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research article

A systematic review of international literature on the gender of unpaid carers attending group-based physical activity with people with dementia

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Dementia affects over 55 million people worldwide, with much support provided by unpaid carers, who struggle to access leisure-time physical activities. This review investigates gender differences in engagement in group-based physical activity for people with dementia and their unpaid carers. A systematic review from inception until 1 August 2024 resulted in the inclusion of 15 studies. The review found that slightly more males than females with dementia attended the group physical activity sessions, with most carers attending being female. Further research is required to inform interventions to promote physical activity in male and female unpaid carers for people living with dementia.

Keywords: dementia • carers • physical activity • group-based

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Introduction

The aim of this systematic review is to provide a greater understanding of gender differences in participation in different types of group physical activity that unpaid

carers of people living with dementia engage in alongside their care recipient. Both individuals with dementia and their carers are at risk of physical and mental health difficulties that could be alleviated through physical activity. However, both groups face varying barriers to accessing physical activity, and there are known gender differences in engagement in physical activity. Therefore, the focus of this review is on group physical activities designed for carers and those with dementia to attend together and the impact of gender on attendance.

Dementia is a syndrome in which there is a deterioration in cognitive function (memory, thinking, orientation, comprehension, calculation, learning, language and judgement) beyond what might be expected from normal biological ageing (World Health Organisation, 2021). It affects more than 55 million people worldwide (World Health Organisation, 2021), and as the proportion of older people in the population is increasing, the number of people with dementia is expected to rise to 78 million in 2030 and 139 million in 2050 (World Health Organisation, 2021). Worldwide, there are twice as many females with dementia as males (Kiely, 2018). Unpaid carers (for example, family members or friends) provide most of the support received by people with dementia (PWD) living at home and often continue to support them after admission into a care home (La Fontaine et al, 2016). In 2019, unpaid carers spent an average of five hours per day providing care for people with dementia, with 50 per cent of the global cost of dementia being attributed to unpaid care (World Health Organisation, 2021).

The literature suggests that unpaid carers are at higher risk of mental and physical health complications, such as anxiety, depression, stress, sleep disturbance, fatigue, pain, loss of strength, loss of appetite and weight loss (Stenberg et al, 2010; Gircis et al, 2013; Loi et al, 2015; 2016; Carers UK, 2019a; 2019b), and are known to focus less on their own health needs and report more negative health behaviours than non-carers (Chassin et al, 2010). Indeed, two thirds of unpaid carers state that they have focused on the care needs of the person they care for rather than their own needs (Carers UK, 2019b). For carers of people with dementia, the negative impact of caring can be exacerbated by the progressive and unpredictable nature of dementia and the high level of care required (Brodaty and Donkin, 2009; Newbronner et al, 2013), leading to an increased risk of health problems (Brodaty and Donkin, 2009).

It has been reported that the majority (81 per cent) of unpaid adult carers are not able to do as much physical activity as they would like (Carers UK, 2019b). Indeed, although a recent international review found mixed results with regard to differences between carers and non-carers in overall physical activity (which includes physical activity undertaken as part of the caring role), six studies focusing on leisure-time physical activity reported that carers engage in less leisure-time physical activity than non-carers (Lindsay et al, 2022). The authors of that review argue that while leisure-time physical activity is beneficial to health, the physical activity involved in the caring role (for example, cleaning, shopping, physical help, personal care and so on) may be detrimental to health. Barriers that carers face in accessing physical activity include increasing ageing, not wanting to leave the care recipient alone, the care recipient being unable to take part in activities, health conditions, fatigue, lack of time and difficulties changing the routine of the care recipient (Horne et al, 2021). For carers of people with dementia, there is seen to be decreased engagement in preventative health behaviours, such as exercise (Brodaty and Donkin, 2009).

Regular and sustained participation in physical activity is beneficial for almost all facets of health (Warburton et al, 2006; Reiner et al, 2013). Therefore, the potential of

physical activity to enhance carers' health is recognised (Lambert et al, 2016), adding to psychosocial benefits (Danucalov et al, 2017). Exercise interventions carried out with people living with dementia suggest that there is potential for exercise to improve physical function and mobility and slow down the decline in the performance of activities of daily living (ADLs) (Rolland et al, 2007; Pitkala et al, 2013). Physical activity has been found to reduce cognitive decline and the behavioural symptoms of dementia (Law et al, 2020) and has also been seen to be associated with a slower progression of dementia severity and a lower risk of mortality in people with Alzheimer's disease (Yann-Ki et al, 2018).

Exercise-based therapy may improve the health status of people with dementia but cannot work without continuous engagement, which has proven difficult to achieve (C3 Collaborating for Health, 2012; van der Wardt et al, 2017). People living with dementia, as well as their families and carers, generally find engagement with exercise challenging, with difficulties in mobility, spatial orientation and social support affecting access to activity programmes and with memory, attention and communication difficulties affecting the ability to take part in the sessions (Pomiersky et al, 2020). Previous research has shown that it is possible to involve people with dementia living in the community in group exercise programmes but that building relationships is vital to successful participation and providing support and ensuring motivation is essential for people with dementia and their carers (Taraldsen et al, 2020). Furthermore, individuals with dementia have reported the importance and the social rewards of group physical activity for maintaining selfhood (Junge et al, 2020).

One of the variables that impact physical activity participation is gender, with males engaging in more physical activity than females (Bassett et al, 2011; Althoff et al, 2017), including in older age groups (Koeneman et al, 2011; Sun et al, 2013) and with people with dementia (Kim et al, 2018). There are also gender differences in preferences for different types of physical activity, with women being more likely than men to prefer activities at a fixed time, supervised and with others of the same sex and age and less likely than men to prefer activities that are competitive, vigorous, skilled or outdoors (van Uffelen et al, 2017). It has, therefore, been suggested that gender differences should be considered when designing physical activity interventions (Hickey and Mason, 2017; Koch et al, 2022). According to National Health Service (NHS) data, of those individuals with a recorded dementia diagnosis in England in March 2020, 62.7 per cent were female and 37.3 per cent were male (NHS Digital, 2020). Additionally, 60–70 per cent of carers for people with dementia are also female (Alzheimer's Research UK, 2015). Group physical activities that appeal to female dyads may be less attractive to male or mixed dyads. In order to inform targeted interventions to promote physical activity for people living with dementia and their unpaid carers, a greater understanding of gender differences in preference towards group-based physical activity is essential. To date, no attempt has been made to collate the literature on the gender profile and preferences of carers attending group physical activity with people with dementia.

The aim of the current systematic review is to provide a greater understanding of gender differences in participation in the different types of group physical activity that unpaid carers of people living with dementia engage in alongside their care recipients. Following the 'PICO' framework (Patient, problem or population–Intervention–Comparison, control or comparator–Outcome) (Richardson et al, 1995), this systematic review aims to synthesise existing knowledge, identify gaps in the literature and provide recommendations for practice and future research.

Methods

This systematic review was conducted according to the recommendations in the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) statement (Page et al, 2021). The review protocol was registered on Prospero (CRD42020193532). The review originally aimed to focus on outdoor group activity, but the initial search revealed insufficient studies, so the scope was widened to include all group-based physical activity. There were no further deviations from the pre-published protocol.

Search strategy

The search was conducted on Medline/PubMed, SPORTDiscus, PsycInfo and CINAHL from inception until 1 August 2024 for articles written in English. The search terms (Title/Abstract) were ('Carer' OR 'caregiver' OR 'family member' OR 'informal carer' OR 'informal car*' OR 'unpaid car*' OR 'family car*') AND ('dementia') AND ('physical activity'). 'Gender' was not used as a search term, as many studies report the gender of participants under demographic information without this being the focus of the study. Additionally, grey literature was searched in Open Grey. The search term 'dementia AND carer AND physical activity' was used to identify grey literature because this was identified as the most relevant term in the exploratory and database searches. In addition, reference lists of all relevant studies, reviews and reports were hand-searched by two reviewers (Joanna Horne [JH] and Jitka Vseteckova [JV]) to identify additional literature. There were no restrictions on study design or date.

Study selection

Titles and abstracts were screened by four reviewers (Nichola Kentzer [NK], JH, JV and Mike Trott [MT]) for eligibility against the inclusion/exclusion criteria. Any disagreements were solved by consensus or by the decision of a third reviewer where necessary. The researchers were inclusive at this stage, and if there was uncertainty about the relevance of a publication, it was retained. The full text was obtained for all the records that potentially met the inclusion criteria (based on the title and abstract/summary only). Full-text screening was conducted by five reviewers (JV, NK, JH, LS and MT) for eligibility against the inclusion/exclusion criteria.

Inclusion criteria

Studies were included if they met *all* the following criteria:

- were published in English;
- related to unpaid/informal carers of any age caring for individuals having been diagnosed with any type of dementia and at any stage of dementia;

- related to group physical activity where unpaid/informal carers accompany their care recipients with dementia; and
- reported on the gender of the attendees.

Exclusion criteria

Studies were excluded if they met *any* of the following criteria:

- were not published in English;
- related only to professional (paid) carers;
- related to unpaid carers caring for individuals who do not have a form of dementia;
- related to individual rather than group-based activity, or group-based activities that care recipients attend without their carers; and
- did not report the gender of attendees.

Data extraction

The following data were extracted by one reviewer (JH) and checked by one of two other reviewers (JV or MT) with 100 per cent agreement: authors; year of study/report; aim/purpose; type of paper (for example, journal article, annual evaluation report and so on); geographical area; study population (for example, diagnosis of individuals being cared for); sample size; study design; and key findings that relate to the systematic review questions.

Critical appraisal

Each of the included studies was appraised using the Mixed Methods Appraisal Tool (MMAT) (Hong et al, 2018) by one reviewer (JH), and these were verified by another reviewer (MT). The MMAT, designed for use in systematic reviews, allows for the appraisal of the methodological quality of five categories of studies: qualitative research; randomised controlled trials; non-randomised studies; quantitative descriptive studies; and mixed-methods studies. Studies are initially appraised using two screening questions relating to the clarity of the research question(s) and whether the collected data address these questions. Questions are scored as 'Yes', 'No' or 'Can't tell'. Where the screening questions are both answered positively, the study is appraised on a further five questions, which vary depending on the method used.

Data analysis

Gender differences in attendance at group physical activities for carers and people with dementia were analysed using descriptive statistics and effect size (Cohen's *h*). Physical activity preferences were synthesised using narrative review due to the qualitative nature of these data.

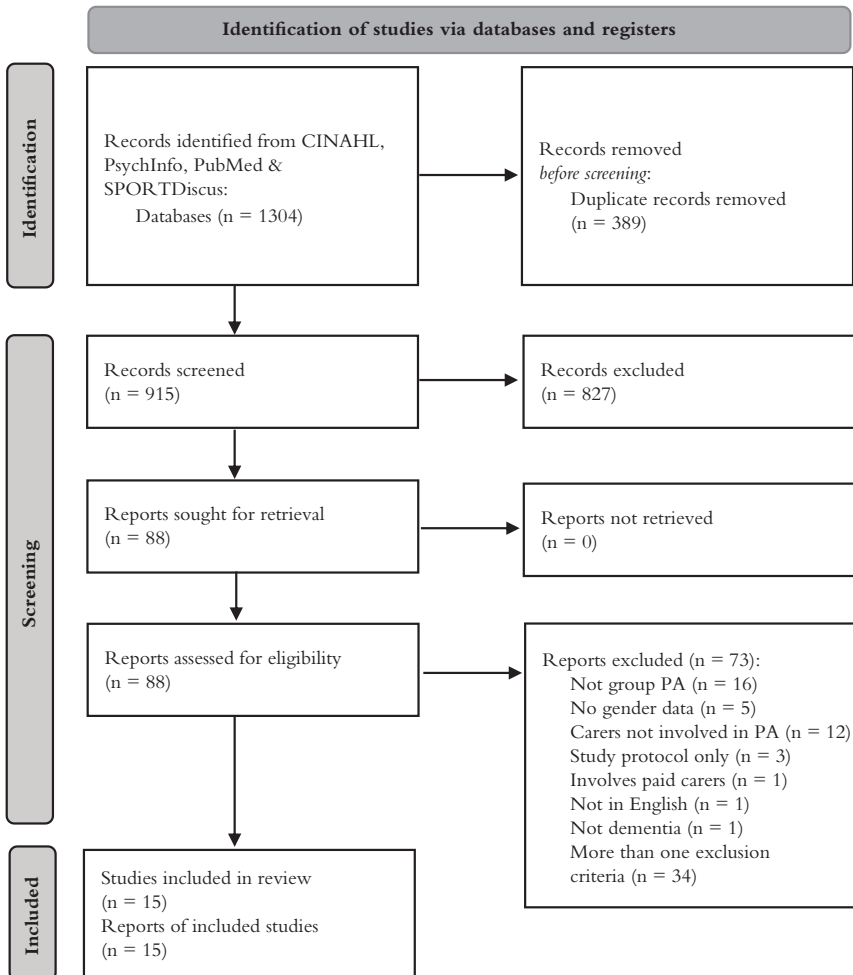
Results

The literature search yielded 1,304 results, of which 389 were automatically removed as duplicates, resulting in 915 studies remaining. The search on Open Grey yielded no relevant results.

The title/abstract screening resulted in the removal of 827 results, with 88 going through to full-text review. Of these, 15 studies were eligible for inclusion. Reasons for exclusion are given in [Figure 1](#) and include not involving group physical activity, not containing data on gender, involving paid carers and not being written in English; many were excluded on more than one criterion (for a full list of excluded studies and reasons for exclusion, see Online Appendix 1: https://ordo.open.ac.uk/articles/dataset/Gender_profile_of_carers_attending_group_physical_activity_with_people_with_dementia_Supplementary_data_1_-_excluded_studies/21543372?file=51246773).

The extracted data for the included studies are given in [Table 1](#). The studies were primarily carried out in England, along with four US studies, two Canadian studies and

Figure 1: PRISMA flowchart of included studies



one each from Australia and Portugal. All studies were published in the last 15 years, with the earliest from 2011. Eight of the studies used qualitative methods, four used quantitative methods and three used mixed methods. Two studies focused on unpaid carers of individuals with Alzheimer's disease, while the remaining studies included carers of people with any form of dementia. Sample sizes ranged from eight (four dyads of people with dementia and their carers) to 661 (343 people with dementia and 318 carers), producing a combined sample size of 1,053, with a median of 20.

The gender of participants (for people with dementia and carer groups) for each study are given in [Table 2](#). It should be noted that, due to a discrepancy in the figures provided (see the explanation in [Table 1](#)), the figures for study 14 are shown in brackets. The figures in [Table 2](#) suggest that there were slightly more males with dementia than females with dementia attending the group physical activity sessions (with 53–54 per cent of attendees with dementia being male, compared to 46–47 per cent being female). There is no effect size (Cohen's *h*) of this difference. [Table 2](#) also shows that the majority of carers attending the group physical activity sessions with their care recipient are female (with 87 per cent of carers being female when Study 14 is included and 67 per cent of carers being female when it is excluded). The effect size of this difference (Cohen's *h*) is large to medium.

With regard to carers' preferences for activity, the findings are limited, with only eight of the studies ([Barrado-Martin et al, 2019; 2021; Borges-Machado et al, 2019; Hobden et al, 2019; Long et al, 2020; Hill et al, 2022; D'Cunha et al, 2023; Girdler et al, 2024](#)) commenting on this. [Borges-Machado et al \(2019\)](#) highlight the inclusion of carers in the exercise programme as being important for attendance, and [Long et al \(2020\)](#) suggest that it is important that classes are designed specifically for people with dementia and their carers. [D'Cunha et al \(2023\)](#) emphasise the importance of classes being easy to follow for those with dementia. [Barrado-Martin et al \(2019; 2021\)](#) reported that other factors that were important to carers in terms of attending classes include qualities relating to the instructor, the participants' ability to sustain attention and stand for 45 minutes, the accessibility of the venue (which was also noted by [Long et al \[2020\]](#)), the time of day, the length of time, group size, and perceived benefits. The importance of an opportunity for socialising was highlighted in several studies ([Barrado-Martin et al, 2019; 2021; Long et al, 2020; D'Cunha et al, 2023](#)). It was also noted that the opportunity to meet other carers was an important factor for carers who found it hard to attend the classes with their care recipient ([Barrado-Martin et al, 2019; 2021; Hill et al, 2022](#)). [Hill et al \(2022\)](#) suggest that this allows carers the opportunity to have a normal conversation, share experiences and vent their frustrations and for their care recipients' difficulties to be understood. [Girdler et al \(2024\)](#) also highlight group physical activity as being helpful for fostering connections and reducing social isolation for carers and people with dementia. Additionally, [Hobden et al \(2019\)](#) reported that the insight and empathy shown by organisers and facilitators were essential for engagement, as this enabled participants to feel safe and secure. [Hill et al \(2022\)](#) found that the provision of an environment where their care recipient was considered to be safe allowed carers some respite from focusing on their needs. [Long et al \(2020\)](#) identified the importance of having staff who were used to working with people with dementia. The carers in [Barrado-Martin et al's \(2019; 2021\)](#) studies also perceived that health difficulties and too much content or complexity within the class would be barriers to engagement. None of the studies reported specifically on gender differences in activity preferences.

Table 1: Descriptive characteristics and key findings of included studies

Authors	Year	Aim	Type of paper	Geo-graphical area	Study population	Sample	Study design	Key findings
Barrado-Martin et al	2019	Explore what affects the acceptability of exercise interventions to better meet the needs of people with dementia and their carers as a dyad	Journal article	England	People with a diagnosis of (mild to moderate) dementia, aged 65 years or older, living in their own home, and able to practise standing tai chi, and their carers	10 dyads	Qualitative – observations, field notes, focus groups	The tai chi classes were attended by 5 male and 5 female people with dementia, accompanied by 4 male and 6 female informal carers. 9 of the carers were spouses/partners, the other one was a niece. 9 of the 10 dyads expressed a willingness to carry on practising tai chi after the study; the remaining dyad withdrew after the first class due to health issues. Carers perceived that facilitators to attending/engaging with group physical activity (tai chi classes) with their care recipient included: the instructor's qualities (that is, use of clear speech, adequate tone and nice manner; made the classes interesting; had a calming personality and professional competency); participants' ability to sustain attention/stand for 45 minutes; convenience/accessibility of venue; time of day; length of time; group size; socialising time at the end; and perceived benefits (relaxation, health, body awareness, brain stimulation, improved balance). Carers perceived that barriers to attending group physical activity (tai chi classes) with their care recipient included: too much content/complexity within the class. Tai chi being an unfamiliar activity did not impact enjoyment/engagement with the activity. Carers did not generally find joint participation to be a burden; only one found it hard, but he kept going for the person with dementia, and the opportunity to meet other carers.

(Continued)

Table 1: Continued

Authors	Year	Aim	Type of paper	Geo-geographical area	Study population	Sample	Study design	Key findings
Barrado-Martin et al ^a	2021	Understand the experiences of people living with dementia and their informal carers' taking part together in tai chi classes and the aspects influencing their adherence	Journal article	England	People with dementia and their unpaid carers	25 dyads	Qualitative – observations, interviews, instructors' notes	Of the participants with dementia, 13 were male and 12 were female, and they were accompanied by 7 male carers and 18 female carers. Overall, participants enjoyed the tai chi classes. Facilitators to attending and engaging included practicalities (venue, weekly classes, 45-minute duration, 4–8 dyads per class, enjoyment, time for socialising within the same room as the class, benefits of the exercise, habit and being able to attend together), instructors' characteristics (patience, authenticity, welcome, attentiveness, relaxed, use of anecdotes). Barriers to attending the classes included health difficulties, left–right confusion, getting relaxed, copying/remembering movements, footwork, mirroring and practising without verbal guidance. Suggested changes were to include younger people with dementia and those in earlier stages of dementia, to have classes in the morning rather than late afternoon (when it might be dark), to offer separate classes for carers or allow PWD to attend on their own to provide respite for carers, to have classes outdoors in the summer, to provide verbal guidance throughout the class, and to enhance the socialising component.
Borges-Machado et al	2019	Analyse the feasibility of a community-based multicomponent intervention for individuals with Alzheimer's disease and their carers	Journal article	Portugal	Individuals diagnosed with mild/moderate Alzheimer's disease and their carers	7 dyads	Quantitative – before-and-after study	Of the participants with Alzheimer's disease, 5 were female and 2 were male. The gender of carers is not stated. The high level of attendance in the programme was put down to the inclusion of the carers in the exercise sessions.

(Continued)

Table 1: Continued

Authors	Year	Aim	Type of paper	Geo-graphical area	Study population	Sample	Study design	Key findings
Burgener et al	2011	Evaluate the effectiveness of a multimodal intervention (Taiji exercise classes and support groups) for people with dementia on family caregiver outcomes	Journal article	Illinois, USA	People with a confirmed diagnosis of dementia and Clinical Dementia Rating score below 2, and family caregivers	18 dyads in the treatment condition	Quantitative – before-and-after study	Within the treatment condition, there were 18 carers, of whom 10 participated in the classes (6 female; 4 male). The gender of participants with dementia is not stated.
Casey et al	2020	Evaluate a group movement programme for people with dementia and their carers	Journal article	California, USA	People with mild to moderate dementia and their carers who had taken part in a paired group movement programme	9 carers	Qualitative – practice logs, letters of support, reflections, feedback	The group of 9 carers included 5 females and 4 males. The gender of people with dementia is not reported.
D'Cunha et al	2023	Examine the feasibility, acceptability and effectiveness of a multidisciplinary rehabilitation intervention (cognitive stimulation, social, emotional and resilience education, physical activity, care of people with dementia, dietary advice) for people with dementia and their carers	Journal article	Australia	People with a diagnosis of dementia and Clinical Dementia Rating score between 0.5 and 2, willing to participate in the programme for at least 10 weeks, with a primary carer willing and able to participate	6 dyads	Mixed methods: quantitative – before-and-after study; qualitative – interviews	Of the attendees with dementia, 4 were male and 2 were female. One of the carers taking part was a paid carer (male). Of the unpaid carers, there were 4 females and 1 male. Participants provided high programme satisfaction ratings and positive feedback. Qualitative analysis revealed an appreciation of the social aspects of the programme and the bond formed by the group. Participants felt that the exercise programme was easy to follow for people with dementia, with assistance from their carers. The physical activity component was considered effective, regardless of whether a participant was already exercising.

(Continued)

Table 1: Continued

Authors	Year	Aim	Type of paper	Geo-graphical area	Study population	Sample	Study design	Key findings
Girdler et al	2024	Examine the lived experiences of individuals with dementia and their carers in the Minds in Motion programme	Journal article	Ontario, Canada	Individuals with dementia who were current/previous participants in the Minds in Motion study, and their unpaid carers, were invited to take part in interviews	3 people with dementia and 6 carers	Qualitative – interviews	The gender information provided is only for those who took part in the interviews, not all participants in the programme. Of the carers taking part in the interviews, there were 4 males and 2 females. The individuals with dementia comprised 2 females and 1 male. The programme was perceived as helpful in fostering connections and reducing social isolation.
Hill et al	2022	Explore the psychological and social benefits of a six-week golf programme for PWD, their carers and golf centre staff	Journal article	England	People with any type of dementia (able to stand for prolonged periods, walk around the course and swing a golf club) and their carers	12 people with dementia, 5 carers (3 who participated; 2 who spectated)	Qualitative – observations, focus groups, interviews	Of the attendees with dementia, 10 were male and 2 were female. The gender of carers is not stated, but their relationships with the person with dementia were either spouse, son or daughter. Carers expressed that the golf programme was more active and enjoyable than other dementia support groups. The provision of an environment where their care recipient was considered to be safe allowed carers some respite from focusing on their needs. Carers also considered that being with other carers of people with dementia allowed them to have a normal conversation, share experiences and vent their frustrations, and for their care recipients' difficulties to be understood. Golf was also seen to be a 'leveler', reducing the imbalance between those with dementia and those without dementia. The carers who attended with their care recipients enjoyed being able to do the activity together and to have that shared experience.

(Continued)

Table 1: Continued

Authors	Year	Aim	Type of paper	Geo-geographical area	Study population	Sample	Study design	Key findings
Hobden et al	2019	Explore participants' views of dementia-friendly swimming sessions in terms of: the impact of the sessions on the lives of people with dementia and their carers; how the sessions affect the experience of caring for people with dementia; and how and in what ways sessions can become 'dementia-friendly'	Journal article	England	People with a diagnosis of dementia and companions/carers of someone with dementia, with the capacity to provide informed consent	4 dyads	Qualitative – interviews, field notes	Attendees of the swimming sessions who were interviewed (that is, those able to give consent) included 4 people with dementia (2 male; 2 female) and 4 carers/companions (all female). Essential to the sessions being dementia-friendly was the insight and empathy shown by organisers and facilitators, which enabled participants to feel safe and secure.
Long et al	2020	Explore the impact of a dementia-friendly exercise class on participants with dementia and their carers	Journal article	England	People with dementia and their carers able to provide informed consent	8 dyads	Mixed methods: quantitative – before-and-after study; qualitative – focus groups	Of the participants with dementia, 6 were male and 2 were female. Of the carers, 7 were female and 1 was male. Accessibility of the venue, opportunities for socialisation and staff who were experienced with working with people with dementia were key to participants reporting benefits. It was felt important that classes were developed specifically for people with dementia and their carers and were facilitated by individuals with knowledge of dementia.
Mapes	2017	Evaluate the Dementia Adventure (DA) holidays attended by people with dementia and their carers	Journal article	England	People with dementia and their carers who attended DA holidays for small groups of PWD and their carers	77 participants (39 people with dementia; 38 carers)	Qualitative - observations, feedback, interviews, survey	Of the 39 participants with dementia, there were 20 males and 19 females. Of the 38 carers, there were 13 males and 25 females.

(Continued)

Table 1: Continued

Authors	Year	Aim	Type of paper	Geo-graphical area	Study population	Sample	Study design	Key findings
Mehling et al	2020	Examine the effectiveness of a dyadic exercise programme for people with dementia and their care partners	Journal article	California, USA	People with dementia with the capacity to provide consent, and their carers	29 dyads	Mixed methods: – before-and-after study; qualitative – open-ended survey questions	Of the participants with dementia, 16 were female and 13 were male. The carers comprised 21 females and 8 males.
Ovenden et al	2019	Explore the perceived benefits of the boccea group for people with dementia and their carers; identify aspects of boccea that contribute to its success; investigate what makes for a dementia-friendly environment	Journal article	England	People with dementia, carers of PWD, group organisers	6 people with dementia, 10 carers, 6 organisers	Qualitative - observations and semi-structured interviews	Participants who were interviewed included 6 people with dementia (3 male; 3 female) and 10 carers (6 male; 4 female).
Regan et al	2019	Evaluate changes in physical functioning, exercise self-efficacy and well-being among participants in the Minds in Motion programme	Journal article	Ontario, Canada	People with mild to moderate dementia and their carers	343 people with dementia, 318 carers	Quantitative – before-and-after study	At the start of the results section, it states that the participants included 343 PWD and 318 care partners. The gender information for the groups is then given in a table. This states that for participants with dementia, 164 (39.1%) of the sample were female, and for carers, 305 (77.8%) were female. These figures do not fit with the earlier figures. If 164 of the 343 PWD were female, then this would be 47.8%; if 305 of the 318 carers were female, then this would be 95.9%. We contacted the corresponding author on four occasions, but they were unable to confirm the correct figures.

(Continued)

Table 1: Continued

Authors	Year	Aim	Type of paper	Geo-graphical area	Study population	Sample	Study design	Key findings
Yao et al	2013	Assess the acceptability of an adapted dyadic tai chi intervention and its preliminary effect on fall risk-relevant functional mobility performance in patients with Alzheimer's disease	Journal article	Michigan, USA	Community-dwelling Alzheimer's disease patients and their carers	22 dyads	Quantitative – before-and-after study	Patients with Alzheimer's disease included 14 males and 8 females. Carers included 13 spouses, 8 daughters and 1 paid carer.

Note: ^a Although this study covers a similar topic area to [Barrado-Martin et al's \(2019\)](#) study, this more recent study uses a different sample and so is considered separately.

Table 2: Gender of attendees (PWD versus carers) for each study

	People with dementia			Carers		
	Male	Female	Effect size (Cohen's <i>h</i>)	Male	Female	Effect size (Cohen's <i>h</i>)
Study 1 – Barrado-Martin et al (2019)	5	5		4	6	
Study 2 – Barrado-Martin et al (2021)	13	12		7	18	
Study 3 – Borges-Machado et al (2019)	2	5		Not stated	Not stated	
Study 4 – Burgener et al (2011)	Not stated	Not stated		4	6	
Study 5 – Casey et al (2020)	4	5		Not stated	Not stated	
Study 6 – D'Cunha et al (2023)	4	2		1	4	
Study 7 – Girdler et al (2024)	1	2		4	2	
Study 8 – Hill et al (2022)	10	2		Not stated	Not stated	
Study 9 – Hobden et al (2019)	2	2		0	4	
Study 10 – Long et al (2020)	6	2		1	7	
Study 11 – Mapes (2017)	20	19		13	25	
Study 12 – Mehling et al (2020)	13	16		8	21	
Study 13 – Ovenden et al (2019)	3	3		6	4	
Study 14 ^a – Regan et al (2019)	(179)	(164)		(13)	(305)	
Study 15 – Yao et al (2013)	14	8		Not stated	Not stated	
Total (including Study 14)	276 (53%)	247 (47%)	0.12	61 (13%)	402 (87%)	1.67 (large)
Total (excluding Study 14)	97 (54%)	83 (46%)	0.16	48 (33%)	97 (67%)	0.69 (medium)

Note: ^aFigures for this study are shown in brackets, as these were not confirmed by the study authors.

All the studies were critically appraised using the (MMAT) (see Online Appendix 2: https://ordo.open.ac.uk/articles/figure/Gender_profile_of_carers_attending_group_physical_activity_with_people_with_dementia_Supplementary_data_2_-_Quality_appraisal_MMAT_/21543429?file=51246602). One of the studies (Mapes, 2017) did not include clear research questions, so no further appraisal was carried out, but the study was retained for inclusion because the information on gender differences in activity attendance was still deemed to be valid and of importance to this review. The other studies were determined to be valid, appropriately designed and conducted, and with clear findings and reasonable interpretation, though three of the quantitative studies were deemed to have a small sample (Burgener et al, 2011; Yao et al, 2013; Borges-Machado et al, 2019).

Discussion

Gender differences in attendance

Of the 15 studies included in the review, none had a primary focus on gender differences, and although they each provided figures for male and female attendees within the people with dementia/carer groups, none of the articles included any discussion around the gender differences in these figures. Nevertheless, the review shows that the group physical activity sessions were more commonly attended by males with dementia than by females with dementia. Given that females with dementia outnumber males with dementia by 2:1 (Kiely, 2018), this gender difference in attendance is clearly not a reflection of gender differences in dementia prevalence. It is recognised that males generally engage in more physical activity than females (Bassett et al, 2011; Althoff et al, 2017), including in older age groups (Sun et al, 2013) and with people with dementia (Kim et al, 2018). However, it is not clear whether the higher attendance of males at group physical activities is because these are more attractive to males with dementia than to females with dementia or whether attendance at such sessions is instigated by the unpaid carers, who those with dementia are largely dependent on to access physical activity (Phinney, 2006).

Only ten of the studies (Yao et al, 2013; Barrado–Martin et al, 2019; 2021; Casey et al, 2020; Long et al, 2020; Mehling et al, 2020; Hill et al, 2022; D’Cunha et al, 2023; Girdler et al, 2024) included in the review stated the relationship between the person with dementia and their carer, and these were predominantly spouses/partners. It is also noted in the wider literature that spouses are the most common carers for people with dementia, followed by adult daughters (La Fontaine et al, 2016). As group physical activity sessions commonly take place during weekdays, it is possible that many non-spousal carers, such as adult daughters, may be working, meaning that such sessions are more likely to be attended by spousal dyads. However, if the majority of people with dementia are female, the majority of their spousal carers are male and attendance at group physical activities is initiated by the carers, then it is important to determine why female spousal carers are choosing to attend group physical activity sessions with their husbands, while male carers are not.

Certainly, there is evidence that males find caring less burdensome and stressful than females (Pruchno and Resch, 1989; Miller and Cafasso, 1992; Yee and Schulz, 2000; Gallicchio et al, 2002; Papastavrou et al, 2007; Witucki Brown et al, 2007; Pöysti et al, 2012; La Fontaine et al, 2016; Williams et al, 2017), which may be because male carers use more coping strategies, such as problem solving and treating the role as work, therefore becoming less emotionally involved and less likely to experience distress (Thompson et al, 2004; Pretorius et al, 2009; La Fontaine et al, 2016). It has also been argued that female carers report poorer health than male carers (Etters et al, 2008; Mannion, 2008). Therefore, if male carers experience less stress and burden from the caring role and fewer health issues, they may feel less need to gain support by attending group physical activity (and other support) sessions. However, research has also suggested that men are less likely to self-identify as carers, prefer to remain independent of service support and may feel guilty about seeking help (Willis et al, 2020). Furthermore, females report loneliness more often than males (Office for

National Statistics, 2018), and female carers report higher levels of social deprivation (Papastavrou et al, 2007), so there may be a greater need for female carers to attend sessions in order to connect with others, especially given the social isolation that is associated with being a carer.

Preferences for physical activity

Many of the factors identified by the studies in this review as being important for engagement in group physical activity classes are supported by the findings from earlier studies in this under-researched area. For example, an appreciation of the benefits of engaging in exercise (for example, mood, weight, flexibility, slowing deterioration and so on) has been identified as a facilitator of carers engaging with physical activity (Horne et al, 2021; Lindsay et al, 2023), as well as group activities with similar people who understand dementia (Horne et al, 2021) and there being a social element to the activity (Hill et al, 2007; Cuthbert et al, 2017; Ptomey et al, 2019; Lindsay et al, 2023). The findings also fit with previous studies which suggest that taking part in physical activity with the care recipient is a motivator for carers (Bailey et al, 2018; Bechard et al, 2020; Cao et al, 2020), as is taking part with other carers (Laditka et al, 2012; Lin et al, 2020; Lindsay et al, 2023).

The barriers identified in this review also fit with the findings of these previous studies. Horne et al (2021) identified that specific health problems experienced by carers (physical functioning, bodily pain, reduced energy, bad back, anxiety, tiredness, insomnia, depression and shortness of breath) can be a barrier to engagement in physical activity, as well as the health difficulties of the care recipient (Lindsay et al, 2023). Carers providing more care activities (such as those caring for people with dementia) show a higher impact of caring on these health issues. Concerns about the safety of the care recipient taking part in specific activities (for example, the risk of falling) is also an obstacle to physical activity participation (Horne et al, 2021).

The studies included in the review did not investigate preferences for different types of group physical activity on the basis of gender. However, Hill et al's (2022) study, which involved a six-week golf programme, had a much higher proportion (83 per cent) of male attendees with dementia than other studies, which showed comparable numbers of male and female people with dementia attending activities like exercise classes, tai chi, swimming, boccia and activity holidays. This fits with the finding that men prefer activities that are competitive, skilled or outdoors (van Uffelen et al, 2017), such as golf.

Critical appraisal

Although the MMAT appraisals of the included studies were generally positive, there are some limitations to these studies. One of the studies did not include clear research questions (Mapes, 2017), and three of the quantitative studies involved small volunteer samples (Burgener et al, 2011; Yao et al, 2013; Borges-Machado et al, 2019). Additionally, four of the studies included only people with mild to moderate dementia (and their carers), excluding those caring for people with more severe

dementia (Barrado-Martin et al, 2019; Borges-Machado et al, 2019; Regan et al, 2019; Casey et al, 2020). It was noted that one of the articles showed a disparity in the figures reported for male and female carers and care recipients, with the figures reported at the start of the results section not matching those provided within the table (Regan et al, 2019). The authors of this article were contacted but were not able to clarify the correct figures.

Limitations

While this systematic review is, to our knowledge, the first to investigate gender differences in participation in and preferences for different types of group physical activity that unpaid carers of people living with dementia engage in alongside their care recipients, the findings should be considered within the limitations of the study. It is clear that there is a scarcity of literature within this area, with only 15 studies being found to be suitable for inclusion within this review. While these studies reported the gender of attendees of the group physical activity sessions, gender difference in attendance was not the focus of any of the studies, and none of the articles provided any discussion within this area. Furthermore, none of the studies reported non-binary or transgender identities. Additionally, none of the studies discussed gender differences in the preference for different types of group physical activity.

It is also important to consider the interaction between gender and type of dementia. Only two of the studies focused on a specific type of dementia (Alzheimer's), and most did not state the stage of dementia – those that did involved participants with mild to moderate dementia and/or who were able to give informed consent. A higher proportion of people diagnosed with Alzheimer's are women (Mielke, 2018), while more men are diagnosed with Lewy body dementia (Savica et al, 2013). These two forms of dementia present differently, with Lewy body dementia having more severe motor symptoms, resulting in different treatment and physical activity needs. Therefore, those with Lewy body dementia might value physical activity as more important to their treatment.

Finally, the studies included in this review were conducted in England, Portugal, Australia, Canada and the US, with no studies from the 'Global South'. This may be due to the inclusion criteria that studies must be published in English, or it may be that such studies have not been conducted. Further research is required to establish this. Nevertheless, this systematic review followed robust procedures and highlights the need for additional studies.

Implications for practice

This review has found suggestive evidence that female carers attending group physical activity with people with dementia outnumber male carers by a ratio of at least 2:1. Practitioners conducting these types of interventions should be acutely aware of this when planning recruitment strategies. Although the findings from this review do not provide clear insight into gender differences in preference for different types of group physical activity, they do provide important information on factors that are important

to the carers of people with dementia in terms of engaging with group physical activity. This information can be used by providers of such sessions to ensure that activities are not too complex, that instructors/volunteers have an understanding of dementia, that the activity is not too long and is within the physical scope of the participants, that sessions are based in an easily accessible location and take place at an appropriate time of day (for example, not too early or late and avoiding mealtimes), that groups are not too large (four to eight dyads has been suggested to be optimal), and that there is an opportunity to socialise with others after the activity without moving to a different location. When promoting group physical activity, it is important to highlight the health benefits, as well as the social benefits of meeting other carers and care recipients.

Implications for research

There is a paucity of research into gender differences in attendance at and preference for different types of group physical activity interventions for carers of people with dementia and their care recipients. This review also highlights the need for large-scale research involving carers for people with dementia to determine differences in the preference for various types of group physical activity on the basis of gender (including the lesbian, gay, bisexual, transgender and queer (LGBTQ+) community) and other variables (for example, age, ethnicity, employment status, health status, location, the availability of support, the type of dementia diagnosis of the person with dementia, the stage of dementia, the relationship of the carer to the person with dementia and so on) in order to inform the provision of targeted physical activity interventions for these groups of carers.

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Conflict of interest

The authors declare that there is no conflict of interest.

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