

# **Acceptability of a dyadic Tai Chi intervention for older people living with dementia and their informal carers**

**Ms Yolanda Barrado-Martín<sup>1,2\*</sup>, Dr Michelle Heward<sup>2</sup>, Prof Remco Polman<sup>3</sup>, and Dr Samuel R. Nyman<sup>1,2</sup>**

<sup>1</sup> Psychology Department, Bournemouth University

<sup>2</sup> Ageing & Dementia Research Centre (ADRC), Bournemouth University

<sup>3</sup> School Exercise & Nutrition Sciences, Queensland University of Technology

\* Corresponding author:

- Address: Yolanda Barrado-Martín,  
Postgraduate Researcher  
Dept. of Psychology & Ageing & Dementia Research Centre (ADRC)  
P302 Talbot Campus, Fern Barrow, Poole,  
Dorset, BH12 5BB  
United Kingdom
- Email: [ybarradomartin@bournemouth.ac.uk](mailto:ybarradomartin@bournemouth.ac.uk)
- Telephone: +44 (0)1202 962213

1

2 Acceptability of a dyadic Tai Chi intervention for older people living with dementia and their

3 informal carers

## 1 Abstract

2 Exercise is effective in preventing falls amongst older adults. However, few studies have  
3 included people living with dementia and their carers and explored their experiences. The aim  
4 of this paper is to explore what affects the acceptability of exercise interventions to better  
5 meet the needs of people with dementia and their carers as a dyad. Observations, field notes  
6 containing participants and instructor's feedback, and focus groups with 10 dyads involved in  
7 Tai Chi classes for 3 or 4 weeks in two sites in the South of England were thematically  
8 analysed to understand their experiences. Findings suggest that dyads' determination to  
9 achieve the benefits of Tai Chi facilitated their adherence, whereas a member of the dyad's  
10 low sense of efficacy performing the movements during classes was a barrier. Simplifying  
11 class content and enhancing the clarity of instructions for home-based practice will be key to  
12 support the design of future exercise interventions.

13

14 *Keywords:* exercise, qualitative, dyad, community-dwelling, falls

1 Acceptability of a dyadic Tai Chi intervention for older people living with dementia and their  
2 informal carers

3 Dementia is estimated to affect 46.8 million people worldwide (Alzheimer's Disease  
4 International, 2015), with advancing age being an important contributor to its prevalence  
5 (WHO, 2015). Due to increasing life expectancy and the resultant increase in the number of  
6 individuals with dementia this has become a matter of concern (WHO, 2012). The  
7 progression of dementia has an increasing impact on the individual's cognitive and physical  
8 performance, ultimately resulting in more dependency towards their informal caregivers  
9 (Alzheimer's Society, 2015). This increase in dependency not only impacts on the person but  
10 also on the informal carer (henceforth "carer") and wider family and friends potentially  
11 affecting social, health and financial circumstances (Alzheimer's Research UK, 2015).

12 Falls have an additional and direct impact on an individual's autonomy and quality of  
13 life (National Institute for Health and Care Excellence, 2013). A variety of interventions  
14 (including Vitamin D supplementation, exercise, environmental, and multifactorial  
15 interventions) have been attempted to reduce the risk factors for falls amongst older people  
16 living in the community. Exercise, including Tai Chi, and home safety interventions have  
17 been effective in reducing the risk of falls (see Gillespie et al., 2012). In most of these  
18 studies, however, people living with dementia have been excluded even when they are more  
19 likely to experience a fall (Shaw, 2003). However, when people living with dementia in the  
20 community have been included, exercise related activities have been shown to be potentially  
21 useful for this purpose reducing around one third the risk of falling (Burton et al., 2015). Tai  
22 Chi in particular shows promise for preventing falls among people living with dementia  
23 (Nyman & Skelton, 2017). However, there is a lack of high quality randomised controlled  
24 trials (RCTs) with blinded assessors that focus on exercise, including Tai Chi, among  
25 community dwelling older people living with dementia and their carer as a dyad.

1           Exercise interventions have been tested for their impact on behavioural and  
2 psychological symptoms in dementia, as well as on physical and cognitive function (i.e.,  
3 Fleiner, Dauth, Gersie, Zijlstra, & Haussermann, 2017; Hamilton et al., 2017; Öhman et al.,  
4 2016). However, recent systematic reviews of such studies have identified inconsistent results  
5 due to differences in settings (i.e., community vs long term care), exercise types (i.e., using  
6 one or different type of exercises as well as exercise alone or in combination with other  
7 interventions), and doses (Abraha et al., 2017; Laver, Dyer, Whitehead, Clemson, & Crotty,  
8 2016; Rao, Chou, Bursley, Smulofsky, & Jezequel, 2014; Öhman, Savikko, Strandberg, &  
9 Pitkälä, 2014). Lessons learnt from previous exercise interventions involving community  
10 dwelling people living with dementia suggest that uptake facilitators are health care  
11 professionals' advice (Chong et al., 2014; Suttanon et al., 2012), the provision of enough  
12 detailed information about the intervention (Frederiksen, Sobol, Beyer, Hasselbalch, &  
13 Waldemar, 2014), and the use of positive phrasing in recruitment materials (Hawley-Hague,  
14 Horne, Skelton, & Todd, 2016). Characteristics of the intervention such as a group-based  
15 format (Chong et al., 2014; Dal Bello-Haas et al., 2014; Hawley-Hague et al., 2016), the  
16 possibility of adapting the intervention to participants' needs (Chong et al., 2014),  
17 affordability (Chong et al., 2014; Hawley-Hague et al., 2016), and the abilities of the  
18 instructors to create a bond with participants influence their perceived attractiveness of the  
19 intervention (Hawley-Hague et al., 2016). Participants' characteristics also has an impact on  
20 acceptance in terms of personal motivations (Hawley-Hague et al., 2016), positive attitudes  
21 towards exercise (Chong et al., 2014; Suttanon et al., 2012) or the perceived benefits,  
22 including the value of research and the potential reduction of caregiver burden (Suttanon et  
23 al., 2012) and the expected impact on cognition (Chong et al., 2014).

24           Interventions designed to enhance well-being amongst people living with dementia  
25 and their informal carers are relatively recent (Van't Leven et al., 2013). Dyadic exercise

1 interventions, where both the person living with dementia and the carer participate together,  
2 however, have been well received and feasible in the community (Chew, Chong, Fong, &  
3 Tay, 2015; Suttanon et al., 2013; Yao, Giordani, Algase, You, & Alexander, 2012; Yu et al.,  
4 2015). The involvement of both members has been found particularly relevant in exercise  
5 interventions to ensure safety and promote enjoyment (Dal Bello-Haas et al., 2014; Logsdon,  
6 McCurry, & Teri, 2005; Suttanon et al., 2012; Yao et al., 2012).

7         Tai Chi is a mind-body exercise originated from China and based on the Taoist  
8 Philosophy (Fetherston & Wei, 2011). Different styles of Tai Chi have been developed (i.e.,  
9 Chen, Yang, Sun, Wu) keeping most of the essential principles, but adopting different  
10 characteristics (i.e., intensity) (Fetherston & Wei, 2011). Previous research suggests that Tai  
11 Chi could be as effective and cost-effective or more than alternative exercises targeting falls  
12 prevention amongst older people living with or without dementia; and could attract better  
13 adherence as a ‘normal’ activity practiced by people of all ages and not just frailer older  
14 adults (Nyman & Skelton, 2017). However, there is little research exploring the use of Tai  
15 Chi amongst people living with dementia in the community (Barnes et al., 2015; Burgener et  
16 al., 2008; Yao et al., 2012). Only Yao et al. (2012)’s pilot study (the most similar to our  
17 study, using an adapted simplified Yang Style form) used Tai Chi in isolation. In this study  
18 participants attended 100% of the group sessions; however, those were only delivered twice a  
19 week for 4 weeks, whereas 84% adhered to the home-practise component which lasted 12  
20 additional weeks. In two other studies, adherence was around 72-75% to classes delivered 3  
21 times a week over 18 or 40 weeks, but Tai Chi was not delivered in isolation which makes it  
22 difficult to differentiate what effects were due to Tai Chi (Barnes et al., 2015; Burgener et al.,  
23 2008). In all three cases as no qualitative methods were used, there is no way to explain the  
24 reasons for participants’ engagement or disengagement with Tai Chi.



## 1 **Recruitment Strategy**

2 Recruitment took place between October and December 2016. Potential participants  
3 were initially identified and approached by three National Health Service (NHS) Trusts in the  
4 South of England, as well as by the research team using Join Dementia Research (JDR)  
5 website where people living with dementia can express their interest in taking part in  
6 research. Additionally, the study was advertised locally, allowing potential participants to  
7 contact the research team directly to express their interest in the study. Once participants  
8 made initial contact (or after referral) to the research team, further information about the  
9 study was posted or emailed to them. Recruitment materials included a Leaflet, a Key Facts  
10 Sheet and a Participant Information Sheet. These materials provided information regarding  
11 balance, falls prevention, Tai Chi and the implications of getting involved in the study for  
12 each member of the dyad. Confidentiality, voluntary participation, data protection and  
13 consent procedure were also described within the Participant Information Sheet. Potential  
14 participants were also provided with a visual representation of the different steps involved in  
15 the study. This study was presented as a falls prevention and balance improvement exercise,  
16 which was informed by the main outcome measures, and aim of the RCT. At least 48 hours  
17 after receiving this information an initial telephone screening was conducted to ascertain  
18 eligibility. A total of 53 people were contacted by the research team and of these 10 dyads  
19 (instead of 14 initially planned at this stage) were successfully recruited into the study (see  
20 Figure 1).

21 [Figure 1 here]

## 22 **Participants**

23 Demographic characteristics of participants included in the study are provided in  
24 Table 1. The inclusion criteria for participants were: A diagnosis of (mild-to moderate)  
25 dementia, be aged 65 years or older, live in their own home, be able to practice standing Tai



1 Chi and have a carer available who would provide support during the assessments and at  
2 home and during the group-based Tai Chi classes. The exclusion criteria were: People with  
3 Lewy Body dementia or Parkinson's disease, receiving end of life care, those with severe  
4 dementia symptoms according to the The Mini-Addenbrooke's Cognitive Examination (M-  
5 ACE) (Hsieh et al., 2015) (cut off point M-ACE <15) or sensory impairments, those already  
6 practising Tai Chi or who would not be able to attend weekly classes. However, after  
7 finishing the Pilot Intervention Phase, on re-analysis of M-ACE scores it was revealed that  
8 three participants included in this phase of the study were in fact ineligible (scores between  
9 10-15), which was reported to the Sponsor. Nevertheless, all of the participants were able to  
10 take part in the classes and provide feedback and no one was put at risk from participating in  
11 the study. A subsequent request was sent to the Research Ethics Committee to lower the M-  
12 ACE threshold score to 10 or above for the next phase of the study, which was approved.

13 [Table 1 here]

#### 14 **Procedure**

15 The ten dyads recruited were split in two groups, according to their proximity to the venues.  
16 In Site 2 participants were invited to attend 4 classes (once a week) and practise at home for  
17 20 minutes a day for 3 weeks as planned. The length of classes and home practice was set up  
18 to imitate the Trial Phase of the study where participants would be encouraged to do so to  
19 build up over 50 hours of exercise dose (Sherrington et al., 2008). Due to the slower  
20 recruitment and restricted time-frame, however, participants in Site 1 were invited to join the  
21 study for 3 weeks only and an extension was not offered. As the aim of this study was to  
22 obtain qualitative feedback on the experiences of participants to help develop the RCT phase,  
23 the impact of participants receiving 3 or 4 classes on research outcomes was not measured.  
24 The classes were to run over 4 weeks to allow the study of the acceptability of the classes, the

1 home-visit conducted by the instructor, the home-based practice and the data collection  
2 methods used during dyad's involvement in the study in the short term.

3         The Tai Chi course was specifically designed and made simple for people to follow,  
4 including several repetitions of the movements both in and between classes (during home-  
5 practice). Corrections were given to all in class, without excluding any participant, and  
6 providing an explanation regarding the importance of ensuring a safe practice. Health and  
7 safety protocols were put in place to guide the instructor on what to do in the event of a fall  
8 during a class and to allow the instructor know about participants' health conditions before  
9 the first class. Classes were led by a professionally trained Tai Chi instructor with experience  
10 of working with older participants living with and without dementia. Both pilot groups were  
11 led by the same instructor. Venues were chosen after checking their suitability against  
12 various criteria: Size (able to accommodate between 14-20 people), maintenance conditions,  
13 accessibility by car and/or public transport, time slots availability, flexible booking,  
14 availability of onsite kitchen facilities and general accessibility within the venue (i.e., lifts  
15 and toilets).

16         Both venues were spacious, had well maintained wooden floors, heating systems, and  
17 used a combination of natural and artificial lighting. Classes were delivered during working  
18 days around midday on a weekly basis, following advice from the Public and Patient  
19 Involvement (PPI) advisory group that was involved in the TACIT Trial's design (see  
20 Appendix A for a description of this meeting). Participants were asked to arrive 10 minutes  
21 before the scheduled time of the class, take part in 45 minute Tai Chi classes and engage in  
22 conversation for 45 minutes after the Tai Chi class over a cup of tea/coffee and cake. Every  
23 session therefore required participants' involvement for up to 90 minutes. Before starting  
24 each class, participants had the chance to talk to other participants and the instructor. During  
25 the classes participants generally practised in silence and with no or only occasional verbal

1 guidelines from the carer to the person living with dementia. Participants were expected to  
2 stand for the duration of the class to challenge their balance, but they were free to sit before  
3 and at the end of the session. Each class had the same structure formed by warm-ups,  
4 patterns, relaxation and socialising. Classes consisted of copying the instructor's movements.  
5 Each pattern (formed by several movements) was slowly repeated two or three times by the  
6 instructor, depending on dyads' performance, whilst participants mirrored him. Participants  
7 responded mostly non-verbally (i.e., with laughs) to the instructor's jokes and interactions.  
8 Only in a few occasions there was a verbal interaction between dyads and with the instructor.  
9 Classes developed in a friendly and relaxed atmosphere, where participants kept mostly  
10 focused on the instructor and received regular positive feedback. After the classes  
11 participants interacted with each other and with the instructor whilst enjoying some  
12 refreshments.

13         Additionally, dyads were asked to practise Tai Chi at home for 20 minutes a day after  
14 the first class. Participants were told that they could compensate their practise over the week  
15 (i.e., one day practice 30 minutes instead, and the next only 10; or split their 20 minutes  
16 practice in 2 slots of 10 minutes if this could fit better in their routines). A booklet was  
17 provided to act as a prompt for participants' home practise, reminding participants how to  
18 perform the movements. This booklet contained several pictures of each pattern, supported  
19 by explanatory text below each picture.

20         Dyads were supposed to receive a home-visit from the instructor during the second  
21 week of their participation in the study to ensure a safe practice at home and complete an  
22 action and a coping plan. However, in practice, only 6 out of 10 received this visit due to  
23 time constraints and various reasons. One of the dyads withdrew from the intervention after  
24 the first class; a second dyad joined the group a week later and the home-visit had to be  
25 postponed because of the person living with dementia not feeling well, but then was never re-

1 scheduled because was ill for the rest of her participation in the study. For the other two  
2 dyads, their location was quite far from the Instructor's and they were not able to arrange a  
3 suitable time for both to meet. A non-compliance report was filled for this and sent to the  
4 Sponsor. Nobody was injured during home-practice and from this experience we learnt that  
5 for the future Trial Phase of this study, classes lead by the same instructor would need to start  
6 at least two weeks apart and home-visits would only take place after the two first weeks of  
7 class practice. This way we could ensure enough time for the instructors to conduct these  
8 home-visits without fail. Additionally, information given to the participants has been revised  
9 to make clear there is to be no home-practice until the home-visit is made. Although four  
10 dyads did not receive the intervention fully as per the protocol, they were not exposed to  
11 undue risk given the very safe intervention they are being asked to do (Tai Chi) in their home  
12 environment that they are very familiar with. We have not had any experience of there being  
13 any risks to account for in any of the home visits in the Pilot Intervention Phase or the ones  
14 conducted so far during the RCT phase.

15         The action plan was introduced to identify a suitable time for home-practice and the  
16 coping plan to develop strategies to overcome possible barriers to home-practice (Chase,  
17 2015). Action and coping plans are techniques used to facilitate behaviour change (National  
18 Institute for Health and Care Excellence, 2014), in this study to facilitate participants'  
19 practice of Tai Chi at home. The action plan is the document where both members of the  
20 dyad specify which days of the week, at what times (morning/afternoon/evening), for how  
21 long, where specifically and with whom will they practise Tai Chi. The coping plan is the  
22 document where both members of the dyad identify the anticipated barriers for practising Tai  
23 Chi at home. For each barrier anticipated, they are requested to provide a way of overcome it  
24 and keep to the plan.

1           During the study period, one dyad from each Site withdrew from the intervention  
2 (20% withdrawal rate). Both dyads, however, decided to carry on providing research data.  
3 As reflected in Table 2, six dyads attended all the classes offered and only one dyad attended  
4 less than 50% of the classes (33%).  
5 [Table 2 here]

## 6 **Data Collection Process**

7           Field notes were used during participants' involvement in the classes to capture what  
8 was observed in the research context (Austin & Sutton, 2014; Patton, 2013) and to record  
9 participants and instructor's feedback. During the classes, qualitative semi-structured  
10 observations were made over the two study sites following a semi-structured checklist  
11 template (see Appendix B for qualitative checklist). Each observation started with an initial  
12 description of the venue, participants' interaction, and spatial distribution in the room. To  
13 capture changes within sessions, observations were split in three blocks (1<sup>st</sup>: 0-15 minutes;  
14 2<sup>nd</sup>: 15-30 minutes; 3<sup>rd</sup>:30-45 minutes). The observational schedule captured examples of  
15 participants' interactions, engagement (as interest and sustained attention) (Kinney & Rentz,  
16 2005), attitudes towards Tai Chi, positive and negative affect (Watson, Clark, & Tellegen,  
17 1988), communication (as expressions of pleasure, sadness, self-esteem, and normalcy)  
18 (Kinney & Rentz, 2005), and psychological needs satisfaction (Deci & Ryan, 2000). Data  
19 collected by the researcher observing the sessions were quotes (where possible) or a  
20 description of what was happening in the intervention context. Sessions were not video or  
21 audio-recorded as the instructor opposed this. However, to ensure the appropriateness of the  
22 qualitative observation tool created for this study, two authors (first and last) took notes  
23 (following guidelines provided by the first author in an observational codebook) during  
24 sessions organised in Site 1, which were later compared to refine the observational data  
25 collection tool. At the end of each class, during the 45 minutes allocated to socialise, the first

1 author interacted with the participants and the instructor individually and they provided their  
2 feedback about the session. This feedback was not audio-recorded but the researcher took  
3 notes whilst participants were providing their feedback or immediately after to avoid altering  
4 their accounts.

5 Focus group data were collected immediately after the last class (3rd or 4th depending  
6 of the Site), and both lasted around one hour taking place in the same venue as the Tai Chi  
7 class. All dyads attending the last class (n=7, 3 dyads in Site 1 and 4 dyads in Site 2) were  
8 involved in these focus groups. Two researchers facilitated each joint dyadic focus group  
9 (last and first authors in Site 1 and first and third in Site 2) and ensured the focus group  
10 schedule was followed. Topics covered included (see Appendix C for focus group  
11 schedule): Experience of taking part in Tai Chi classes and at home, their willingness to  
12 continue and their experience of taking part in research. This was audio-recorded and  
13 professionally transcribed verbatim, to ensure the accuracy of participants' accounts. First  
14 author attended all the sessions and was present in both focus groups. This researcher was in  
15 touch with participants weekly so they were sharing their experiences with a familiar person.

## 16 **Ethical Issues**

17 Due to the progressive nature of dementia process consent procedure was followed  
18 (Dewing, 2008), meaning that participants were verbally asked about their willingness to  
19 carry on taking part in the study at key points in the study, as well as the researcher looking  
20 for verbal cues that confirmed consent to participate.

21 During the data collection process participants were informed any data collected  
22 would be anonymised so their identities or any personal details would not be disclosed,  
23 participants' non-verbal communication, particularly for participants living with dementia  
24 was checked during their interactions with the researchers. Participants provided informed  
25 consent to take part in the study and focus group during the baseline home-visit, when they

1 were asked to summarise back to the researcher what the study was about and what they  
2 would be doing as part of their participation in the study to check their ability to provide  
3 informed consent. However, to ensure their willingness to continue taking part in the study,  
4 process consent was sought at each interaction with the researcher. This was also verbally  
5 checked before and after the focus group. Should any participant have declined to carry on  
6 with their participation in the study, up until the point when their data would have been  
7 anonymised, their data would have not been analysed. During the focus group, all  
8 participants were given an equal opportunity to share their experiences, with occasional direct  
9 invitations from the researcher to contribute to the conversation. To facilitate participants'  
10 living with dementia's involvement in the conversation, printed copies of focus group  
11 questions were provided in A4.

## 12 **Data Analysis Strategy**

13       Thematic analysis was used to identify common trends in systematic qualitative  
14 observations of the classes, field notes containing participants and instructor's views during  
15 their involvement in the study and the content of the focus groups. Methodological  
16 (observation, feedback and focus group) and data sources (participants, instructor and  
17 researchers) triangulation were used to ensure credibility. Data were analysed together  
18 following the 6 steps described by Braun and Clarke (2013) for thematic analysis: a) Audio  
19 files from focus groups were professionally transcribed verbatim, double-checked and  
20 anonymised (UK Data Archive, N. D.); b) Reading and re-reading the transcripts to get  
21 familiar with the data; c) Coding all the data sets inductively, looking for salient units of  
22 meaning (Saldaña, 2016) in the manifest content expressed by participants, and developed a  
23 codebook with inclusion and exclusion criteria and examples for each code. A large number  
24 of codes were identified after this process and, after revision, very similar codes were  
25 merged; d) Themes were searched amongst the codes; e) Themes were reviewed to make sure

1 they were representative of the codes contained; and f) Themes were defined and named.  
2 Data sets and the analytical process were managed using NVivo.11 (QSR International Pty  
3 Ltd., 2012). One author (first) coded the whole data set, and once the initial codes had been  
4 identified, and refined (merging very similar codes), a coding booklet was developed. This  
5 booklet was provided to the second author, who double coded 10% of each type of data  
6 collected to enhance rigour. Coding was compared to refine the coding framework.

## 7 **Results**

8 The intervention was well received by the majority of participants (9 out of 10 dyads)  
9 who expressed a willingness to carry on practicing Tai Chi after the study (see Table 1 for  
10 participants' characteristics). The remaining dyad was unable to continue participating in the  
11 pilot and withdrew after the first class due to health issues.

12 Two main themes were identified: intervention's characteristics and participants'  
13 reactions to the intervention (as reported in Table 3). Direct quotes presented contain  
14 participant identification numbers and a "C" when mentioned by a carer or a "P" if was  
15 mentioned by a person living with dementia. An "O" indicates this was heard during an  
16 observation or observed and described by the researcher, "FG" in the context of a focus  
17 group, and "F" when providing feedback at the end of the class. A summary of barriers,  
18 facilitators and improvements suggested to enhance the acceptability of the intervention by  
19 participants, the instructor or the research team are provided in Table 3.

20 [Table 3 here]

### 21 **Intervention's Characteristics**

22 All subthemes contained by this overarching theme relate to the way the intervention  
23 was: a) delivered by the instructor, including the way he engaged with participants, built  
24 rapport, reassured participants and tailored the intervention to meet participants' needs; and  
25 b) practised by participants, in terms of class- and home-based Tai Chi practise.



1           **Instructional methods.** All participants valued the instructor (see Table 3 for  
2 example quotes). Both people living with dementia and their carers stated that they were able  
3 to understand him as he was using clear speech and a calm tone of voice. During the classes,  
4 the instructor made use of examples from his private life to create rapport with participants  
5 (i.e., sharing comments made by his daughter), but also used examples from everyday life to  
6 describe the movements during the classes (i.e., “*is like drinking a cup of tea*” (O)). He  
7 regularly provided positive feedback during the classes to encourage participants’  
8 engagement in the activity and reassured the participants when they verbalised difficulties  
9 while doing Tai Chi at home or during classes. Sometimes this positive feedback was given  
10 when some participants were struggling to perform the movements or doing them incorrectly.  
11 This approach was chosen by the instructor for this study to facilitate their engagement and  
12 was positively perceived by one of the carers during a focus group:

13           *when he's doing the exercises, he says, oh, that's good, yes, that's right, you're doing it*  
14           *right there, but...you know they're not really but... he's just encouraging* (02001C-  
15           FG).

16           Corrections, however, were mostly made as a general comment not directed to  
17 individual participants (i.e., “*golden rule: your knees very slightly bent go forward and your*  
18 *heels stay in the ground*” (O)), unless participants had expressed a particular difficulty in  
19 performing a movement. The instructor reinforced participants’ home-practice by providing  
20 positive feedback (i.e., “*I can see some of you have been practising*” (O)).

21           The instructor adapted the intervention to participants’ needs and responded to their  
22 requests (i.e., introducing breathing while practising one movement, as requested by a carer  
23 during the class) to make the intervention accessible for both people living with dementia and  
24 their carers. He emphasised the need of participants to focus only on their own performance.

1           **Class and home-based Tai Chi practice.** Occasionally participants performed better  
2 when attempting a move for the second time during a class. However, more frequently  
3 participants (mostly people living with dementia) carried on practising the movement in the  
4 opposite direction, bending too much forward or pausing their engagement in the activity.  
5 During the first class participants living with dementia stood closer to their carers, however in  
6 the classes that followed three of the carers in Site 2 practised in front, leaving the person  
7 living with dementia to work individually behind them.

8           At home, eight out of ten dyads reported that they had managed to do some practice.  
9 Dyads who did not report any practice were the one dyad who withdrew after the first class  
10 and another dyad that attended all the classes but was not able to practice due to an  
11 unexpected lack of time.

12           Two carers verbalised their difficulties motivating the person living with dementia to  
13 do things, which had an impact on their home-practise meaning that they did not manage to  
14 do any practise or not more than 20 minutes during one week. However, only one participant  
15 living with dementia struggling to practice at home had experienced difficulties following the  
16 classes, instead focused on doing the warm ups (“*you do get quite a bit of benefit in that*”  
17 (02004C-FG), “*But our warm-ups is Tai Chi in my mind*” (02004P-FG)).

18           The lack of guidance and confidence when practising at home was the main issue  
19 raised by participant dyads. Particularly carers felt like the “*blind leading the blind*”, which  
20 led one of the carers to stop practising at home, whilst the person living with dementia carried  
21 on alone, convinced that any practice would be positive for her. The booklet in all the cases  
22 was perceived as not useful, unclear and with inconsistent (picture-description) instructions  
23 which failed to show the progression of the movements (see Table 3 for example quotes).

## 1 **Participants' Reactions to the Intervention**

2 Subthemes contained by this overarching theme relate to the way participants  
3 responded to the intervention in terms of their: a) feelings toward the intervention and their  
4 dyadic participation; and b) interaction with others (see Table 3).

5 **Feelings towards the intervention and their dyadic participation.** Before starting  
6 the classes and after the first class half the dyads were particularly passionate and enthusiastic  
7 about the opportunity of taking part in Tai Chi, whereas the rest were more neutral in their  
8 behaviours and expressions. Generally, participants had neutral and positive feelings towards  
9 the intervention ("*a good addition to my life*" (02005P-F)). All participants shared their  
10 enjoyment of the intervention and the socialising component, when providing feedback (see  
11 Table 3 for example quotes). However, only occasionally they verbalised this satisfaction  
12 during the class (i.e., "*I like it!*" (01002P-O)). In site 2, participants expressed their content  
13 non-verbally at the end of the class by clapping the instructor.

14 Tai Chi was perceived as a different activity that participants were not familiar with,  
15 however, this had no impact on participants' enjoyment and engagement in the activity ("*It's*  
16 *strange from another tasters that I went to, but I like it*" (02003P-FG)). Tai Chi is an activity  
17 that carers see themselves doing with their partners to improve or maintain their physical  
18 condition unlike other types of exercise, and both enjoy doing.

19 Carers did not find their joint participation to be a burden. Only one expressed it had  
20 been hard as a carer although he would keep going for the person living with dementia and  
21 the possibility of meeting with other carers. Similarly, only one participant living with  
22 dementia seemed to react negatively towards the intervention, feeling "*distressed before*  
23 *going*" (02006C-F)) to the sessions as reported by the carer.

24 During the classes, all participants were focused in the session, looking at the  
25 instructor and copying his movements. Three participants expressed they had experienced

1 difficulties following the classes after the first session, one due to their fear of falling and  
2 two because they struggled during sessions when copying more complicated patterns. It was  
3 clearly observed, however, that an additional participant, who did not report any difficulties,  
4 also struggled copying some of the movements. One of the participants living with dementia,  
5 on the contrary, according to the instructor and first author's observations got more into the  
6 intervention and was able to follow the class without verbal prompting from the carer. Carers  
7 engaged in the intervention reported no difficulties in copying the movements during the  
8 classes. Generally, participants appear to enhance their perceptions of competence during  
9 sessions and with practice, feelings of the "flow" and getting other benefits of the  
10 intervention. Participants' progress was already noticeable in the second class when half of  
11 the participants living with dementia and carers anticipated the movements taught by the  
12 instructor. Finally, three non-serious and non-severe, and expected adverse events  
13 experienced by participants were rated as definitely/probably/possibly related to the  
14 intervention: dizziness - reported by two participants living with dementia and pain -reported  
15 by a carer and attributed to previous conditions, which did not impact on their willingness to  
16 carry on practising Tai Chi.

17         The most important facilitators of participants' engagement in the intervention were  
18 the benefits perceived by both members of the dyad after taking part in the intervention: a)  
19 relaxation; b) exercise for health benefits –increasing activity levels, keeping muscle supple;  
20 c) body awareness– "*it makes you think about what's going on in your body while you're*  
21 *doing this*" (01004P-FG); d) brain stimulation; and e) balance improvement. Taking part in  
22 the intervention was perceived as a source of pride in itself.

23         **Interactions with others.** During the classes, most of the interactions were initiated  
24 by the instructor as he was the one leading the session. However, participants reacted to the  
25 instructor's comments frequently with smiles and laughs. In both sites only occasionally

1 there was an interaction between members of the same dyad, for instance, in the form of non-  
2 verbal interactions expressing mutual understanding. When the carers started a verbal  
3 interaction this was always in a soft and comfortable way to ensure the person living with  
4 dementia was all right or to support the instructions provided by the instructor. At the end of  
5 the class participants were able to engage in informal conversation with other dyads and the  
6 instructor.

### 7 **Discussion**

8 The aim of this study was to understand what is influencing the acceptability of Tai  
9 Chi amongst people living with dementia and their carers and how this could be enhanced.  
10 Findings suggest that Tai Chi is perceived by people living with dementia of mild-to-  
11 moderate severity and their carers as an enjoyable activity that they can readily carry out  
12 together. Carers play a key role in supporting people living with dementia's involvement in  
13 the classes and facilitating home-practice, therefore content and supporting materials must be  
14 carefully adapted so both members feel comfortable when practicing at home. Once  
15 incorporated in their routines, Tai Chi could be an enjoyable and mutually beneficial activity.

16 Caution is required in supporting the acceptability of Tai Chi as a falls prevention  
17 intervention, as recruitment was challenging. An important reason for this is that eligible  
18 participants felt that they were not at risk of falls (Hawley-Hague et al., 2016) and as such  
19 that a falls prevention intervention was not for them. This has been a common problem in  
20 that participants rate exercise intervention designed to reduce falls as important for other  
21 people (Haines, Day, Hill, Clemson, & Finch, 2014). In this study there were also  
22 participants who did not feel at risk of falls, which is consistent with the findings of another  
23 study with older participants (Yardley et al., 2006). For this reason, in the RCT phase of the  
24 TACIT Trial we have changed our strategy to take the emphasis away from falls to general  
25 health and well-being.

## 1 **Class-Based Practice**

2           The intervention was widely accepted by participants who particularly adhered to the  
3 class-based component. Consistent with previous exercise research, the qualities of the  
4 instructor (Hawley-Hague et al., 2016), the creation of a warm and failure-free environment  
5 (Barnes et al., 2015) and the socialising component (Wu et al., 2015) have been positively  
6 valued by participants and influenced their adherence to the study.

7           Researchers observed participants living with dementia that at times struggled to copy  
8 the instructor; however these participants only reported their enjoyment of Tai Chi. One  
9 reason for this might be that they felt able to do the Tai Chi well-enough and so report that  
10 they found the experience enjoyable. This could be partially supported by previous research  
11 suggesting that participants' enjoyment of the intervention could be critical for their sustained  
12 participation in falls prevention interventions (McPhate et al., 2016). Previous studies have  
13 also found apathy in participants with lack of insight to their dementia symptoms (Aalten et  
14 al., 2006). This could explain a lack of awareness about their performance during the classes  
15 and their tendency not to communicate their difficulties. However, participants' enjoyment  
16 of the socialising component could have impacted more positively on their acceptability of  
17 the intervention, as the satisfaction of the social need seemed to be crucial for people living  
18 with dementia (Maki, Amari, Yamaguchi, Nakaaki, & Yamaguchi, 2012).

19           Low sense of efficacy performing the movements perceived by the carer or the person  
20 living with dementia could have an impact on participants' willingness to carry on taking part  
21 in the intervention. Both dyads who expressed this lack of competence ended up not willing  
22 (or not being able, due to health issues) to attend further sessions. In light of these results,  
23 tailored support from the instructor (Chong et al., 2014; Day, Trotter, Donaldson, Hill, &  
24 Finch, 2016; Pitkälä et al., 2013) in becoming aware of these perceptions could facilitate their  
25 adherence to the exercise intervention. Having successful experiences and verbal

1 encouragement from the instructor, however, could have enhanced most participants' efficacy  
2 beliefs (Bandura, 1977) which in turn have been shown to be a predictor of perseverance and  
3 adherence (Alharbi et al., 2016).

#### 4 **Home-Based Practice**

5 The home-based component was generally well perceived by participants who  
6 included Tai Chi practice in their routines. However, their acceptability was challenged due  
7 to their difficulties remembering the Tai Chi movements at home, which was not improved  
8 by the use of the home-exercise booklet. Such difficulties could have potentially impacted on  
9 participants' adherence to the home-based component. Our results expand on previous  
10 research findings suggesting the use of memory aids such as exercise booklets with images  
11 and explanations to support home-practice (Connell & Janevic, 2009; Logghe et al., 2011;  
12 Logsdon, McCurry, Pike, & Teri, 2009; Prick et al., 2014; Suttanon et al., 2013) and  
13 highlight the need for additional support so participants can perceive movements'  
14 progression.

15 Difficulties to sustain attention have not been previously identified in exercise  
16 interventions for people living with dementia (Dal Bello-Haas et al., 2014; Prick et al., 2014).  
17 However, in this study, difficulties reported by two carers trying to get the attention of the  
18 person living with dementia for 20 minutes in one bout could be motivated by the home  
19 environment and the level of confidence of the carer supporting this practice. Previous  
20 research suggested that instructions provided by the instructor could have more impact on the  
21 person living with dementia than the ones offered by the carer (Prick et al., 2014), which  
22 could be influenced by the instructional methods and qualities of the instructor.

#### 23 **Dyadic Approach**

24 In this study the use of a dyadic approach was accepted by both people living with  
25 dementia and their carers. This finding concurs with previous studies where a dyadic

1 approach had been used to facilitate people living with dementia's adherence to exercise  
2 interventions (Teri et al., 2003; Yao et al., 2012). Results from the current study suggest that  
3 this dyadic approach could not only facilitate their adherence to the intervention, but enable  
4 people living with dementia's inclusion in these interventions. In the same way, feedback  
5 from carers reinforce the use of this dyadic approach in the context of dementia as it gives  
6 them the opportunity to discover enjoyable activities which could evolve to shared interests.  
7 These would be of particular relevance when these common activities could be helpful for  
8 carers (to experience their role more positively) and the person living with dementia (to feel  
9 competent and empowered) (DiLauro, Pereira, Carr, Chiu, & Wesson, 2015; Lamotte, Shah,  
10 Lazarov, & Corcos, 2016). Another strength of this dyadic approach highlighted by carers is  
11 that both, they themselves and the person living with dementia benefit from taking part in Tai  
12 Chi. This perceived benefit could potentially mean carers are willing to carry on practising  
13 after their involvement in the study, which would also be of benefit for the person living with  
14 dementia (Lamotte et al., 2016). In contrast to some reports in the literature (Wesson et al.,  
15 2013; Woods et al., 2016), carers did not perceive their involvement in this study as a burden.

### 16 **Strengths and Limitations**

17 Our results describe for the first time how people living with dementia and their carers  
18 respond to a Tai Chi exercise intervention. This study is the first of its kind to use qualitative  
19 methods to understand how appropriate a Tai Chi intervention is for people living with  
20 dementia and their carers. The use of a dyadic approach to gather the views of participants  
21 living with dementia and their carers, has enabled carers to support the researcher by  
22 rephrasing questions and inviting the person living with dementia to provide their views  
23 during the focus groups, as found in previous research (Nyman, Innes, & Heward, 2016;  
24 Prick et al., 2014) and in the TACIT Trial PPI advisory group.



1           This study has a number of limitations. First, the quality of the observations may  
2 have been impacted by the fact that the Tai Chi classes were not video-recorded (as the  
3 instructor did not consent for him or participants to be recorded during classes). The  
4 researcher may have missed some participants' reactions whilst they were taking notes on  
5 different participants. Second, feedback from the two dyads who withdrew from the  
6 intervention was limited because one did not agree to take part in the final focus group, and  
7 the other dyad was not feeling well after their holiday period. An interview with the dyad  
8 that withdrew during the first class could have provided more insight into ways of facilitating  
9 their acceptability of the intervention. Third, time to collect participants' views at the end of  
10 the class was also limited, however, capturing how people feel in that specific moment (after  
11 practising Tai Chi) could be particularly relevant in the context of dementia as recall could be  
12 facilitated by interviewing participants in their natural environment where they were taking  
13 part in the activity (Nygård, 2006). Lastly, during one of the focus group participants living  
14 with dementia could have felt uncomfortable by hearing their carers commenting they are not  
15 always able to provide accurate responses. Although people living with dementia did not  
16 seem to respond verbally or non-verbally to this, this could have silenced their voices.

### 17 **Practical Implications**

18           This study highlights three main aspects which should be considered in designing  
19 future exercise programs for people with dementia. First, the use of a dyadic approach in  
20 exercise interventions could be beneficial for both the person living with dementia and the  
21 carer at an individual level, but also facilitate their uptake of the intervention, as this would  
22 provide them with a potential common interest. Second, the combination of class and home-  
23 based practice could be advantageous to reinforce participants' social support networks as  
24 well as strengthen dyadic relationships and facilitate the acceptability of the intervention by  
25 feeling an increased competence. Third, instructors' awareness of dementia and adapted

1 instructional methods in class and support materials at home facilitates participants'  
2 acceptability of the classes. For this reason, it must be taken into account that booklets with  
3 images and descriptions might be insufficient for people living with dementia and their carers  
4 when facing unfamiliar movements such as those of Tai Chi. In this case, simple, clear and  
5 when possible, dynamic prompts (i.e., DVD) are advised.

## 6 **Future Research**

7 Future research investigating the acceptability of Tai Chi should consider the  
8 inclusion of participants from different ethnic backgrounds and with different relationships  
9 with the person living with dementia (other than spouse). In this study, informal carers were  
10 sought to be recruited independently from their relationship with the person living with  
11 dementia. However, only one dyad was not formed by a couple and in all cases the person  
12 living with dementia was living with the informal carer, which could have influenced their  
13 acceptability of the intervention and particularly their availability to take part in home-based  
14 practice. Similarly, the impact of the size of the group on dyads acceptability was only  
15 explored in two small groups, which could be less cost effective in community settings. The  
16 acceptability of larger groups formed by dyads rests unexplored in the context of exercise  
17 interventions for people living with dementia and their informal carers.

## 18 **Conclusion**

19 In summary, this novel study contributes to our understanding of the experiences,  
20 needs and preferences of people living with dementia taking part in exercise interventions  
21 with their carers. Intervention's characteristics and participants' reactions to the intervention  
22 might impact on their acceptability of exercise interventions. A series of improvements have  
23 been suggested by participants, instructor and the research team to facilitate the engagement  
24 of people living with dementia with different levels of performance (i.e., reducing the amount  
25 of content to be delivered) and support home practice (i.e., adjusting materials).



- 1 Abraha, I., Rimland, J. M., Trotta, F. M., Dell'Aquila, G., Cruz-Jentoft, A., Petrovic, M., . . .  
2 Cherubini, A. (2017). Systematic review of systematic reviews of non-  
3 pharmacological interventions to treat behavioural disturbances in older patients with  
4 dementia. The SENATOR-OnTop series. *BMJ Open*, 7, 1. doi: 10.1136/bmjopen-  
5 2016-012759Alharbi, M., Gallagher, R., Neubeck, L., Bauman, A., Prebill, G.,  
6 Kirkness, A., & Randall, S. (2016). Exercise barriers and the relationship to self-  
7 efficacy for exercise over 12 months of a lifestyle-change program for people with  
8 heart disease and/or diabetes. *European Journal of Cardiovascular Nursing*, 16(4),  
9 309-317. doi:10.1177/1474515116666475
- 10 Alzheimer's Disease International. (2015). Dementia statistics. Retrieved from  
11 <http://www.alz.co.uk/research/statistics>
- 12 Alzheimer's Research UK. (2015). Dementia in the family: The impact on carers. Retrieved  
13 from [https://www.alzheimersresearchuk.org/wp-content/uploads/2015/12/Dementia-](https://www.alzheimersresearchuk.org/wp-content/uploads/2015/12/Dementia-in-the-Family-The-impact-on-carers.pdf)  
14 [in-the-Family-The-impact-on-carers.pdf](https://www.alzheimersresearchuk.org/wp-content/uploads/2015/12/Dementia-in-the-Family-The-impact-on-carers.pdf)
- 15 Alzheimer's Society. (2015). Factsheet 458LP: The progression of Alzheimer's disease and  
16 other dementias. Retrieved from  
17 [https://www.alzheimers.org.uk/site/scripts/download\\_info.php?fileID=1772](https://www.alzheimers.org.uk/site/scripts/download_info.php?fileID=1772)
- 18 Austin, Z., & Sutton, J. (2014). Qualitative research: Getting started. *The Canadian Journal*  
19 *of Hospital Pharmacy*, 67(6), 436-440. doi:10.4212/cjhp.v67i6.1406
- 20 Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change.  
21 *Psychological Review*, 84(2), 191-215. doi:10.1037/0033-295X.84.2.191
- 22 Barnes, D. E., Mehling, W., Wu, E., Beristianos, M., Yaffe, K., Skultety, K., & Chesney, M.  
23 A. (2015). Preventing loss of independence through exercise (PLIÉ): A pilot clinical  
24 trial in older adults with dementia. *PLoS ONE*, 10(2), e0113367.  
25 doi:10.1371/journal.pone.0113367

- 1 Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for*  
2 *beginners*. London: SAGE Publications Ltd.
- 3 Burgener, S. C., APRN-BC, FAAN, Yang, Y., Gilbert, R., & Marsh-Yant, S. (2008). The  
4 effects of a multimodal intervention on outcomes of persons with early-stage  
5 dementia. *American Journal of Alzheimer's Disease & Other Dementias*, 23(4), 382-  
6 394. doi:10.1177/1533317508317527
- 7 Burton, E., Cavalheri, V., Adams, R., Browne, C. O., Boverly-Spencer, P., Fenton, A. M., . . .  
8 Hill, K. D. (2015). Effectiveness of exercise programs to reduce falls in older people  
9 with dementia living in the community: A systematic review and meta-analysis.  
10 *Clinical Interventions in Aging*, 10, 421-434. doi:10.2147/CIA.S71691
- 11 Cameron, I. D., Gillespie, L. D., Robertson, M. C., Murray, G. R., Hill, K. D., Cumming, R.  
12 G., & Kerse, N. (2012). Interventions for preventing falls in older people in care  
13 facilities and hospitals. *Cochrane Database of Systematic Reviews*, (12), 1-184.  
14 doi:10.1002/14651858.CD005465.pub3
- 15 Chase, J.-A. D. (2015). Interventions to increase physical activity among older adults: A  
16 meta-analysis. *Gerontologist*, 55(4), 706-718. doi:10.1093/geront/gnu090
- 17 Cheng, S.-T., Chow, P. K., Song, Y.-Q., Yu, E. C. S., Chan, A. C. M., Lee, T. M. C., & Lam,  
18 J. H. M. (2014). Mental and physical activities delay cognitive decline in older  
19 persons with dementia. *The American Journal of Geriatric Psychiatry*, 22(1), 63-74.  
20 doi:10.1016/j.jagp.2013.01.060
- 21 Chew, J., Chong, M. S., Fong, Y. L., & Tay, L. (2015). Outcomes of a multimodal cognitive  
22 and physical rehabilitation program for persons with mild dementia and their  
23 caregivers: A goal-oriented approach. *Clinical Interventions in Aging*, 10, 1687-1694.  
24 doi: 10.2147/CIA.S93914

- 1 Choi, J. H., Moon, J. S., & Song, R. (2005). Effects of Sun-style Tai Chi exercise on physical  
2 fitness and fall prevention in fall-prone older adults. *Journal of Advanced Nursing*,  
3 *51*(2), 150-157. doi:10.1111/j.1365-2648.2005.03480.x
- 4 Chong, T. W. H., Doyle, C. J., Cyarto, E. V., Cox, K. L., Ellis, K. A., Ames, D., &  
5 Lautenschlager, N. T. (2014). Physical activity program preferences and perspectives  
6 of older adults with and without cognitive impairment. *Asia-Pacific Psychiatry:*  
7 *Official Journal of the Pacific Rim College of Psychiatrists*, *6*(2), 179-190.  
8 doi:10.1111/appy.12015
- 9 Connell, C. M., & Janevic, M. R. (2009). Effects of a telephone-based exercise intervention  
10 for dementia caregiving wives: A randomized controlled trial. *Journal of Applied*  
11 *Gerontology*, *28*(2), 171-194. doi:10.1177/0733464808326951
- 12 Dal Bello-Haas, V. P. M., O'Connell, M. E., Morgan, D. G., & Crossley, M. (2014). Lessons  
13 learned: Feasibility and acceptability of a telehealth-delivered exercise intervention  
14 for rural- dwelling individuals with dementia and their caregivers. *Rural and Remote*  
15 *Health*, *14*(3), 2715. Retrieved from  
16 [http://www.rrh.org.au/publishedarticles/article\\_print\\_2715.pdf](http://www.rrh.org.au/publishedarticles/article_print_2715.pdf)
- 17 Day, L., Trotter, M. J., Donaldson, A., Hill, K. D., & Finch, C. F. (2016). Key factors  
18 influencing implementation of falls prevention exercise programs in the community.  
19 *Journal of Aging and Physical Activity*, *24*(1), 45-52. doi:10.1123/japa.2014-0143
- 20 Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and  
21 the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227-268.  
22 doi:10.1207/S15327965PLI1104\_01
- 23 Dewing, J. (2008). Process consent and research with older persons living with dementia.  
24 *Research Ethics Review*, *4*(2), 59-64. doi:10.1177/174701610800400205

- 1 DiLauro, M., Pereira, A., Carr, J., Chiu, M., & Wesson, V. (2015). Spousal caregivers and  
2 persons with dementia: Increasing participation in shared leisure activities among  
3 hospital-based dementia support program participants. *Dementia, 16*(1), 9-28.  
4 doi:10.1177/1471301215570680
- 5 Drabble, S. J., O’Cathain, A., Thomas, K. J., Rudolph, A., & Hewison, J. (2014). Describing  
6 qualitative research undertaken with randomised controlled trials in grant proposals:  
7 A documentary analysis. *BMC Medical Research Methodology, 14*, 24.  
8 doi:10.1186/1471-2288-14-24
- 9 Farran, C. J., Staffileno, B. A., Gilley, D. W., McCann, J. J., Li, Y., Castro, C. M., & King,  
10 A. C. (2008). A lifestyle physical activity intervention for caregivers of persons with  
11 Alzheimer’s disease. *American Journal of Alzheimer's Disease and Other Dementias,*  
12 *23*(2), 132-142. doi:10.1177/1533317507312556
- 13 Fetherston, C. M., & Wei, L. (2011). The benefits of tai chi as a self management strategy to  
14 improve health in people with chronic conditions. *Journal of Nursing & Healthcare of*  
15 *Chronic Illnesses, 3*(3), 155-164. doi:10.1111/j.1752-9824.2011.01089.x
- 16 Fleiner, T., Dauth, H., Gersie, M., Zijlstra, W., & Haussermann, P. (2017). Structured  
17 physical exercise improves neuropsychiatric symptoms in acute dementia care: A  
18 hospital-based RCT. *Alzheimer's Research & Therapy, 9*, 1-9. doi:10.1186/s13195-  
19 017-0289-z
- 20 Frederiksen, K. S., Sobol, N., Beyer, N., Hasselbalch, S., & Waldemar, G. (2014). Moderate-  
21 to-high intensity aerobic exercise in patients with mild to moderate Alzheimer's  
22 disease: A pilot study. *International Journal of Geriatric Psychiatry, 29*(12), 1242-  
23 1248. doi:10.1002/gps.4096

- 1 Gibson, G., Timlin, A., Curran, S., & Wattis, J. (2004). The scope for qualitative methods in  
2 research and clinical trials in dementia. *Age and Ageing*, 33(4), 422-426.  
3 doi:10.1093/ageing/afh136
- 4 Haines, T. P., Day, L., Hill, K. D., Clemson, L., & Finch, C. (2014). "Better for others than  
5 for me": A belief that should shape our efforts to promote participation in falls  
6 prevention strategies. *Archives of Gerontology and Geriatrics*, 59(1), 136-144.  
7 doi:10.1016/j.archger.2014.03.003
- 8 Hamilton, S., Ramsay, E., Webster, L., Payne, N. L., Taylor, M. E., Close, J. C. T., . . .  
9 Brodaty, H. (2017). A home-based, carer-enhanced exercise program improves  
10 balance and falls efficacy in community-dwelling older people with dementia.  
11 *International Psychogeriatrics*, 29(1), 81. doi: 10.1017/S1041610216001629
- 12 Hawley-Hague, H., Horne, M., Skelton, D. A., & Todd, C. (2016). Older adults' uptake and  
13 adherence to exercise classes: Instructors' perspectives. *Journal of Aging and Physical*  
14 *Activity*, 24(1), 119-128. doi:10.1123/japa.2014-0108
- 15 Hill, K. D., Hunter, S. W., Batchelor, F. A., Cavalheri, V., & Burton, E. (2015).  
16 Individualized home-based exercise programs for older people to reduce falls and  
17 improve physical performance: A systematic review and meta-analysis. *Maturitas*,  
18 82(1), 72-84. doi:10.1016/j.maturitas.2015.04.005
- 19 Hsieh, S., McGrory, S., Leslie, F., Dawson, K., Ahmed, S., Butler, C. R., . . . Hodges, J. R.  
20 (2015). The Mini-Addenbrooke's Cognitive Examination: A new assessment tool for  
21 dementia. *Dementia and Geriatric Cognitive Disorders*, 39, 1-11.  
22 doi:10.1159/000366040
- 23 Kinney, J. M., & Rentz, C. A. (2005). Observed well-being among individuals with  
24 dementia: Memories in the Making, an art program, versus other structured activity.



- 1           *American Journal of Alzheimer's Disease and Other Dementias*, 20(4), 220-227.  
2           doi:10.1177/1533331750502000406
- 3     Judson, M. A. (2015). The clinical features of sarcoidosis: A comprehensive review. *Clinical*  
4           *Reviews in Allergy & Immunology*, 49(1), 63-78. doi:10.1007/s12016-014-8450-y
- 5     Lamotte, G., Shah, R. C., Lazarov, O., & Corcos, D. M. (2016). Exercise training for persons  
6           with Alzheimer's disease and caregivers: A review of dyadic exercise interventions.  
7           *Journal of Motor Behavior*, 1-13. doi:10.1080/00222895.2016.1241739
- 8     Laver, K., Dyer, S., Whitehead, C., Clemson, L., & Crotty, M. (2016). Interventions to delay  
9           functional decline in people with dementia: A systematic review of systematic  
10           reviews. *BMJ Open*, 6(4), 1. doi:10.1136/bmjopen-2015-010767
- 11    Lewin, S., Glenton, C., & Oxman, A. (2009). Use of qualitative methods alongside  
12           randomised controlled trials of complex healthcare interventions: Methodological  
13           study. *BMJ*, 339. doi:10.1136/bmj.b3496
- 14    Logghe, I. H. J., Verhagen, A. P., Rademaker, A. C. H. J., Zeeuwe, P. E. M., Bierma-  
15           Zeinstra, S. M. A., Van Rossum, E., . . . Koes, B. W. (2011). Explaining the  
16           ineffectiveness of a Tai Chi fall prevention training for community-living older  
17           people: A process evaluation alongside a randomized clinical trial (RCT). *Archives of*  
18           *Gerontology and Geriatrics*, 52(3), 357-362. doi:10.1016/j.archger.2010.05.013
- 19    Logsdon, R. G., McCurry, S. M., Pike, K. C., & Teri, L. (2009). Making physical activity  
20           accessible to older adults with memory loss: A feasibility study. *The Gerontologist*,  
21           49(Suppl 1), S94–S99. doi:10.1093/geront/gnp082
- 22    Logsdon, R. G., McCurry, S. M., & Teri, L. (2005). A home health care approach to exercise  
23           for persons with Alzheimer's disease. *Care Management Journals*, 6(2), 90-97.  
24           Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/16544870>

- 1 Maki, Y., Amari, M., Yamaguchi, T., Nakaaki, S., & Yamaguchi, H. (2012). Anosognosia:  
2 Patients' distress and self-awareness of deficits in Alzheimer's disease. *American*  
3 *Journal of Alzheimer's Disease and Other Dementias*, 27(5), 339-345.  
4 doi:10.1177/1533317512452039
- 5 McPhate, L., Simek, E. M., Haines, T. P., Hill, K. D., Finch, C. F., & Day, L. (2016). "Are  
6 your clients having fun?" The implications of respondents' preferences for the  
7 delivery of group exercise programs for falls prevention. *Journal of Aging and*  
8 *Physical Activity*, 24(1), 129-138. doi:10.1123/japa.2014-0168
- 9 Moon, H., & Adams, K. B. (2013). The effectiveness of dyadic interventions for people with  
10 dementia and their caregivers. *Dementia*, 12(6), 821-839.  
11 doi:10.1177/1471301212447026
- 12 National Institute for Health and Care Excellence. (2013). *Falls in older people: Assessing*  
13 *risk and prevention*. Retrieved from  
14 [https://www.nice.org.uk/guidance/cg161/resources/falls-in-older-people-assessing-](https://www.nice.org.uk/guidance/cg161/resources/falls-in-older-people-assessing-risk-and-prevention-35109686728645)  
15 [risk-and-prevention-35109686728645](https://www.nice.org.uk/guidance/cg161/resources/falls-in-older-people-assessing-risk-and-prevention-35109686728645)
- 16 NHS. (2014). Diverticular disease and diverticulitis. Retrieved from  
17 [http://www.nhs.uk/conditions/Diverticular-disease-and-](http://www.nhs.uk/conditions/Diverticular-disease-and-diverticulitis/Pages/Introduction.aspx)  
18 [diverticulitis/Pages/Introduction.aspx](http://www.nhs.uk/conditions/Diverticular-disease-and-diverticulitis/Pages/Introduction.aspx)
- 19 NHS. (2016). Fibromyalgia. Retrieved from  
20 <http://www.nhs.uk/Conditions/Fibromyalgia/Pages/Introduction.aspx>
- 21 Nowalk, M. P., Prendergast, J. M., Bayles, C. M., D'Amico, F. J., & Colvin, G. C. (2001). A  
22 randomized trial of exercise programs among older individuals living in two long-  
23 term care facilities: The FallsFREE program. *Journal of the American Geriatrics*  
24 *Society*, 49(7), 859-865. doi:10.1046/j.1532-5415.2001.49174.x

- 1 Nygård, L. (2006). How can we get access to the experiences of people with dementia?  
2 Suggestions and reflections. *Scandinavian Journal of Occupational Therapy, 13*(2),  
3 101-112. doi:10.1080/11038120600723190
- 4 Nyman, S. R., Innes, A., & Heward, M. (2016). Social care and support needs of community-  
5 dwelling people with dementia and concurrent visual impairment. *Aging and Mental*  
6 *Health, 21*(9), 961-967. doi:10.1080/13607863.2016.1186151
- 7 Nyman, S. R., & Skelton, D. (2017). The case for Tai Chi in the repertoire of strategies  
8 to prevent falls among older people. *Perspectives in Public Health, 132*(2), 85-86.  
9 doi:10.1177/1757913916685642
- 10 O’Cathain, A., Thomas, K. J., Drabble, S. J., Rudolph, A., & Hewison, J. (2013). What can  
11 qualitative research do for randomised controlled trials? A systematic mapping  
12 review. *BMJ Open, 3*.
- 13 Öhman, H., Savikko, N., Strandberg, T. E., Kautiainen, H., Raivio, M. M., Laakkonen, M.-L.,  
14 . . . Pitkälä, K. H. (2016). Effects of exercise on cognition: The Finnish Alzheimer  
15 disease exercise trial: A randomized, controlled trial. *Journal of the American*  
16 *Geriatrics Society, 64*(4), 731-738. doi:10.1111/jgs.14059
- 17 Öhman, H., Savikko, N., Strandberg, T. E., & Pitkälä, K. H. (2014). Effect of physical  
18 exercise on cognitive performance in older adults with mild cognitive impairment or  
19 dementia: A systematic review. *Dementia and Geriatric Cognitive Disorders, 38*(5-6),  
20 347-365. doi:10.1159/000365388
- 21 Patton, M. Q. (2013). *Qualitative research and evaluation methods* (4th ed.). Los Angeles:  
22 SAGE.
- 23 Pitkälä, K. H., Pöysti, M. M., Laakkonen, M.-L., Tilvis, R. S., Savikko, N., Kautiainen, H., &  
24 Strandberg, T. E. (2013). Effects of the Finnish Alzheimer disease exercise trial

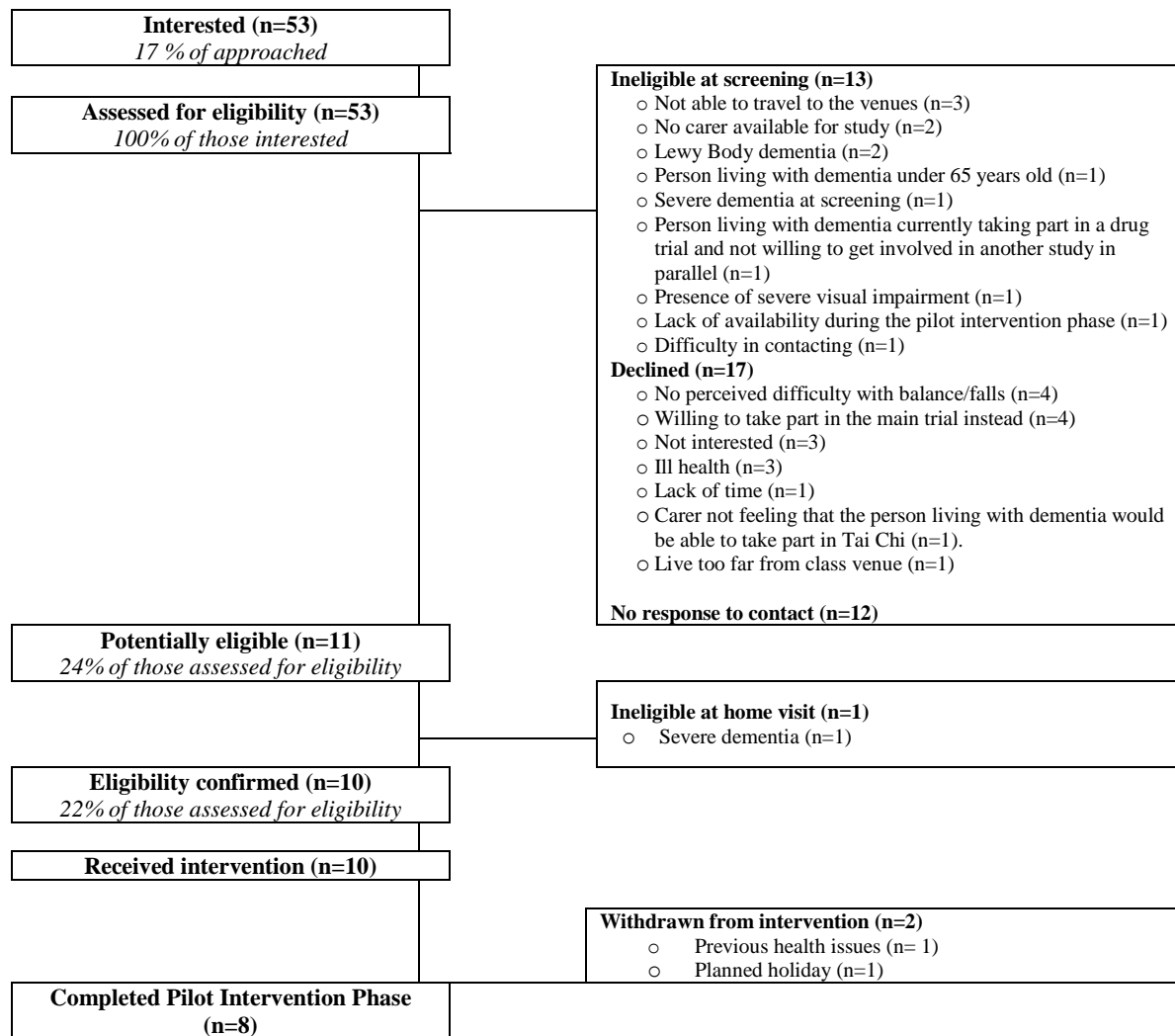
- 1 (FINALEX): A randomized controlled trial. *JAMA Internal Medicine*, 173(10), 894-  
2 901. doi:10.1001/jamainternmed.2013.359
- 3 Prick, A. E., de Lange, J., van 't Leven, N., & Pot, A. M. (2014). Process evaluation of a  
4 multicomponent dyadic intervention study with exercise and support for people with  
5 dementia and their family caregivers. *Trials*, 15(1), 1-14. doi:10.1186/1745-6215-15-  
6 401
- 7 QSR International Pty Ltd. (2012). NVivo qualitative data analysis Software (Version 11).
- 8 Rao, A. K., Chou, A., Bursley, B., Smulofsky, J., & Jezequel, J. (2014). Systematic review of  
9 the effects of exercise on activities of daily living in people with Alzheimer's disease.  
10 *American Journal of Occupational Therapy*, 68(1), 50-56.  
11 doi:10.5014/ajot.2014.009035
- 12 Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). London: SAGE  
13 Publications Ltd.
- 14 Saravanakumar, P., Higgins, I. J., Van Der Riet, P. J., Marquez, J., & Sibbritt, D. (2014). The  
15 influence of Tai Chi and yoga on balance and falls in a residential care setting: A  
16 randomised controlled trial. *Contemporary Nurse*, 48(1), 76-87.  
17 doi:10.5172/conu.2014.48.1.76
- 18 Shaw, F. E. (2003). Falls in older people with dementia. *Geriatrics and Aging*, 6(7), 37-40.  
19 Retrieved from  
20 <https://www.healthplexus.net/files/content/2003/August/0607dementiafall.pdf>
- 21 Shelat, A. M. (2016). Neuralgia. Retrieved from  
22 <https://medlineplus.gov/ency/article/001407.htm>
- 23 Sherrington, C., Whitney, J. C., Lord, S. R., Herbert, R. D., Cumming, R. G., & Close, J. C.  
24 (2008). Effective exercise for the prevention of falls: A systematic review and meta-

- 1 analysis. *Journal of the American Geriatrics Society*, 56(12), 2234-2243.  
2 doi:10.1111/j.1532-5415.2008.02014.x
- 3 Strookappe, B., Swigris, J., De Vries, J., Elfferich, M., Knevel, T., & Drent, M. (2015).  
4 Benefits of physical training in sarcoidosis. *Lung*, 193(5), 701-708.  
5 doi:10.1007/s00408-015-9784-9
- 6 Suttanon, P., Hill, K. D., Said, C. M., Byrne, K. N., & Dodd, K. J. (2012). Factors  
7 influencing commencement and adherence to a home-based balance exercise program  
8 for reducing risk of falls: Perceptions of people with Alzheimer's disease and their  
9 caregivers. *International Psychogeriatrics*, 24(7), 1172-1182.  
10 doi:10.1017/S1041610211002729
- 11 Suttanon, P., Hill, K. D., Said, C. M., Williams, S. B., Byrne, K. N., LoGiudice, D., . . .  
12 Dodd, K. J. (2013). Feasibility, safety and preliminary evidence of the effectiveness  
13 of a home-based exercise programme for older people with Alzheimer's disease: A  
14 pilot randomized controlled trial. *Clinical Rehabilitation*, 27(5), 427-438.  
15 doi:10.1177/0269215512460877
- 16 Teri, L., Gibbons, L. E., McCurry, S. M., Logsdon, R. G., Buchner, D. M., Barlow, W. E., . .  
17 . Larson, E. B. (2003). Exercise plus behavioral management in patients with  
18 Alzheimer disease - A randomized controlled trial. *Journal of the American Medical*  
19 *Association*, 290(15), 2015-2022. doi:10.1001/jama.290.15.2015
- 20 Tsai, P.-F., Chang, J. Y., Beck, C., Kuo, Y.-F., Keefe, F. J., & Rosengren, K. (2015). A  
21 supplemental report to a randomized cluster trial of a 20-week Sun-style Tai Chi for  
22 osteoarthritic knee pain in elders with cognitive impairment. *Complementary*  
23 *Therapies in Medicine*, 23(4), 570-576. doi:10.1016/j.ctim.2015.06.001
- 24 UK Data Archive. (N. D.). Create & Manage Data: Anonymisation. Retrieved from  
25 <http://www.data-archive.ac.uk/create-manage/consent-ethics/anonymisation?index=2>

- 1 Van't Leven, N., Prick, A. E., Groenewoud, J. G., Roelofs, P. D., de Lange, J., & Pot, A. M.  
2 (2013). Dyadic interventions for community-dwelling people with dementia and their  
3 family caregivers: A systematic review. *International Psychogeriatrics*, 25(10), 1581-  
4 1603. doi:10.1017/s1041610213000860
- 5 Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief  
6 measures of positive and negative affect: The PANAS scales. *Journal of Personality  
7 and Social Psychology*, 54(6), 1063-1070. doi:10.1037/0022-3514.54.6.1063
- 8 Wesson, J., Clemson, L., Brodaty, H., Lord, S., Taylor, M., Gitlin, L., & Close, J. (2013). A  
9 feasibility study and pilot randomised trial of a tailored prevention program to reduce  
10 falls in older people with mild dementia. *BMC Geriatrics*, 13, 89. doi: 10.1186/1471-  
11 2318-13-89.
- 12 WHO. (2007). *WHO global report on falls prevention in older age*. Retrieved from  
13 [http://www.who.int/ageing/publications/Falls\\_prevention7March.pdf?ua=1](http://www.who.int/ageing/publications/Falls_prevention7March.pdf?ua=1)
- 14 WHO. (2012). *Dementia: A public health priority*. Retrieved from  
15 [http://apps.who.int/iris/bitstream/10665/75263/1/9789241564458\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/75263/1/9789241564458_eng.pdf?ua=1)
- 16 WHO. (2015). *The epidemiology and impact of dementia: Current state and future trends*.  
17 Retrieved from  
18 [http://www.who.int/mental\\_health/neurology/dementia/dementia\\_thematicbrief\\_epide](http://www.who.int/mental_health/neurology/dementia/dementia_thematicbrief_epide)  
19 [miology.pdf](http://www.who.int/mental_health/neurology/dementia/dementia_thematicbrief_epide)
- 20 Woods, R. T., Orrell, M., Bruce, E., Edwards, R. T., Hoare, Z., Hounsome, B., . . . Russell, I.  
21 (2016). REMCARE: Pragmatic multi-centre randomised trial of reminiscence groups  
22 for people with dementia and their family carers: Effectiveness and economic  
23 analysis. *PLoS ONE*, 11(4), e0152843. doi:10.1371/journal.pone.0152843
- 24 Wu, E., Barnes, D. E., Ackerman, S. L., Lee, J., Chesney, M., & Mehling, W. E. (2015).  
25 Preventing Loss of Independence through Exercise (PLIE): qualitative analysis of a

- 1 clinical trial in older adults with dementia. *Aging and Mental Health*, 19(4), 353-362.  
2 doi:10.1080/13607863.2014.935290
- 3 Yao, L., Giordani, B. J., Algase, D. L., You, M., & Alexander, N. B. (2012). Fall risk-  
4 relevant functional mobility outcomes in dementia following dyadic Tai Chi exercise.  
5 *Western Journal of Nursing Research*, 35(3), 281-296.  
6 doi:10.1177/0193945912443319.
- 7 Yardley, L., Bishop, F. L., Beyer, N., Hauer, K., Kempen, G. I. J. M., Piot-Ziegler, C., . . .  
8 Holt, A. R. (2006). Older people's views of falls-prevention interventions in six  
9 European countries. *The Gerontologist*, 46(5), 650-660. Retrieved from  
10 [https://www.research.manchester.ac.uk/portal/files/29912088/POST-PEER-](https://www.research.manchester.ac.uk/portal/files/29912088/POST-PEER-REVIEW-PUBLISHERS.PDF)  
11 [REVIEW-PUBLISHERS.PDF](https://www.research.manchester.ac.uk/portal/files/29912088/POST-PEER-REVIEW-PUBLISHERS.PDF)
- 12 Yu, F., & Swartwood, R. M. (2012). Feasibility and perception of the impact from aerobic  
13 exercise in older adults with Alzheimer's disease. *American Journal of Alzheimer's*  
14 *Disease and Other Dementias*, 27(6), 397-405. doi:10.1177/1533317512453492
- 15 Yu, F., Thomas, W., Nelson, N. W., Bronas, U. G., Dysken, M., & Wyman, J. F. (2015).  
16 Impact of 6-month aerobic exercise on Alzheimer's symptoms. *Journal of Applied*  
17 *Gerontology: The Official Journal of The Southern Gerontological Society*, 34(4),  
18 484-500. doi:10.1177/0733464813512895

19



1 *Figure 1.* Flow diagram of participant recruitment.

2



Table 1

*Baseline Demographic Characteristics*

Participant	Item	Frequencies or means (Standard Deviations (SD))		
		Site 1 (n=4)	Site 2 (n=6)	Total
<b>People Living With Dementia</b>	Gender			
	Male	2	3	5
	Female	2	3	5
	Mean age (SD)	73.75 (0.96)	81.17 (5.04)	78.20 (5.39)
	Relationship status			
	Married / Civil partnership	3	5	8
	With partner	1	0	1
	Widowed	0	1	1
	Current living situation			
	Living with family/friends	4	6	10
	Level of education			
	Primary	0	2	2
	Secondary	2	2	4
	Higher education college / university	1	0	1
	Further education / professional qualification	1	2	3
	Ethnicity			
	White	4	6	10
	Dementia type			
	Alzheimer's	3	6	9
	Mixed Alzheimer's & Vascular	1	0	1
	Mean number of months diagnosed with dementia (SD)	21 (22.23)	25.67 (28.56)	23.80 (24.97)
	Other chronic conditions			
	Yes	3 (Glaucoma, high pressure and headache/hypertension/sarcoidosis <sup>1</sup> )	4 (Fibromyalgia <sup>2</sup> and stroke/prostate cancer and diverticulitis <sup>3</sup> /neuralgia <sup>4</sup> /hypertension)	7
	No	1	2	3
	Uses a walking aid?			
	No	4	6	10
	Mean prescribed daily medications (SD)	3.5 (1.29)	5.5 (4.32)	4.7 (3.47)
	Falls in the last year?			
	Yes	0	1 (minor injury)	1
No	4	5	9	
Falls in the last month?				
Yes	0	1 (minor injury)	1	
No	4	5	9	
Frequency of moderate PA practise				
Everyday	1	2	3	
3 times per week	1	0	1	
2 times per week	2	1	3	
Weekly	0	1	1	
Rarely/never	0	2	2	
Frequency of vigorous PA practise				
Monthly	1	0	1	
Rarely/never	3	6	9	

<sup>1</sup> Sarcoidosis is a disease “characterized by the formation of immune granulomas” in any organ affected (Strookappe et al., 2015, p. 701). If present, symptomatology generally disappears spontaneously or with adequate treatment without further consequences for the patient (Judson, 2015).

<sup>2</sup> Fibromyalgia is a syndrome characterised by chronic “widespread pain” and possibly other physical (i.e., “muscle stiffness”) and psychological (“memory and concentration” difficulties) manifestations (NHS, 2016).

<sup>3</sup> Diverticulitis is an infection caused by bacterial accumulation in “small bulges that stick out of the side of the large intestine” which is generally cured after dietary, pharmacological or (rarely) surgical intervention (NHS, 2014).

<sup>4</sup> Neuralgia is the pain caused by nerve irritation or damage (Shelat, 2016).

Table 1 Continued

Participant	Item	Frequencies or means (Standard Deviations (SD))		
		Site 1 (n=4)	Site 2 (n=6)	Total
<b>People Living With Dementia</b>	Previous experience practising Tai Chi?			
	No	4	6	10
	Mean confidence about being able to practise Tai Chi for at least 20 minutes per day (SD) <sup>5</sup>	1.75 (0.96)	2.67 (1.21)	2.3 (1.16)
	Mean intention to practise Tai Chi for at least 20 minutes per day (SD) <sup>6</sup>	2.25 (0.96)	2.17 (0.75)	2.2 (0.79)
<b>Carers</b>	Gender			
	Male	2	2	4
	Female	2	4	6
	Mean age (SD)	69.25 (1.5)	74.5 (5.96)	72.40 (5.28)
	Relationship with the person living with dementia			
	Spouse/partner	4	5	9
	Other	0	1 (niece)	1
	Live with the person living with dementia			
	Yes	4	6	10
	Relationship status			
	Married / Civil partnership	3	6	9
	With partner	1	0	1
	Current living situation			
	Living with family/friends	4	6	10
	Level of education			
	Primary	0	1	1
	Secondary	1	2	3
	Higher education college/university	2	1	3
	Further education/professional qualification	1	2	3
	Ethnicity			
	White	4	6	10
	Previous experience practising Tai Chi?			
	No	4	6	10
Mean confidence about being able to practise Tai Chi for at least 20 minutes per day (SD) <sup>5</sup>	1.33 (0.58)	1.17 (1.17)	1.89 (1.05)	
Mean intention to practise Tai Chi for at least 20 minutes per day (SD) <sup>6</sup>	1.33 (0.58)	2 (1.1)	1.78 (0.97)	

1 <sup>5</sup> Participants were asked to rate their confidence using a Likert scale from 1 (true) to 7 (false), where 1 was the best score –showing  
2 participants' confidence about being able to practise for 20 minutes per day.

3 <sup>6</sup> Participants were asked to rate their intention using a Likert scale from 1 (likely) to 7 (unlikely), where 1 was the best score –showing  
4 participants' intention to practise for at least 20 minutes per day.

5

Table 2

*Dyads' Attendance to the Classes in the Pilot Intervention Phase*

Dyads	Class number				Totals		
	1st	2nd	3rd	4th	Classes attended per dyad	Dyads' average attendance	Groups' average attendance
01001	Yes	Withdrawn <sup>1</sup>	Withdrawn	N/A	1	33%	
01002	Yes	No <sup>2</sup>	Yes	N/A	2	67%	Site 1 75%
01003	Yes	Yes	Yes	N/A	3	100%	
01004	Yes	Yes	Yes	N/A	3	100%	
02001	Yes	Yes	Yes	Yes	4	100%	
02002	Yes	Yes	Yes	Yes	4	100%	
02003	Yes	Yes	Yes	Yes	4	100%	Site 2 83%
02004	Yes	Yes	Yes	Yes	4	100%	
02005	Yes	Yes	Withdrawn <sup>3</sup>	Withdrawn	2	50%	
02006	Not recruited	Yes	Yes	No <sup>4</sup>	2	50%	
<b>Dyads attending each class</b>	9	8	8	4			

1 Due to previous health issues.

2 Due to a traffic accident blocking traffic.

3 Due to planned holiday.

4 Due to illness.

Table 3

*Barriers, Facilitators and Improvements Suggested to Increasing Participant's Acceptability of Tai Chi*

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
<b>Interventions characteristics</b>	<ul style="list-style-type: none"> <li>Instructor's qualities (i.e., use of clear speech, adequate tone, nice manner; made the classes interesting; had a calming personality and professional competency) (Participants). <i>He's a very, very warm, delightful man and I felt at ease immediately with...with him (02004P-FG)<sup>1</sup>. He makes it really interesting. He's got a very nice manner (...) He's right at the top of his field in what he's doing, so, I mean, you're very lucky to be working with him (01004C-FG). ... clearly &lt;Instructor&gt; is a superb instructor (01004C-FG); Yeah, because of the clarity of speech and everything isn't it? (010002C-FG).</i></li> </ul>	<ul style="list-style-type: none"> <li>Amount of content delivered during the classes (Participants). <i>As that was only a short course. I think if you'd concentrated on the warm-ups, to be perfectly honest (02004C-FG); Yeah (02003C-FG); Because you get...you do get quite a bit of benefit in that (02004C-FG); Yeah (02001C-FG); Yeah (02003C-FG); And these people here are pretty limited, you know...(02004C-FG); Yeah (02003C-FG); you know, they can't help it, but they'll only grasp so much. And I think to...to concentrate on a few movements every week...would benefit them (02004C-FG); ...if you're gonna go to the few that probably do grasp it, there's gonna be a lot that don't</i></li> </ul>	<ul style="list-style-type: none"> <li>Reduce the amount of content to be delivered during the classes to adapt the intervention to participants with more difficulties copying the movements (Instructor and participants).</li> </ul>

<sup>1</sup> Direct quotes are coded with the participant number and a "C" if provided by a carer or a "P" if provided by the person living with dementia. An additional code is used to mark the context where data was collected: during observations ("O"), feedback provided at the end of the class ("F"), or during the focus group ("FG").

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
	<p><i>&lt;Instructor&gt;'s so good that it's really brought it home to me what the various movements are (02004P-FG).</i></p> <p><i>...he's a good man, isn't he (02001P-FG).</i></p> <p><i>... an excellent instructor who made the classes fun (01002P-FG).</i></p> <ul style="list-style-type: none"> <li>Adaptation of the classes to participants' needs or requests (Instructor and researcher).</li> </ul> <p><i>Tai Chi is about you, this is your Tai Chi (...) everybody has different flexibility, different hips. Please don't worry about looking as anybody else (Instructor-O).</i></p> <p><i>The instructor says in the next class it was planned to introduce something new, but comments he'll not do this, to adapt the class to the group's needs (Researcher notes).</i></p> <p>02001C asks the instructor "what's the breathing with that one?" –The instructor responds to 02001C's question "that's actually a good thing, let's do it incorporating breathing"- and at the end of the practise the instructor adds "I like questions, questions are good!" (Researcher</p>	<p><i>... The ones that can't are the ones that really need the help, aren't they really. (02004C-FG); (...)I picked hold of them reasonably well, but... you have to realise everyone's got their own limitations (02004C-FG).</i></p> <p><i>The worry I got is if it, um, if it progressed and it was more complicated, how she would cope with the complicated bits (01003C-FG); I would have expected that &lt;Instructor&gt; would manage that side of things. I don't think he's going to push people beyond what they could be expected to reasonably do (01004C-FG).</i></p> <ul style="list-style-type: none"> <li>Lack of tailored support to individuals who kept performing the movements wrong after correction (Observed by researcher).</li> </ul> <p><i>Keeps doing the movement in the wrong direction, stays on a side (Researcher - O).</i></p> <p><i>I got muddled up there (01004P-O) (and we could see this).</i></p> <p><i>&lt;Instructor&gt; said actually she did it right but only got footwork</i></p>	<ul style="list-style-type: none"> <li>Approach participants individually if required copying the movements closer and in front of them to support their individual and safe practice (Research team).</li> </ul>

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
Class-based Tai Chi	<p>notes).</p> <p>“Breathing makes me dizzy” (01004P-O) – &lt;Instructor &gt; said not to focus on breathing then (Researcher notes).</p> <ul style="list-style-type: none"> <li>• Provision of regular positive feedback (Observed by researcher). <i>Good stuff, your movement is great (to 01002P), everybody’s movement is great ;</i> <i>You’re doing great &lt;02004P&gt;;</i> <i>Excellent, that’s good, that’s perfect, wonderful</i> (Instructor –O)</li> <li>• Creation of a reassuring, failure free and warm class environment (Observed by researcher).</li> <li>• Use of everyday life examples to facilitate copying the movements and create rapport with participants (Observed by researcher). <i>... raising your hand as if you're taking your cup of tea; ...like asking for money; ...Imagine you are riding a horse</i> (Instructor –O).</li> <li>• Movements’ repetition - most of the movements were practised twice (Participants and researcher). <i>Misses some parts of the pattern (the</i></li> </ul>	<p><i>slightly wrong (in heel not in toe).</i></p> <p><i>Second time she still didn’t confidently do it and got stuck again</i> (Researcher - O).</p> <ul style="list-style-type: none"> <li>• Unexpected or unavoidable difficulties to attend the classes: traffic accident, ill-health, planned holiday period (Research team).</li> </ul>	-

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
	<p><i>instructor repeats the pattern</i> (Researcher –O).</p> <ul style="list-style-type: none"> <li>• Participants' ability to sustain attention for 45 minutes (Participants and researcher).</li> <li>• Participants' ability to stand for 45 minutes (Participants and researcher). <i>I think 45 minutes of the actual exercise is...is probably quite enough</i> (01004C-FG); <i>It is enough, yes</i> (01002P-FG); <i>There's a lot of concentration...</i> (01002C-FG); <i>Concentration...</i> (01002P-FG); <i>Yeah</i> (01004C-FG); <i>Yes</i> (01004P-FG).</li> <li>• Chosen venues (Participants and researcher). <i>[Venue] It's not bad</i> (02001C-FG); <i>And there's easy...Easy parking...convenient isn't it? (...)</i> <i>I mean, there are various ways of getting in here if you can't drive, for example. And if the classes were going on for long periods, um, you know, there may be times when you didn't have a car or something like that, or weren't able to drive. There's no problem because access, &lt;Location Research site 2&gt; which is pretty easy for most people, I'd say.</i> (02003C-FG); <i>It is. By bus or anything else really</i></li> </ul>	<ul style="list-style-type: none"> <li>• During classes: coughing, stopping practice because of fear of falling or feeling stiff (Observed by researcher).</li> </ul>	<ul style="list-style-type: none"> <li>• Instructor's closer relationship with participants to know the reasons they have to stop their practice during classes and provide any support required to facilitate their continued engagement (Research team).</li> </ul>

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
<b>Home-based Tai Chi</b>	<p>(02002C-FG).  <i>And the actual venue itself, do you think this is a good venue or do you think we could try and...? (Researcher); Oh yes. Yes (01004P-FG); Yes (01004C-FG); Yes. Very good (01002P-FG). It's ideal (01002C-FG). A car park and a, and a nice room, small (01002P).</i></p> <ul style="list-style-type: none"> <li>• Timings (Participants and researcher).</li> <li>• Length of the classes (Participants and researcher).  <i>I think that's perfect the timing....And the time of the day and the length of time (02003C-FG); Yes (02001C-FG); By the time my wife gets up, it is anyway [laugh] (02004C-FG).</i></li> <li>• Group sizes (Participants and researcher).</li> <li>• Allocation of socialising time at the end (Participants and researcher).</li> <li>• Carers supporting practice (Participants).</li> <li>• Role of routine (Participants).  <i>... I find everything's easier...life is routine in our household, and it, and it works very, very well (01002C-FG); Yeah (01002P-FG); That's interesting.... I'm afraid we're quite the</i></li> </ul>	<ul style="list-style-type: none"> <li>• Early start of home-practice (Participants).</li> <li>• Booklet (overwhelming and unclear). (Participants) <ul style="list-style-type: none"> <li>○ Negative feelings raised by the home-exercises booklet.  <i>"I felt depressed" (01004P-F) when she was not able to follow the</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Provide the booklet in smaller volumes (Participants).</li> <li>• Delay home practice at least two weeks after starting the class-based practice, so participants are more familiar with the movements and carers feel more confident to</li> </ul>



Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
	<p><i>opposite (01004C-FG); Yeah... I find routine helps me (01004P-FG); We don't have a lot of routine. We... We, we found it far better to do the Tai Chi in the mornings after breakfast... &lt;01004P&gt; gets tired towards the end of the day so, you know, we listen to the news and things... But if, um, if we had a, a shopping day and got up, had breakfast and went out and came back, those are the days we, we might have given it a miss... So it...I, I...routine is important, um, but it, it depends how busy you are (01004C-FG); Yes (01004P-FG).</i></p> <p><i>It's good, isn't it, this time of year when the winter's coming on and, um, to help people, er,..you know, the people who are caring to, um, ex...keep exercising without having to go out time. Well, apart from the lessons, obviously, um...(02003C-FG); It becomes the routine really doesn't it? (02004C-FG)(...) It's fitting it in what we do, isn't it (02001C-FG).</i></p> <ul style="list-style-type: none"> <li>• Importance of repetition to improve practice and get the benefits of the intervention (Participants).</li> </ul> <p><i>It's the, it's the repetition that's the</i></p>	<p>booklet.</p> <p><i>The class sessions were very good but at home we found the book slightly overwhelming and perhaps a DVD of &lt;Instructor&gt; would have been more helpful. (01003C-FG)</i></p> <p><i>“Booklet not helpful, need a DVD” (02002C-F).</i></p> <p><i>The book I found...I'm not as good as I was at reading and the book was difficult for me to comprehend...Yeah, I'd like to have had him [Instructor] on the screen in front of me so I could copy him [laughs] (01002P-FG); I...I, I basically think it's that we haven't had enough practice. We have done one session here...(01002C-FG).</i></p> <ul style="list-style-type: none"> <li>• Carers' lack of confidence guiding the person living with dementia (Participants).</li> <li>• Difficulty remembering (how to start) the movements/practice (Participants).</li> </ul> <p><i>The very first weeks participants felt home-practice was difficult as</i></p>	<p>guide the person living with dementia (Participants and research team).</p> <ul style="list-style-type: none"> <li>• Create a DVD as requested by participants or provide a crib sheet to guide their practice (Participants and instructor).</li> <li>• Allow at least two weeks between the start of classes lead by the same instructor to facilitate home-visits scheduling (Instructor).</li> </ul>

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
	<p><i>important...part of it (01002P-FG). Just when he...you, you practice over and over again...I mean, it's much better than you saying, well, do this and then, and then the next minute you've forgotten all about it... (01004P-FG).</i></p> <ul style="list-style-type: none"> <li>• Participants' determination to achieve perceived benefits (Participants). <i>[Home practice]Um, not every day, I must say [laughs], but mostly we have, yes. Um, and yes, I found that beneficial and in... I don't know that, um, we...I don't...some of the things are probably not, um, we're not... We're not probably doing them properly... And I, and I do forget...(01004P-FG); And us [laughs] (01003C-FG); Yeah. I do forget whether you should be going up there or down there or, you know, and if... But then somehow it doesn't really seem to matter all that much [laughs] (01004P-FG); It's still doing us some good (01003C-FG).</i></li> <li>• Participants' pointing to unexpected events as barriers to practice and being positive providing ways to overcome these difficulties and do the practice (Instructor).</li> <li>• (When conducted) Instructor's home-</li> </ul>	<p><i>they could not remember what they had been doing in class (Instructor-F).</i></p> <p><i>So one session, and then you go home and you're doing four different things and you've got to do it for so many different times. It was a bit like the blind leading the blind. (...) Then try to guide somebody else with something you're not sure about... (01002C-FG).</i></p> <p><i>...once you've started the rest...after a couple of movements the rest actually falls into place...It's starting it that's the difficult... Your first action is the difficulty...At home, in the lounge, you're stood there and you...I didn't really know... We did get into it...but starting was hard (01002P-FG).</i></p> <ul style="list-style-type: none"> <li>• Carers' discontinued engagement in practice due to their lack of confidence (Participants). <i>01004P reports being practising alone after 01004C stopped practising because he was not sure he was doing the movements right (01004P-F).</i></li> </ul>	<ul style="list-style-type: none"> <li>• Ask carers about ways of getting over people living with dementia's lack of motivation (Research team).</li> </ul>

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
	visits were useful to clarify and make home-practice easier (Participants).	<ul style="list-style-type: none"> <li>• Instructor's time constraints to arrange home-visits (Instructor).</li> <li>• Carers' difficulties to motivate the person living with dementia to do things or to carry on practising for 20 minutes (Participants).  <i>But, er, as I said to you, we could do the movement, got to do the move...the warm-ups fairly quickly and, er, we did them alright. So we concentrated on the warm-ups more than anything else, to be perfectly honest. When it got to the actual Tai Chi, er, we never really got the hang of that completely. But the warm-ups, yes, it was...(02004C-FG); Yeah, that's what we did (02004P-FG); ...it was quite good. So we concentrated on giving warm-ups a little more extra time so that, you know...we tried to get to 20 minutes but, um...(02004C-FG); But our warm-ups is Tai Chi in my mind (02004P-FG); Well, it is Tai Chi, &lt;02004P&gt;, yeah, yes (01004P-FG); Well, call it Tai Chi because it sounds much better than warm-ups (02004P-FG); [laugh] Yeah, well, it was (02004C-FG); Did anyone else</i> </li> </ul>	<ul style="list-style-type: none"> <li>• Prompt participants to fill in their action and coping plans or use a duplicate system to</li> </ul>

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
<b>Participant's reactions to the intervention</b>	<ul style="list-style-type: none"> <li>• Chance to take part together in the intervention as a facilitator for people living with dementia's involvement in Tai Chi practice (Participants). 01004P and 01003P report that they would not have joined the class without their carers (01004P-F and 01003P-F).</li> <li>• People living with dementia's value of their carers' role supporting their practice (Participants).</li> <li>• Participants' positive or neutral feelings towards Tai Chi before and after the first class (Researcher notes).</li> <li>• Carers not feeling burden in taking part together with the person living with dementia and providing support at home (Participants).</li> <li>• Rewarding for both members of the dyad (Participants).</li> </ul>	<p><i>do the timer, do you know? I found this business of not being able to concentrate for too long (02003C-FG).</i></p> <ul style="list-style-type: none"> <li>• Participants' not filling their action and coping plans (Instructor).</li> <li>• Finding time to practice (Participants)..</li> </ul> <ul style="list-style-type: none"> <li>• Feeling sceptical about the intervention (Participants).</li> <li>• Perception of Tai Chi as an "awkward activity" (Participants).</li> <li>• Carers feeling hard to take part in the intervention (although the socialising component would compensate this effort) (Participants).</li> <li>• Perception of Tai Chi as not appropriate for people living with dementia at more advanced stages, or as being less beneficial for them (Participants).</li> </ul> <p><i>I've enjoyed it. I've enjoyed it to a point but I've found it hard work being a carer. And, um, but if it helps me wife, so it's all very well, yeah. Um, er, it's nice to meet</i></p>	<p>reduce instructor's work load during home-visits (Instructor).</p> <ul style="list-style-type: none"> <li>• Reassure participants who express this and explain them the potential benefits of practising Tai Chi (Research team).</li> <li>• Reinforce the idea that practice is more important than the number of patterns performed, to avoid participants feeling that they are not practising enough (i.e., if they are only practising the warm-ups at home and they feel this is beneficial to them, there is no need to feel like they should be doing all the patterns) (Research team).</li> </ul>

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
	<ul style="list-style-type: none"> <li>• Willingness to carry on practicing Tai Chi or reengage in previously practised exercises (i.e. Pilates) (Participants).</li> <li>• Discovery of a new pleasurable activity to practice together (Participants). <i>They keep...all these people, they sort of say, oh, you've got to do about sixty minutes a day of something.....energetic, get your heart moving and all that. But, you know, I couldn't do that, but.....as I say, I like this movement (02001C-FG).</i>  <i>Thoroughly delighted and enjoyed the experience (...) I have got my carer at home and he's so updated and he's now able to do Tai Chi every single day (...) he's getting better (...) I love doing the exercises with &lt;02004C&gt; (02004P-FG).</i>  <i>Well, I thought they were...I enjoyed them that's firstly you know. Er, also, um, I also...and learnt something from them really. (...) But I've enjoyed it (02003P-FG);</i>  <i>I have very much enjoyed the experience and would like to continue. (01004P-FG).</i></li> </ul>	<p><i>people, come out and meet people. I think that's why we all kept coming, to meet somebody (02002C-FG); Yeah, I think we all felt that, didn't we? (02004C-FG); Yeah, we did, yeah (02001C-FG); It's nice to meet like-minded people in the same situation...and you feel you're not alone really...that there's other people with the same sort of problems (02004C); That's right (02002C-FG); Yeah, I've enjoyed it. I thought it was quite nice (02001C-FG).</i></p> <p><i>... And, of course, some people are more, unfortunately, afflicted by this dementia, aren't they? (02004C-FG); Yeah (020002C-FG); So they're not gonna respond quite so well. I mean, &lt;02004P&gt;'s quite good at the moment but, um, er, going forward it's gonna get very much harder (02004C-FG); Yeah (02003C-FG); So whether anyone with quite bad dementia could really benefit from it, I don't know, er. (02004C-FG); I think if they start it earlier...(02003C-FG); I</i></p>	

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
	<ul style="list-style-type: none"> <li>• Participants' autonomy to engage in class-based practice (Researcher notes).</li> <li>• Attribution of a beneficial effect to their Tai Chi practice (Participants).</li> </ul>	<p><i>think they can, &lt;02004C&gt;. (02004P-FG).</i></p>	
	<ul style="list-style-type: none"> <li>• Joint participation and enjoyment (Participants).</li> <li>• Participants' familiarity with the Tai Chi movements over session, allowing them to anticipate the movements (Researcher notes).</li> <li>• Participants' perceived progression in practice, getting more into Tai Chi and feeling the "flow" (Participants).</li> </ul> <p><i>Comments after 3 classes, he's felt more "getting into it", he was "flowing more" (Observational notes). I think the exercises ultimately with people with dementia could help with balance (01002P-FG). May I say the one thing I have noticed, I love to do my bit of gardening and I rather love to go out and inspect everything daily. And to go into my greenhouse, for instance, I'm very much more careful with my legs. And I have said quietly to myself, um, thank you</i></p>	<ul style="list-style-type: none"> <li>• Previous health issues (Participants and research team).</li> <li>• Adverse events (i.e., feeling dizzy) (Research team).</li> <li>• Participants' difficulties to engage in the intervention in a non-familiar (class-based) environment without supports nearby (Participants). <i>... for some reason, I can do the exercise [at home], which I had difficulty with [in class], that's with my feet and...and my balance. (...) But I think just being at home and, you know, having something nearby that if...that if I happened to get a little bit dizzy... I can put my hand out. My grandma's chair is down near me (02004P-FG); Yeah, that's true (02004C-FG); (...) And for that reason, I love doing the exercises with &lt;02004C&gt; (02004P-FG).</i></li> </ul>	<ul style="list-style-type: none"> <li>• Instructors should be aware of participants' health conditions and provide them a tailored advice on how to practice depending on these conditions or adverse events experienced during their practice. Similarly, more contact at the end of the session with participants will allow instructors to identify possible difficulties linked to home or class-based settings and provide tailored recommendations to facilitate participants' adherence to the intervention (Research team).</li> </ul>

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
	<p><i>Tai Chi, because it has helped me so much with balance. (02004P-FG). I think if, if one can feel that you...slowly...a slow benefit, an im...improving benefit of better balance perhaps, even feeling better within yourself...I, I feel a little bit better after having done it. Um... (01004C-FG); Yes, I think it does... Yeah (01004P-FG); But it... I think if you, if you put a lot of effort into it and you think, well, I just feel the same as I did before... (01004C-FG); [Laughs] (01003C-FG);...then you think, well, you know... So you've got to see a reward. It's, you know, the effort and the reward's got to come from it (01004C-FG); Yeah ...It ma...it makes you think about what's going on in your body while you're doing this. That's how I feel. You know, or, or...it... Oh, sorry. I don't know. Yeah. [Laughs]. (01004P-FG).</i></p> <p><i>It's something to be kind of proud of and, yeah, makes you feel better... you know, that you're doing something good for yourself.(...) I have to say we've almost been quite, um, proud to, to tell our friends we've been doing Tai Chi. (01004C-FG).</i></p>		

Table 3 Continued

Theme / Subtheme	Facilitators	Barriers	Improvements suggested (by...)
<b>Interaction with others</b>	<p><i>Well, we...we do quite a bit, don't we, but you need to feel you've gone out somewhere and do some exercises, it sounds pretty basic but that's what it's all about really isn't it...coming together and doing something that breaks the week up [laugh] (02004C-FG).</i></p> <ul style="list-style-type: none"> <li>• Creation of a semi-circle of chairs before starting the first class to encourage participants' conversations whilst waiting for the rest of participants (Researcher notes).</li> <li>• Allowing time at the end of the sessions for participants' socialisation was perceived as something positive particularly for carers (Participants).</li> <li>• Involving participants in their coffee/tea preparation (Researcher notes).</li> </ul> <p><i>When participants laugh at the instructor's jokes they look at each other (Observational notes).</i></p>	-	-

1



## Appendix A

## PPI Advisory Group Meeting

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20

The advisory group was formed of four people living with dementia, and six carers (four of them spouses of the four people living with dementia). Of the four people living with dementia there were two male and two female. The two carers who were not accompanied by their relatives living with dementia were both females. In one of the PPI groups organised to inform the design of the trial, they were asked to review a 14 font size, double line spacing and bold letters document containing the Focus Group schedule was provided to each member of the group. The researcher explained briefly the context where the questions would be formulated. Participants of this group were asked about the appropriateness of the questions, as well as if they would feel comfortable responding these questions in front of their family members (person living with dementia or carer). Participants of this group did not provide any negative comment on the questions. Two of them asked if those questions would be handed out to the participants or asked verbally instead, they found more appropriate to formulate the questions to participants. One of the participants reported it was not a problem for him (carer) to talk openly in positive or less positive terms in front of his wife (person living with dementia). The rest of the group agreed. This carer also advised to ask first the dyad if they are happy to take part in a joint interview.

## Appendix B

## Qualitative Semi-structured Checklist for Observation of Tai Chi Classes

**Research stage:** Pilot Intervention Phase

**Date:**

**Session number:**

**Starts at:**

**Ends at:**

**Instructor:**

**Research Site:**

**Venue:**

**Number of participants attending the session:**

**Participants' names:**

Dyad ID	People living with dementia	Carers

### 1. Notes on the Intervention Setting

**Venue description** [Physical environment: accessibility to the building, Tai Chi room's flooring conditions, windows, type of lighting, size of the room, temperature of the room, other objects in the room].

**Interaction amongst (and affect) participants before the intervention starts** [Affect shown by participants at their arrival to the session, dyads interactions, interaction with members of other dyads when they arrive in the venue].

**Participants' / Space distribution in the room** [Map of participants distribution in the room]

**Session structure as introduced by the instructor:**

1

**1. Notes on participants'...:****Observation: 1 (0-15 min) / 2 (15-30 min)/ 3 (30-45 min)**

<b>Interactions</b>	
<b>With the other member of the dyad</b>	Positive – Negative – Neutral
<p><b>Kind of responses provided by people living with dementia to the carers</b> Verbal/ non-verbal expressions of support acceptance/rejection and positive/negative responses to the carer.</p> <p><b>Kind of support provided by carers</b> Verbal communication speed and tone, physical support provided (i.e., area of physical contact, soft/brusque movements), Examples of disenpowerment and/or infantilization.</p>	
<b>With other participants</b>	Positive – Negative – Neutral
<b>Interest</b>	
<p><b>Camaraderie between peers</b> Interest shown towards other participants and verbal or non-verbal interactions established with them (i.e., "making eye contact, smiling or acknowledging" support from peers.</p>	
<b>With the instructor</b>	Positive – Negative – Neutral
<b>Initiated by participants</b> Verbal or non-verbal interactions and their purpose.	
<b>Instructor's rapport</b>	
<b>Interaction started by the instructor</b> Purpose of these interactions and speed and tone used. Examples of positive feedback.	
<b>Tailored comments for people living with dementia or carers</b> Presence or absence of tailored comments for (a) specific dyad(s). If present, purpose/content of those. Instructor's response to participant's comments (i.e., examples of verbal/ non-verbal acknowledgement, appreciation), establishment of eye contact with participants when they are talking to the instructor	
<b>Engagement</b>	
<b>Participants' engagement</b> Examples of verbal/non-verbal signs of active/passive engagement/non-involvement (i.e., they are able to sustain attention for 10 minutes/ need prompting to sustain their attention in the activity/ interact with peers or instructor and are able to return to the activity and refocus).	

2

<b>Attitudes towards Tai Chi</b>	
<p><b>Verbal/non-verbal positive / negative / neutral attitudes</b> Verbalizations on expected benefits/harms from practising Tai Chi, or positive/negative feelings while performing the movements.</p>	
<b>Affect (during/after Tai Chi)</b>	
<p><b>Positive</b> – interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, active.</p> <p><b>Negative</b> – Distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, afraid. Agitation, angry, feeling anxious. Confusion.</p>	
<b>Communication</b>	
<p><b>Verbal</b></p> <p><u>Pleasure</u> <u>Displeasure</u> <u>Sadness</u> <u>Self-esteem</u> – satisfaction, pride. <u>Normalcy</u> - feeling good about being in a group activity.</p>	
<p><b>Non-verbal</b></p> <p><u>Pleasure</u> – relaxed body language <u>Displeasure</u> – tense body language <u>Sadness</u> <u>Self-esteem</u> – satisfaction, pride. <u>Normalcy</u> - feeling good about being in a group activity.</p>	
<b>Psychological needs</b>	
<p><b>Competence</b> Ability to perform the exercises.</p>	
<p><b>Relatedness</b> Closeness with the other member of the dyad and sense of belonging to the group.</p>	
<p><b>Autonomy</b> Freedom of act to choose if they want to perform a movement with/without additional support (i.e., chair), stop performing a movement if they do not want to do it or if they feel tired. Describe if any member of the dyad is not allowing this freedom of act to the other member.</p>	

1

2 **Other notes:**

3

## Appendix C

## Focus Group Schedule

Before starting the focus group

- ✓ Set up the room: place chairs in circle, confirm drinks are provided.
- ✓ Test video and audio recording equipment.
- ✓ Check preliminary questions and ball pens are ready.
- ✓ Provide name badges to participants.
- ✓ Check every participant knows what will happen and accept to be recorded.

Introduction

Housekeeping – fire, loos, stretching legs.

I would like to thank you all for coming today. My name is \_\_\_\_\_ and my assistant\_\_\_\_\_. We are both researchers at \_\_\_\_\_. Today \_\_\_\_\_ will be taking notes and helping me if I forget anything.

Over the last few weeks you have been taking part in Tai Chi classes and practising Tai Chi at home as part of our research project. We feel that the best way to improve the sessions and the Tai Chi practise at home is talking with you about your opinions and experiences of taking part in it. It is particularly important for us to gather the views of those of you who have dementia, and also those of your family member or friend. Even if you have not been able to attend all the classes or do the exercises at home, your views and opinions are still very valuable to us.

To learn from your experiences, we are going to conduct a group discussion. Your participation in this group is voluntary, so if you prefer not to participate you are completely free to leave. However, we value all your opinions and would like to hear them. Whatever you say in this group will be confidential and used only for this research project. We will audio record this discussion in order to help us produce an accurate written record of this meeting and make sure that the record is an accurate version of your views. Any information that might disclose your identity will be anonymised in the written record. If we use any quotes from your contributions in research conferences, publications or events, we won't include any information that could identify you personally. We will also video record this conversation, just to make easier for us to identify who is talking at each time. Is it OK with everyone to audio and video record this discussion? (Check consent)

During this discussion I will ask you a few questions. There are no right or wrong answers, just different opinions that we would like to hear. Please feel free to state what you really think, even if you disagree with others but please respect their views. I would appreciate if <name of participants living with dementia> could give their opinions first, and then family members or friends. It is important that only one person talks at a time as this makes it easier for the discussion to be clearly recorded and for <researcher's name> to take notes. Can I ask

1 you to say your names in order, so we will be able to recognise your voices in the recording?  
 2 (Check every participant says his/her name). Thank you.

3 This discussion will last around an hour or an hour and a half. If you want to have some  
 4 refreshments, please feel free to help yourselves during the conversation. Half way through  
 5 the conversation I will ask if you would like to have a short break. So we will be able to have  
 6 a pause and the restart the conversation if you need so.

7 Are there any questions before we start?

8 Before starting the group discussion, we would like you to consider the three topics that we  
 9 will be discussing:

- 10 1. What has helped you to take part in Tai Chi in the classes and at home?
- 11 2. How could the Tai Chi have worked better for you in class and at home?
- 12 3. How would you describe your experience of taking part in Tai Chi together with  
 13 your family member, friend or neighbour?

14 These 3 questions are written on this paper (hand out). You do not need to write your name  
 15 on this page, so your thoughts will be anonymous. However, I would like to ask <carers  
 16 names> to write a C on the right corner of your paper, please. Just to be able to differentiate  
 17 which member of the dyads' responses come from. We would like you to note down your  
 18 answers. This might help in our conversation as people can forget what they want to say in  
 19 the group conversation. Should you need any support in writing, just let <focus group  
 20 facilitator name> or < focus group assistant> know. You don't have to share everything you  
 21 write down, but we will collect these anonymous papers at the end of the group discussion.

22

## 23 ***EXPERIENCE OF TAKING PART IN TAI CHI***

### 24 **1. Tell me about your experience of taking part in the Tai Chi classes.**

25 [Prompt: Some images of people doing Tai Chi classes]

- 26 ○ Enjoyment:
  - 27 ■ What did you like about the Tai Chi classes?
  - 28 ■ What did you not like about the Tai Chi classes?
- 29 ○ Participation:
  - 30 ■ What helped you to take part in the Tai Chi classes?
  - 31 ■ What if anything, made taking part in the Tai Chi classes more  
 32 difficult?
  - 33 ■ How did you feel about taking part in a group activity? E.g. keen,  
 34 anxious, uncertain?
- 35 ○ Improvements:
  - 36 ■ How could the classes be improved to make it easier for you to  
 37 participate?

- 1                   • Length of the session?
- 2                   • Frequency?
- 3                   • Intensity?
- 4                   • Timing and venue?
- 5                   • Explanations, support and guidance (by the Tai Chi instructor)?

6       **2. Tell me about your experience of doing the Tai Chi exercise at home.**

7       [Prompt: Hold up the Booklet that was provided for people to take home and follow]

- 8
- 9           ○ Participation:
  - 10           ▪ How did you do the Tai Chi exercises at home?
    - 11           • How often did you practise the Tai Chi exercises at home?
    - 12           • How many minutes did you practise the Tai Chi exercises at
    - 13           home?
  - 14           ▪ What helped you do the Tai Chi exercises at home?
  - 15           ▪ Did anything stop you doing the Tai Chi exercises at home?
- 16           ○ Enjoyment:
  - 17           ▪ What did you like most about the Tai Chi exercises at home?
  - 18           ▪ What did you not like about the Tai Chi exercises at home?
- 19           ○ Home visit by Tai Chi instructor:
  - 20           ▪ How did you feel about the home-visit by the Tai Chi instructor?
- 21           ○ Booklet:
  - 22           ▪ How did you find the booklet for guiding you while doing the Tai Chi
  - 23           exercises at home?
    - 24           • Was it easy to follow?
    - 25           • How could the booklet have worked better for you?

26

27       ***WILLINGNESS TO CONTINUE***

28       **3. Do you feel there have been any changes to your health or wellbeing since taking**

29       **part in the Tai Chi exercise?**

- 30           ○ Benefits and harms:
  - 31           ▪ Do you think there has been any benefit to you from taking part in the
  - 32           Tai Chi classes?
  - 33           ▪ Do you think there has been any harm to you from taking part in the
  - 34           Tai Chi classes, or has anything not worked so well?

35

36       **4. How did you feel about carrying out Tai Chi with your family/friend member?**

37

38       **5. Would you be willing to carry on practising Tai Chi?**

- 39           ○ Why/ why not?

40

1 ***EXPERIENCE OF TAKING PART IN RESEARCH***

2 **6. Tell me about your experience of taking part in this research.**

- 3 ○ How did you find the first interviews and tests (at baseline)?
- 4 ○ How did you find filling in the weekly log of your Tai Chi exercise?
- 5 ○ How did you find filling in the falls calendar?
- 6 ○ How did you feel about being observed while doing the Tai Chi Classes?
- 7 ○ How did you feel about the weekly telephone calls with the researcher?
- 8 ○ How could this research be improved for you to make it easier to take part in?

9

10 ***DOUBTS AND COMMENTS***

11 **7. Is there anything else you would like to let us know?**

12 **8. Are there any questions you would like to ask us?**

13 *Conclusion*

14 I would like to thank you all again for coming today and sharing your opinions with us. Your  
15 views will help us improve Tai Chi classes for others to take part.

16 If you have further questions or you want to share any information personally regarding the  
17 Tai Chi sessions or the research, please contact me (provide Researcher's e-mail and contact  
18 number).

19 *At the end of the focus group*

- 20 ✓ Seek verbal process consent.
- 21 ✓ Collect preliminary questions sheets.
- 22 ✓ Check and secure video and audio recording equipment.
- 23 ✓ Tidy up the room.

24