was not funded and many activities were only possible with volunteers; (4) developing support and ownership among employees. Risks included the following: a loss of enthusiasm and commitment when processes were complicated, the realization that the ADS took more time than expected, employees getting a job elsewhere; (5) the high workload of care employees because they saw the nature-based activities as additional to their normal tasks.

Table 3. *Cont.*

Author(s) Year	Results
Hassink et al., 2019 [34]	Specific ADS-type challenges: (1) social entrepreneurs—finding a suitable location/establishing a new location requires considerable investments in time, financial resources, e.g., for building, equipment, and perseverance; (2) nursing homes—involving PLWD living at home to establish interaction with the neighborhood, commitment among employees and support within the organization, continuation when the funding ends or the project leader moves to another position, costs for maintenance of the garden and making sure there is sufficient expertise to manage the garden and involve PLWD in nature-based activities; (3) social care organization—the difficulty in finding volunteers who are interested and able to take responsibility for PLWD visiting the city farm, location needs to be close to the day center of the welfare organization to allow people to get there, arranging transportation; (4) citizens' initiative—getting support from the municipality, getting competent volunteers involved who were willing to invest time in the initiative and who were also able to build a good relationship with PLWD, securing the back-up and support from an organization with expertise in dementia care; (5) hybrid initiatives—engaging committed managers of different organizations, combining different sources of funding, taking differences in interests and work culture between organizations into account.
Hewitt et al., 2013 [24]	There was an increase in mean BWBP scores for the first eight sessions, followed by a leveling off of the scores due to reaching a ceiling. There was no significant difference in BWBP scores (original Profile-$t(5) = 1.43$, $p = 0.21$; amended version-$t(5) = 0.88$, $p = 0.425$) between the first and last sessions. There was no statistical change in MMSE at 6 months; there was a statistically significant decline in MMSE at 12 months (paired $t(5) = 3.88$, $p = 0.012$). Themes: *(1) At 6 months—what difference has the gardening group made?* (1.1) Self-identity; (1.2) Companionship; (1.3) Orientation. *(2) 'What difference has the gardening group meant for you, personally?'* (2.1) Respite/independence for participant; (2.2) Safe physical activity and knowing a loved one was being looked after. *(3) End of project—What difference did the gardening group make*: (3.1) Enjoyment; (3.2) Independence; (3.3) Feeling useful, having achievement; (3.4) Feeling valued; (3.5) Reduced anxiety— 'Small size of group led to reduced anxiety for participant and carer'.
Ibsen et al., 2018 [35]	The highest # of farms were in the central and south-eastern part of Norway. • All but three FDCs typically had agricultural production. Income information for 23 farms: 83% had >50% of total income from farm production or funding sources other than the FDC. • Farms often had several buildings. Most FDCs reported having a separate building dedicated to day care purposes. Only four of the services took place in the farmer's own house. • All farms reported that participants spent time in the yard or in a garden. Many reported using their own or others' uncultivated farmland, the nearby forest, or lake. • All FDCs, except two, had animals. In total, 78% included animal-related activities, e.g., preparing food, feeding the animals, watching the animals. • n = 6 offered welfare services to other target groups, e.g., school children or groups in need of vocational training, in parallel with the service for PLWD. Some FDCs had other groups than PLWD on separate days. • For all FDCs, a municipal health care unit was responsible for assigning the day care services to PLWD; n = 18, this was done in collaboration with the farm service provider in the farm; n = 14, the municipality selected participants on their own. • The season influenced which activities took place at the farm. The most common activities were going for a walk outside, and social interaction indoors, often related to meals. Farm activities involving work with plants, including flowers, fruits, and vegetables, occurred at 90% of the FDCs. • n = 9 (28.1%) day care for young participants. More than half (n = 19) had young PLWD (≤65 years of age) and/or PLWD at an early stage as their primary target group; n = 13 included PLWD in general. n = 227 total participants: • The average # of participants per day = 5; the average # of days per week = 2.8; the average # of participants per employee = 2.3; the average hours per day = 5.3. • A typical day usually started between 9:00 a.m. and 10:00 a.m. and ended between 14:00 p.m. and 15:30 p.m. Most FDCs served three meals each day: breakfast at arrival, a lunch/coffee break, and dinner before the day ended. Between the meals, there were indoor or outdoor activities. • All reported that participants spent time outdoors every day; Summer—between 1 and 4 ½ hours; Winter—between ½ hour and 4 h. • n = 7 had small groups (1 to 3 participants), n = 19 had medium groups (4 to 6 participants), n = 6 had large groups (7 to 10 participants)

Table 3. *Cont.*

Author(s) Year	Results
Hewitt et al., 2013 [24]	Personnel: Regular nurse, n = 17 (53.1%); health-educated personnel, n = 25 (78.1%); volunteer workers n = 20 (62.5%) All highlighted the opportunity to choose activities individually tailored for each participant. • n = 22 FDCs reported they met with the PLWD, the next of kin or both, when the PLWD started. • n = 15 filled out a written document designed to gain knowledge about the background and resources of the PLWD • All had regular conversations with the PLWD, next of kin or both, focusing on the participant's well-being at the farm • More than 40% wrote a daily summary, which the participants could bring back home to their relatives • n = 2 reported that dialogue with the participants was their only information source.
Ibsen et al., 2020 [36]	Fifteen farms (60.0%) had health-educated personnel with a bachelor's degree. All farms, but one, had animals. The mean # (SD) of days at FDC per week = 2.2 (0.9); the average # (SD) of participants per day = 5.9 (1.3); the average # (SD) of employees per day = 2.2 (0.6); the average # of participants per employee = 2.7 The average time (SD) spent at the FDC = 5.8 h/day (1.3). The mean time (SD) spent outdoors summer and winter = 2.2 h (0.6); Summer—average 2.9 h (range 1 to 4.5 h) outdoors; Winter—average 1.4 h (range 0.5 to 3 h) outdoors. The mean # (SD) physical active (≥20 min) days per week mean = 2.9 (3.6). QoL associated with the following: the experience of having social support ($p = 0.023$); a low score on depressive symptoms ($p < 0.001$); spending time outdoors at the farm ($p < 0.001$). In total, 14% of all the variance in QoL was explained by the variable time spent outdoors at the FDC.
Ibsen T.L, & Eriksen S., 2021 [37]	# of days at FDC per week: range = 1 to 4 days; 1 day (n = 1), 2 days (n = 5), 3 days (n = 3), 4 days (n = 1). Three main categories (and corresponding sub-categories): (1) *Social relations*—being part of a fellowship. (1.1) Social relationships that occurred = to other participants, providers and animals. (1.2) A special fellowship due to the similar situation of having dementia helped participants use humor as a coping strategy with their diagnosis. (2) *Being occupied at the farm*—occupied in different ways with activities that provided meaning and a feeling of usefulness. (2.1) Feels like working—the farm was viewed as a place of work, the activity was meaningful and experienced as 'real work'. (2.2) Being active—there was a great variety of activities, physically active while working; there were many walking opportunities. (2.3) Being outdoors—added to their experience; natural surroundings; the outdoors facilitated natural conversations; attached to animals, animals were perceived as more like a part of the outdoor scenery. (3) *Individually tailored service*—(3.1) being seen for who I am—providers facilitated work tasks in accordance with their individual abilities. This revealed a feeling of being seen by the provider as someone who had skills that were useful and even needed; personality was respected and taken seriously; (3.2) being one who contributes—participants had influence on the activities and they, to some extent, could choose between different tasks; there was the opportunity for participants to do things that might be new and challenging; this contributed to the participants' feeling of mastery and self-esteem since they were able to handle the delegated work; (3.3) attending day care at a farm makes me feel like a real participant—an active part in the relationships with others and in the work and help; the farm context was a natural setting for outdoor activities, and work tasks were characterized as authentic farm work that needed to be done; participants were allowed to use their competency at different tasks and had the opportunity to have an influence on their stay at the day care.
Innes et al., 2024 [38]	Themes: (1) *Outdoor-based care was conceptualized as the following: (1) built environment*—the nature and design of the built environment influenced whether participants described a location as favorable for outdoor-based activities for PLWD; and (2) *outdoor activities*—a range of formal activities promoting engagement with the outdoors, in particular, natural environments. PLWD, older adults, and care partners also talked about less formalized activities as important either on their own or together in locations they enjoyed. (2) *Perceived benefits*: (2.1) *mental*—emotional well-being, the outdoors is a place where mood and emotions could be experienced in a positive manner, the mood improves, a sense of freedom is experienced, feelings of acceptance and connections to people and their communities are realized. Gardening activities were perceived as an opportunity for therapeutic benefit and to give a sense of purpose for PLWD; (2.2) *social well-being*—connecting with others, chance social connections, being outdoors allows for placing oneself to be with others and choosing to engage or not, there is the opportunity to be part of, and build, a community, see wildlife, and be with pets and animals; (2.3) *physical well-being*—moving one's body, physiological benefits.

Table 3. *Cont.*

Author(s) Year	Results
Morris et al., 2021 [39]	Before the GLC interview, four themes: (1) *Well-being through gardening*—(1.1) a general love of gardening and enjoyment of being outdoors; (1.2) access to an outdoor space and the opportunity to engage in gardening was important; (1.3) relaxation and the therapeutic benefit of gardening was important; (1.4) participants enjoyed watching plants grow, giving them a sense of satisfaction and a feeling of purpose. (2) *Social connectedness*—(2.1) gardening provided a social environment where they could connect with other people; the importance of sustaining and building upon these relationships through the GLC.; (2.2) friendships with like-minded people in similar situations, which are based on a mutual purpose, enabled individuals to work together bringing enjoyment and satisfaction. Friendships were a key motivator for current and former care partners attending the GLC; (2.3) gardening provided opportunity to connect socially and engage in new activities; (2.4) former care partners highlighted that through a communal gardening group, they could share their experiences and empathize with other group members; (2.5) GLC offers a trusted social environment where members feel supported and can fulfil a need to support others. (3) *Increasing knowledge*—(3.1) a motivation for participation was to improve the knowledge of gardening and dementia; (3.2) learning among participants—varying levels of expertise create an environment where group members can learn from each other and further enhance a sense of social connection. (4) *Active participation*—(4.1) a desire to engage in a range of activities related to participants' creative interests and activities they would like to spend more time doing. DCM findings during GLC: participants spent the majority of their time engaged and experiencing good overall levels of well-being. At no point during mapping was ill-being recorded. The mean ME score was +2.5 indicating a good and sustained overall level of mood and engagement. Post-GLC, follow-up interviews, five themes: (1) *What is a good life?*—Having active participation in a social life is a key aspect of living a good life. (2) *Active participation*—participants reflected positively on the autonomy afforded by the GLC—the number of different things on offer and the lack of prescribed ways of conducting oneself during sessions. (3) *Social connectedness and peer support*—peer support was experienced and a supportive environment was created. (4) *What could be improved?*—More PLWD attending groups like the GLC. (5) *Impact of COVID-19*
Noone & Jenkins, 2018 [40]	Three themes: (1) *Gardening and identity*—gardening activities offered the opportunity to express elements of identity that had become less prominent on their dementia journeys. (1.1) Care staff believed the ability to participate in an activity that the participant enjoyed had improved their level of engagement. (1.2) Express aspects of the participant's character; (1.3) there was the opportunity for the participant to share his/her extensive gardening knowledge. (2) *Gardening and agency*—a sense of agency was expressed through gardening. (2.1) There was a sense of control and involvement in the project; (2.2) a freedom of choice afforded through the project represented an opportunity that was lacking in their everyday lives; (2.3) the opportunity to work autonomously in the garden appeared to be particularly enjoyable; (2.4) the ability to work autonomously and make free choices was a primary benefit of gardening for PLWD; (2.5) the group's successes had defied the expectations of others; (2.6) the ability of the garden to offer PLWD a sense of freedom from the restrictions impinging upon their everyday lives. (3) *Gardening and community*—gardening created an opportunity to create a new social dynamic. (3.1) This saw the emergence of a new social group, changing dynamics as a consequence of the study; (3.2) this gave participants the confidence to break out of their social routine; (3.3) the creation of a new group dynamic, distinct from the larger day center group, and mutual interest in it encouraged the development of new friendships.
Oher, Tingberg, & Bengtsson, 2024 [25]	Two main categories (and related sub-categories): (A) *Being Comfortable in the outdoor environment*—represented the need to be able to, and dare to, use the outdoor environment. Seven environmental qualities which constitute considerations of the physical environment were discussed by people with YOD and/or staff: (A1) closeness and easy; (A2) entrance and enclosure; (A3) safety and security; (A4) familiarity; (A5) orientation and way finding; (A6) different options in different kinds of weather; (A7) calmness. (B) *Access to nature and surrounding life*—represented what makes spending time in the outdoors interesting, enjoyable, rewarding, and meaningful. Thirteen environmental qualities, which constitute considerations of the physical environment, for designers to pursue in order to increase the possibility of both stimulation and restoration: (B1) contact with surrounding life; (B2) social opportunities; (B3) joyful and meaningful activities; (B4) sensory experiences of nature; (B5) species richness and variety; (B6) seasons changing in nature; (B7) culture and connection to the past; (B8) openness; (B9) symbolism and reflection; (B10) space; (B11) serenity and peace; (B12) wild nature; (B13) secluded and protected.

Table 3. *Cont.*

Author(s) Year	Results
Robertson et al., 2020 [41]	Themes identified: (1) *Being with Others: Social Inclusion, Participation and Confidence*—(1.1) the most prominent benefit was the increase in social integration and social health more broadly. (1.2) Individuals interacted with a more diverse group than might happen elsewhere; (1.3) attending the walks gave PLWD the opportunity to meet and spend time with other people, in a relatively safe, supported environment; (1.4) the combination of a predominantly open membership combined with group norms encouraged informal engagement and PLWD were recognized and valued as 'full' members. (1.5) Being part of a group often offered an opportunity to connect organically with others who had shared/similar experiences and created understanding between members which fostered enabling (rather than disabling) practices; this created a sense of community, and friendships emerged. (2) *Reciprocity and Looking Out for Each Other: Creating a Safe and Secure Social Environment*—(2.1) groups created a safe and secure social environment where participants engaged in meaningful activities supportive of their physical, mental, and social health. (2.2) Safety and security were important to walkers with and without dementia, and walk leaders were considered within the ethos of dementia-inclusiveness. (2.3) Participants valued the walking groups as a place where family carers and the person they cared for could spend some time apart, gaining some respite from each other; (2.4) opportunities for mixed abilities, e.g., different length walks depending on mobility and support from other group members, this meant that carers could feel reassured that their partner would be looked after by others while they spent time with other people; (2.5) potential catalyst for PLWD to develop new social relationships and networks, while supporting them to be active participants in their local communities. (3) *Accessing the Outdoors: Promoting Agency and Capacity through Physical Activities*—(3.1) walking groups functioned as part of a wider initiative to support attendees to take proactive steps to maintain health; (3.2) Walking was discussed as proactive and reactive responses to health concerns, and as a valuable and valid method of promoting/maintaining health; (3.3) walking was an activity that could be made accessible for people at various stages of their dementia journey; (3.4) walking groups functioned as spaces where the challenges faced by PLWD were validated and respected alongside challenges faced by others rather than in isolation; (3.5) physical gains—walking could reassert confidence, agency, and capacity; (3.6) walking was socially situated; exercise was more enjoyable when performed with others; (3.7) a continued participation via walking was enabled as a healthy and meaningful activity which reinforced a broader commitment to and acceptance of adaptation and enablement for all members irrespective of a formal diagnosis.
Schols, van der Schriek, & van Meel, 2006 [42]	Care Farm participants: • Mean visit frequency = 2 days/week; Mean participation time = 4 months. • Mean Barthel = 17. • Mean # of drugs used = 3.0; mean # of psychopharmaca = 0.5. • Behavior problems, n = 0; reported problematic behavior at reference time, n = 0 (0%); sundowning at reference time, n = 5 (38%). • Active (involved), n = 1 3 (100%); afternoon nap, n = 0 (none). • Medical involvement, n = 0; paramedical involvement, n = 0. • Satisfaction of family, 100%. Day care at nursing home participants: • Mean visit frequency = 3 days/week; mean participation time = 5 months. • Mean Barthel = 13. • Mean # of drugs used = 4.8; mean # of psychopharmaca = 1.0. • Behavior problems, n = 10; reported problematic behavior at reference time, n = 10 (42%); sundowning at reference time, n = 17 (71%). • Active (involved), n = 16 (66%); afternoon nap, n = 8 (33%). • Medical involvement, n = 24; paramedical involvement, n = 19 (1/week). • Satisfaction of family, 50%.

Table 3. *Cont.*

Author(s) Year	Results
Smith-Carrier et al., 2021 [43]	Master Themes: (1) *Digging in the dirt: Activating the sense of touch*—(1.1) participants clearly enjoyed being in the natural environment and derived much pleasure from activating their senses through gardening. (1.2) 'All of it' (the experience of gardening) was valuable; (1.3) the sense of touch, particularly the feel of the dirt, emerged as the most important; something everyone can do. (2) *Reminiscence ignited: Links to the past in our eternal gardens*—(2.1) all senses were activated in the garden, bringing about precious memories. The sense of smell was especially identified as a key mechanism for cultivating reminiscence; (2.2) participating in the garden had the power to bring forward pleasant memories and erase painful thoughts of the present. (3) *A sense of accomplishment for engaging in productive work*—(3.1) gardening gave an implicit sense of being productive, and of contributing to the greater good, prestige of hard work, satisfaction. (3.2) Gardening was not perceived to be a favourite pastime or hobby but a job, with the prestige and status that comes with hard work. (4) *Being together: The social benefits of gardening*—(4.1) shared sense of being part of something larger than oneself. (4.2) Working with the group reduces sensations of physical pain. (4.3) Gardening fosters the development of intimate relationships and provides camaraderie that gives a feeling of connection. (5) *Finding meaning: Curiosity, wonder, and lifelong learning*—(5.1) participants used the seasons as an analogy for the circle/cycle of life. (5.2) Regardless of one's age or stage in the cycle of life, individuals maintain a deep sense of curiosity and the need to keep learning. Lifelong learning, curiosity and wonder. (6) *'It's just another season': Cultivating peace and hope*—(6.1) gardening was meaningful as it gave a sense of hope for the future. (6.2) In the garden participants were able to 'focus on the present'; this mindful awareness brought them peace, and hope. (7) *Reaping the benefits of positive and physical well-being*—(7.1) both the physical and therapeutic exercises of gardening had positive effects on mental health, reducing feelings of depression and increasing levels of happiness. (7.2) Positive emotions generated in the garden are not only experienced during the actual gardening activity but stay with participants for extended periods afterward.

Abbreviations: # = number; ADS = Adult day services; BADL = Basic Activities of Daily Living; BWBP = Bradford Well-Being Profile; DCM = Dementia Care Mapping; FDC = Farm-based dementia care; GCF = Green care farms; GLC = Good Life Club; IADL = Instrumental Activities of Daily Living; IDDLD = Interview for Deterioration in Daily Living in Dementia; ME = Mood and engagement; MMSE = Mini Mental State Examination; = PLWD = People living with dementia; QoL = Quality of Life; SE = Standard error; SD = standard deviation; TUG = Timed up and go; VD = Vascular dementia; YOD = Young onset dementia.

The ages of PLWD ranged from 43 years [24] to 96 years [33,36], with a total of 14 women, 14 men, 199 female and 260 male participants. Types of dementia included the following: Alzheimer's disease (AD, n = 61), vascular dementia (n = 19), Parkinson's-related dementia (n = 2), frontotemporal dementia n = 2, mixed AD/vascular n = 2, Lewy body dementia n = 1, other dementia diagnosis n = l2; unknown/unspecified n = 116. Mean years with dementia ranged from 1.8 years [27]) to 6.8 years [28]. PLWD participants had mild (n = 59), moderate (n = 160), and severe impairment (n = 2). There were 44 female and seven male care partner participants [28,29], with a mean of 68.3 and 72.5 years [28], ranging from 46 to 82 years [29].

3.2. Types of Outdoor-Based Care and Support Programs

Two studies examined outdoor-based care and support programs broadly, with service providers, organizations, and staff describing initiatives, structure, and formats [34,38]. Specific program types comprised the following: nature-based adult day services (ADS, n = 2) [29,34]; green care farm (GCF) programs (n = 3) [27,28,34]; care farm (n = 1) [42]; farm-based day care (FDC) programs (n = 6) [30–32,35–37]; gardens, gardening or outdoor horticulture (n = 6) [24,25,33,39,40,43]; and health walks walking group (n = 1) [41].

Service provider participants in Innes et al.'s 2024 study [38] conceptualized potential and realized outdoor-based programs within the context of the following: (1) the favorable and potentially unfavorable location and structure and design elements of the built environment and the eco-systems of the natural environment for creating opportunities for use in providing support and care to PLWD; and (2) the type of activities that could be

undertaken in built and natural environments that would promote engagement with the outdoors, e.g., formal activities, such as gardening and walking.

Hassink and colleagues' 2019 study [34] identified five main types of formal outdoor-based programs that could be realized in an urban setting: (1) nature-based day services offered by social entrepreneurs either using their own facilities, e.g., nursery, city farm, or within existing facilities, e.g., community garden, city farm; (2) nursing homes opening their gardens to PLWD living at home; (3) social care organizations setting up nature-based activities, e.g., city farm; community gardens set up by citizens; and hybrid initiatives whereby care organizations initiated nature-based day services with other institutional partners, e.g., garden, or social entrepreneurs, e.g., city farm. Although program types varied, typical outdoor-based activities across programs included growing and harvesting vegetables and flowers, taking care of the animals, making raised beds, and walking.

Sixty percent of the included studies examined nature-based, care farm, GCF programs (Netherlands) or farm-based day care FDC programs (Norway). These types of programs comprised a range of outdoor and nature-based activities delivered within a farm or other nature-based outdoor setting, such as a community garden. While seasons may have influenced activities, they typically included the following: farm- and/or animal-related activities, e.g., feeding the farm animals; garden- and yard-related activities, e.g., painting fences, gardening [30,34,35,37], and walking [30,34,35,37]. Days per week ranged from 1 to 4 days [37]), with the mean number of days per week ranging from 1.8 [26] to 2.8 [35]. Time spent outdoors ranged from ½ hour to 4 h in the winter, and from 1 to 4 ½ hours in the summer [35].

Six included studies focused on specific outdoor-based garden or gardening programs. Two studies described gardens/gardening programs within a university campus setting, and included the perspectives of PLWD and care partners in the design: (1) an 8-week long nature-based program in a rehabilitation garden for YOD participants [25]; and (2) the Good Life Club (GLC) garden [39]. One study described a 6-week gardening program in a garden located on the grounds of a community hall which hosted a day center, with participants suggesting activities incorporated into subsequent sessions [40]. One study described a 10-week structured horticultural therapy program which took place in a 'dementia-friendly' designed and landscaped garden space, based on best practice knowledge available at the time [33].

One study examined a weekly health walks program, specifically walking groups supported by volunteers ("Paths for All", Scotland). Walks occurred in a range of urban green spaces and rural locations, taking a circular route lasting approximately one hour, with a set end-point usually at a local café [41].

3.3. Opportunities and Benefits

Many opportunities and benefits, examined qualitatively and quantitatively, were reported. Three studies [28,29,38] described what an outdoor-based program broadly or specifically (e.g., GCF), afforded PLWD as related to the outdoor context/setting: a green and natural environment, a sense of space and freedom, being in and "feeling" the outdoors, being physically active, and being with animals. PLWD participants made a deliberate choice and were motivated to attend this type of program for these reasons [28,29].

The essence of and connections with nature and the outdoors had notable relevance and value for PLWD, with participants expressing 'fondness', 'like', 'love' of the outdoors or outdoor activities [29] and deriving pleasure from natural environments, e.g., sitting in the sun, 'lots to see', species richness and variety, sensory experiences from stimuli [25,29,43]. Entering the outdoor space could be like entering another world, which added meaning

and relevance to the overall experience. Being in a private place, only "theirs", created a sense of identity and community, and a positive feeling of being part of a "we" [25].

The green environment was relaxing, calming, and therapeutic [25,29,33,39] and brought back happy memories of childhood [29,33,43]. Positive feelings and emotions were not only experienced in the moment during the activity, but extended for a time afterward [29,33,43].

Outdoor-based program activities were regarded by PLWD, care partners, and services providers as stimulating, useful, meaningful, and purposeful which gave rise to feelings of being useful, and a sense of achievement/accomplishment for PLWD [25,28,33,37,43]. Seasons changing could facilitate orientation by providing clues for PLWD with time and space orientation difficulties [25].

Outdoor-based programs that offered freedom of choice facilitated engagement and meaningfulness and promoted alignment with the PLWDs' interests and capabilities [29]. Participating and handling new and challenging activities contributed to PLWDs' feelings of mastery and self-esteem [37]. A structured program, e.g., a fixed day at an ADS with jobs and activities at certain times and structured activities, provided a degree of direction which was deemed beneficial by care partners [29] and also enhanced experiences for PLWD [25,33]. Unstructured activities provided autonomy [33,39] and allowed PLWD to assume risks as they saw fit [33].

Participating in outdoor-based programs provided opportunities for PLWD to share their knowledge and expertise, e.g., about farming, gardening, or to gain knowledge and learn from other participants [29,39,40,43]. Outdoor-based programs that created a sense of inclusion and belonging through more open 'membership' or opportunities to interact with others, e.g., not just PLWD, and were structured so that time and space, organically or purposefully, allowed for informal engagement led to within- and outside-program opportunities and benefits for both PLWD and care partners including: the expansion or creation of (new) social circles and dynamics, meaningful and enhanced rapport among participants, the sharing of experiences and feelings, a decreased focused on the disease and what is to come, and the formation of friendships [25,29,33,39,40].

Program location and proximity, e.g., to the PLWD's home or integrated into the local community, were considered important [25,29,41]. Program staff and volunteer characteristics and demeanor, e.g., calm and friendly, enthusiastic and passionate, treating PLWD with dignity, listening carefully to PLWD and respecting preferences and capacities, demonstrating interest in the PLWD and care partners, facilitated and enhanced social interactions with and between participants, and provided a sense of security and reassurance that the PLWD were being looked after and that staff were taking good care of them, assuaging concerns and anxieties [29,37,41].

There were a number of key factors that promoted program development and implementation realization: knowledge about financing, dementia care, and running a project; and entrepreneurial behavior, e.g., networking, being creative, having guts, taking risks, strong motivation, and perseverance [34].

3.3.1. Quantitative Findings

Quantitative methods and measures used to assess outcomes varied widely across the studies, see Table 3. One study found that being outdoors was not associated with emotional well-being [32], and two studies reported no statistical changes in the outcomes assessed: longitudinal changes in performance in GCF versus regular day care (RDC) participants [27] and Bradford Well-Being Profile scores in people with YOD in a structured group gardening program [24]. Benefits, summarized by category due to heterogeneity, were reported in 85% of the studies (n = 17):

(1) Being more active/having higher levels of physical effort, e.g., carrying out activities while standing versus sitting, walking, less napping [30,31,34,42];
(2) Spending more time outdoors [26,30];
(3) More social interactions [30,31];
(4) Positive or improved mood [30,31,39];
(5) Improved or higher emotional well-being [31,33];
(6) Higher levels of engagement, being engaged, e.g., in the activity [33,39,42];
(7) Greater quality of life scores percent of variance explained by, or associations with, being outdoors [36];
(8) Fewer behavior problems and less need for medical or health care interventions [42].

3.3.2. Qualitative Findings

Studies that used qualitative methods also reported numerous benefits, often overlapping with the benefit categories found in the quantitative studies. Some studies reported benefits theoretically, e.g., potential/perceived, and others reported realized benefits; benefits were similar regardless. Benefits in the following domains and areas were described by PLWD, care partners and service organization participants:

(1) Social domain: Benefits in this domain were reported most often. Outdoor-based programs served as a platform for supportive social circles, social connections, and connectedness, social integration, engaging in socially relevant activities, and meeting new people leading to: increased interactions with others, a sense of belonging, feeling and being a "part of something" [28,41]; being and feeling a part of a group and community [25,33,37–39,41]; social health [38,41]; and, camaraderie [25,41,43].

(2) Physical domain: Outdoor-based programs and activities provided many opportunities for PLWD to be physically active and move their bodies [37,38]. Physiological benefits such as physical health and physical gains were reported [38,41]. Becoming physically tired helped reduce anxiety, depression, the need for medication, and various behavioral disorders [25].

(3) Psychological domain: Care partners described PLWD as 'happy' and 'enthusiastic' about outdoor-based program and activities [24]. Emotional well-being, positive mental health, reduced feelings of depression, improved mood, mental well-being, and increased levels of happiness were realized [38,41,43].

(4) Cognitive domain: Very few studies explored this domain. Better orientation was noted in one study [24].

(5) The care partner: Care partners were provided with respite, as they did not have to take care of or worry about their relative for the day and were reassured as their relative was at the right place, which they liked to visit [24,29]. Care partners reported receiving support from the program staff and feeling less alone and noted the following: less burden; being able to engage in their own activities and social interactions; more freedom [24,28,29] and feeling less guilty [24,29].

3.4. Challenges

Various challenges, barriers, and concerns were identified in seven studies [25,29,33,34,37,38,41]. Although diverse, they were most often related to risk and safety considerations, and development, implementation, and delivery factors.

Location/space was viewed as a potential barrier at the individual and program level. Although considered within a 'positive risk-taking' context [33], various natural and built environment-related issues are inherently present, making a location or space less desirable for service providers [25,38,41] due to potential hazards, risks or safety issues for the PLWD.

Concerns about potential risks, safety, and security were expressed by care partners, PLWD, and service providers [25,33,41]. Some were related to dementia-related issues within the context of the location/space, e.g., PLWD may experience disorientation and have difficulty wayfinding [25,41]; PLWD may have strong and negative reactions to nearby traffic noise [25]; and care partner concerns about their loved one engaging in new activities in new spaces [41]. Others were related to the intersection of location/space and being outdoors: falls, balance problems, sun- and heat-related issues (e.g., sunburn, dehydration, feeling too warm), plant hazards, water [25,33,41]. Fatigue due to overstimulation may be a potential issue [25,33] and different personalities and participants with varying levels of impairment may create challenging situations [37].

Weather and programming in particular seasons were identified as potential challenges, e.g., persuading PLWD to participate in activities and go outside when the weather was bad could be difficult [34] and required different options [25]. During holiday seasons, there were regular changes in staff which care partners perceived as less positive [29].

A scarcity of green spaces in city centers and creating new locations required considerable time and financial investments [34]. A lack of a sustainable or consistent location may make it challenging to persuade PLWD to participate in activities [34]). Additional challenges and barriers linked to program development, implementation, and delivery included the following: lack of resources; decreased funding in the face of increasing support and care needs; difficulty finding or having to rely on volunteers; developing and maintaining support, enthusiasm, commitment and ownership among organizations, employees and municipalities; program location, and transportation and access [34].

4. Discussion

The ever-increasing prevalence of AD and related dementias, as well as associated consequences for PLWD and their care partners, is the most significant health, social, and economic crisis of the 21st century. Globally, dementia societies and organizations are emphasizing the need for appropriate and effective non-pharmaceutical approaches to managing symptoms and enhancing well-being. Our scoping review of literature published across more than two decades aligns with this necessity through the collation and summarizing of the various types of outdoor-based care and support programs that have been explored and implemented, and the related opportunities, benefits, and challenges, and the characteristics of the PLWD who attended these programs. We specifically focused on community-dwelling PLWD and structured programs needed to fill a gap, as, to date, outdoor and nature-based programs and activities have been predominantly explored in PLWD who are in residential care settings or have focused on unstructured outdoor activities.

People earlier in their dementia journey reported valuing the outdoor environment for a variety of reasons, including exercise, fresh air, and emotional well-being. Not being able to go out has been found to be associated with feelings of depression [44]. Our work also emphasizes the potential of outdoor-based care and support programs to improve a quality of living and quality of life for PLWD and their care partners.

The importance of exposure to the outdoors and nature has become more prominent in the literature [45,46], underscoring critical implications for health and social care practice and policy through 'nature prescriptions' [47] and 'social prescribing' [48], which are also applicable for PLWD. Furthermore, connecting to nature and spending time outdoors is increasingly being recognized for its beneficial physical, mental, and social effects. Exposure to the outdoors, nature, and greenspaces has been found to be associated with numerous health benefits and health outcomes in the general population [49–53], including positive brain health [54,55]. Included studies in this scoping review reported that compared to

community-dwelling PLWD participating in RDC programs, PLWD in outdoor-based programs spent more time outdoors and more time being physically active outdoors (e.g., [26,30]). However, these studies did not examine broader health benefits and health outcomes related to time spent outdoors and being active outdoors, a research gap that warrants being explored in the future.

As described in some of our included studies [29,33,39,42] and the work of others [18], outdoor-based programs provide PLWD opportunities to engage in enjoyable and meaningful activities aligned with their pre-dementia lives, interests and abilities. Engaging in meaningful and purposeful activities has been shown to enhance quality of life [56] and well-being [57]. Additionally, outdoor-based care and support programs can affirm and reaffirm agency, autonomy, capacity and identity through engagement in activities in a trusted and positively connected social environment. Outdoor-based programs for PLWD integrate a biopsychosocial approach [58], which recognizes the psychological and social aspects as well as the physiological aspects of care and support and the concepts of person-centered care which promote a sense of personhood and well-being by meeting four psychological needs: comfort, attachment, inclusion, and identity [59]. PLWD experience many changes which are not due to the disease and their interactions and experiences along the disease trajectory. The potential and realized social, psychological, and physical benefits of outdoor-based care and support programs for PLWD, as described by the experiences and perspectives of those living with dementia, care partners, and service providers in the included studies, aligned with all four personhood needs concepts. Additionally, there were several reported benefits for care partners.

4.1. Limitations

Scoping review methodology typically does not include an assessment of study quality [23]. Because we set our search start date as 1 January 2000, seven years before observational and qualitative research reporting guidelines were published, e.g., Consolidated criteria for reporting qualitative research (COREQ) [60] and Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) [61], and in keeping with scoping review methods, we decided a priori to not undertake a quality assessment of the included studies. A lack of assessment of the study quality may potentially hinder the uptake of findings into practice or policy [62].

Not all included studies had similar participant inclusion and exclusion criteria; nor did all studies report participant demographics or report similar demographics or particular demographics in a similar manner, e.g., some studies did not report age, some reported age mean, and others reported age range. This makes it difficult to compare and contrast among the included studies, generalize care and support program benefits, opportunities, and challenges for a particular sub-population of PLWD, and make definitive recommendations for practice and policy. Benefits and challenges are likely dependent on the specific type of program and target population. Similarly, study designs, methods, and outcome measures and assessment tools used across the included studies were highly variable, again making it difficult to compare and contrast the findings, generalize findings, and make recommendations.

We limited our inclusion criteria to outdoor-based care and support that was organized (e.g., a formal program to expand on the literature) versus including informal activities (e.g., PLWD decides to go for a walk in nature). We intentionally chose this novel focus to address gaps in the literature. Our choice of search terms may have limited the number of papers appearing in our search, as some terms may not have been included in a title or abstract. Although we used a broad search strategy across seven databases, some relevant papers may have been missed. In addition, we focused our scoping re-

view to peer-reviewed primary studies published in the English language. All included studies were conducted in developed countries, limiting the diversity of the research. We did not search for grey literature. Relevant thesis work yet to be published in a peer-review publication and non-peer-reviewed reports and documents relevant to our aim were not included.

4.2. Future Directions

The heterogeneity of reporting across the included studies underscores the need for standardized data collection and reporting, e.g., a core set of demographic variables that should be collected and reported in all studies and the use of outcome measures applicable to this evolving area of research. A large number of measures have been developed and evaluated for research with PLWD and care partners of PLWD. However, which measures are most relevant and clinically and personally meaningful to elucidate the effects and effectiveness of outdoor-based programs for stakeholders across the spectrum, e.g., community-dwelling PLWD, their care partners, practitioners, and policy-makers, has not yet been determined. Outcome measure choice may nullify findings of a rigorously conducted study [63]. Heterogeneity across studies has also been reported in a recent systematic of outdoor garden use in PLWD in nursing homes [64]. As noted previously, this is problematic for comparisons across studies. In addition, heterogeneity makes planning studies difficult and limits the ability for conducting comprehension meta-analyses, e.g., pooling data [63].

Many of the reported benefits were within the social domain. It is unclear whether benefits resulted from outdoor-based care and support programs versus an interaction effect with the social connectedness component of these types of programs. Few studies examined changes or benefits in the cognitive domain. To what extent outdoor-based care and support programs affect aspects of cognition is not known. As memory and executive function are common impairments in PLWD, assessing cognitive domain measures sensitive to change may be of importance. A minimal number of PLWD participants had more severe cognitive impairment scores. Whether or not the reported findings of the included studies would be generalizable to people with more advanced dementia is unknown. Identifying outdoor-based program planning, implementation, and service delivery needs for people with more advanced dementia, e.g., adaptations and potential issues, would be important to explore.

Quantitative studies to date have been limited to cross-sectional or observational designs, and studies with small sample sizes, or lacking sample size or effect size calculations. Some studies using qualitative or mixed methods articulated a specific qualitative design; however, many did not. A preponderance of included studies, including those more recently published, did not refer to reporting guidelines. Evidence-informed practice and policy depends on scientific rigor in research conduct and reporting and trustworthy findings for decision-making and implementation. Co-produced, theory-driven research studies and designs; considerations of alterative study designs, e.g., hybrid implementation designs, randomized control trials or quasi-experimental designs if randomization is not possible or desirable; increasing the number of longitudinal and mixed methods studies; qualitative studies with clearly described methodological orientation and theoretical frameworks; and studies adhering to reporting standards would expand and strengthen the evidence base in this area for PLWD, care partners, service organizations, practitioners and policymakers.

At an individual level, outdoor-based programs may be of value in supporting PLWD to remain at home, through maintenance and enhancement of social, mental, emotional and physical health and well-being, and decreased caregiver burden. This has yet to be

explored. Evidence is needed to understand the scope and breadth of the long-term effects and benefits and upstream and downstream system-level implications of outdoor-based programs of PLWD to remain at home, with quality of living and quality of life, for longer and for as long as possible. At a community-level, outdoor-based programs may be of value in increasing public awareness about dementia, the need for inclusive natural and built outdoor environmental design, and the need for a rights-based approach to the social inclusion and participation of PLWD in their communities in meaningful ways and for as long as possible. These opportunities have also not yet been realized.

Building capacity at individual, community, and organizational levels to implement and sustain initiatives is difficult; and, as noted by others [18] initiatives may be difficult to sustain long-term due to the reliance on securing funding. Hassink and colleagues' work [34] described various outdoor-based program models and suggests that a multi-functional use of existing locations, such as city farms and community gardens, may be a practical mechanism to facilitate implementation in the urban setting. Although focused on implementation in long-term care facilities, a recent scoping review provides many insights into facilitating and impeding implementation factors of nature-based interventions, classified into the five domains of the Consolidated Framework for Implementation Research, [65] several of which were also reported in several of our included studies [25,29,33,34,37,38,41]. Implementation research studies may assist community-based, social, and health service organizations and municipalities to recognize the opportunities and benefits of integrating outdoor-based programs for PLWD and care partners. Engaging stakeholders in an asset-based approach to identify and mobilize relationships, strengths, and resources is key to gaining and sustaining support and finances. Cost-effectiveness analysis for non-pharmacological and supportive care interventions is scarce [66]. In the context of healthcare system resource allocation, evidence of the value for money of outdoor-based care and support programs for community-dwelling PLWD and their care partners, particularly looking towards long-term individual-level and upstream and downstream societal and social and health system benefits, would further inform and support implementation, delivery, practice, and policy.

5. Conclusions

Engaging with nature and the outdoors through structured outdoor-based programs reflects a shift away from more traditional and medicalized approaches to dementia research and management and care. Our scoping review highlights the noteworthy realized opportunities, benefits, and potential of outdoor-based care and support programs to promote and enhance quality of life and quality of living for community-dwelling PLWD and their care partners. This initial collation of the available evidence serves as a foundation and a call-to-action for the consistency of robust research and, more importantly, co-designed, person-focused, inclusive and innovative care and support approaches. Future research addressing identified gaps and emerging opportunities will strengthen this critical and growing field of dementia research.

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Abbreviations

The following abbreviations are used in this manuscript:

PLWD	People living with dementia
PRISMA	Preferred Reporting Items for Systematic Revies and Meta-Analyses
PRISMA-ScR	Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIMSA) Extension for Scoping Reviews
YOD	Young onset dementia
AD	Alsheimer's disease
ADS	Adult day services
GCF	Green care farm
FDC	Farm-based day care
GLC	Good Life Club
COREQ	Consolidated criteria for reporting qualitative research
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology

Appendix A

Table A1. Search Strategy Example: OVID Medline.

	Query
1	(alzheimer disease.mp OR "alzheimer-type dementia (atd)".mp OR "alzheimer type dementia (atd)".mp OR "dementia, alzheimer-type (atd)".mp OR alzheimer dementia.mp OR dementia, alzheimer.mp OR alzheimer's disease.mp) OR ((Alzheimer Disease/OR Alzheimer Disease.mp) OR (Dementia, Vascular/OR Dementia, Vascular.mp) OR (Frontotemporal Lobar Degeneration/OR Frontotemporal Lobar Degeneration.mp) OR (Lewy Body Disease/OR Lewy Body Disease.mp) OR (Mixed Dementias/OR Mixed Dementias.mp))
2	Caregivers/OR Caregivers.mp OR (caregivers.mp OR caregiver.mp OR care givers.mp OR care giver.mp OR carers.mp OR carer.mp OR family caregiver, family.mp OR caregivers, family.mp OR family caregiver.mp OR spouse caregiver, spouse.mp OR caregivers, spouse.mp OR spouse caregiver.mp OR informal caregiver, informal.mp OR caregivers, informal.mp OR informal caregiver.mp)
3	Independent Living/OR (independent living.mp OR living, independent.mp)
4	(Nature/OR nature.mp) OR (Gardens.mp OR Horticulture.mp) OR (gardens.mp OR garden.mp)
5	Support Group.mp OR Support Groups.mp OR Community Support.mp OR Group, Support.mp OR Groups, Support.mp OR Program Development/OR (program development.mp OR development, program.mp OR program descriptions.mp OR description, program.mp OR descriptions, program.mp OR program description.mp)
6	limit to (english language and humans and yr = "2000–2024")

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