

RESEARCH ARTICLE

Effectiveness of a group-walking intervention for people with dementia based on quality of life and caregivers' burden

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Abstract

Aims: To test the effectiveness of a 28-week group-walking intervention for person with dementia. Participants were accompanied by trained volunteers. The effectiveness was assessed according to the quality of life, ability to perform activities of daily living, independence, mobility, cognition, challenging behaviours and the burden on their caregiving relatives.

Design: Quasi-experimental, one-group, pretest-posttest trial.

Methods: Thirty-two persons with dementia and their caregiving relatives were recruited. The nursing intervention consists on easy walking tours lasting three and a half hours. The walks were performed biweekly and each person with dementia had support from one or two trained volunteer helpers.

Results: The quality of life was stable through all seasons. The secondary outcomes were uneven. While the impairment (WHODAS) and the dependence (IADL) increased, the challenging behaviours and the burden on the caregivers were stable through all seasons.

KEYWORDS

clinical trial, dementia, quality of life, walking

1 | INTRODUCTION

According to the World Health Organization (WHO), around 50 million people worldwide have dementia, and there are nearly 10 million new cases every year (World Health Organization, 2017a). ICD-10 defines dementia as "a syndrome due to disease of the brain, usually of a chronic or progressive nature, in which there is a disturbance of multiple higher cortical function, including memory, thinking, orientation, comprehension, calculation, learning capacity, language and judgement" (World Health Organization, 2016). Dementia is associated with complex needs and, especially in the later stages, high levels of dependency and morbidity (National Institute for Health & Care Excellence NICE, 2016). In the advanced state of the disease,

the major challenges for the affected person, as well as for their family and caregivers, are the behavioural and psychological symptoms. There are four predominant symptom groups: affective symptoms, psychosis, hyperactivity and euphoria (van der Linde et al., 2014).

Approximately two-thirds of people with dementia live at home and are supported by their spouse and families (Saxl, 2014). These family caregivers show high levels of physical, time-dependence and developmental burdens (Wang et al., 2014). People with dementia have increased difficulties in doing housekeeping tasks independently. However, they need activities in daily life for structuring their day and cognitive training. For several reasons, people with advanced dementia are limited in doing their leisure activities. One aspect is security: the affected persons are unable to carry out an

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activity alone. Another problem could be that a person suffering from dementia caused by behavioural symptoms is unable to integrate into a group activity. In community-dwelling people with dementia, there is an unmet need for daytime activities (van der Roest et al., 2009). Movement is a central need of persons who have dementia and enhancing mobility interventions are important therapies in dementia care (Bunn et al., 2014). Walking is a physical activity that can be easily adapted to the performance of the individual and has low cost. Thus, walking is an activity that is suitable for a person with dementia and allows them the ability to get in contact with the environment, especially with nature (plants, animals, weather). Therefore, the goal of our study was to test a group-walking intervention over 28 weeks for people with dementia. On the walks, the dementia patients were accompanied by trained volunteers. Our primary interest was on the outcome according to quality of life. Our secondary interests were on the outcomes of the ability to perform ADLs, independence, mobility, cognition, challenging behaviour and the burden on the caregivers.

1.1 | Background

There is limited literature on activity interventions for a person who has dementia. A visiting/walking programme called "special steps" (physical and/or psychological stimulation from a walk or outing, depending on the physical capabilities of a trained volunteer) for "at risk" elderly with cognitive impairment who are residing in a private residence showed that their caregivers were very satisfied with the intervention, that the caregivers sensed a decreased burden, and they appreciated the respite and support. The caregivers were of the opinion that the care recipient enjoyed the visits/walks (Wishart et al., 2000). Another community-based exercise programme, which consisted of daily exercises and walking under the supervision of their caregivers, demonstrated improvements according to cognition, mobility and activities of daily living (Vreugdenhil et al., 2012). A multimodal exercise intervention programme showed that participants with Alzheimer disease in the intervention group performed better on dual-task activities and had better postural balance, as well as greater functional capacity, than participants in the control group (Andrade et al., 2013). A Cochrane review (Forbes et al., 2015) concluded that there is no clear evidence of benefit from exercise on cognitive functioning for people suffering from dementia. While no benefit was shown from exercise on cognition, neuropsychiatric symptoms, nor depression, there is promising evidence that an exercise programme improves the person's ability to perform ADLs. The systematic review by Cooper et al. (2012) found that a coping strategy-based, family caregiver therapy with or without a patient activity intervention improves the quality of life of people with dementia who are living at home. Oliveira et al. (2015) investigated non-pharmacological interventions to reduce behavioural and psychological symptoms of dementia and concluded that an activity programme that is tailored to the participant's interests and skills is more effective.

Impact Statement: What does this paper contribute to the wider global clinical community?

- Generates new results about the effectiveness of group-walking interventions accompanied by trained volunteers over 28 weeks for people with dementia. The results shown that the quality of life held stable over all seasons.
- Shows findings about the burden of caregiving relatives after the group-walking interventions for people with dementia. The burden did not worsen significantly over 28 weeks.
- Give information about the acceptance of a group-walking intervention for people with dementia. Acceptance of the intervention was high. In none of the seasons did a participant leave the walking group and all the participants always wanted to come for the walk.

In conclusion, there is a lack of evidence. The interventions in the studies with Wishart et al. (2000), Vreugdenhil et al. (2012) and Andrade et al. (2013) did not focus on group activities and their outcome according to social competencies. Further, only one study has considered the burden on the caregivers. In addition, there is limited evidence that activity interventions for people with dementia improve the patient's mobility, cognition and their ability to perform ADLs.

2 | METHODS

2.1 | Study design and setting

We conducted a quasi-experiment, one-group, pretest-posttest trial (Polit & Beck, 2016) from July 2015 until September 2017 in the German-speaking part of Switzerland. We decided to resign from a control group for two main reasons. First, to care for a person who has dementia takes a lot of time. Taking part in a control group for this study means that the caregiver must provide their spare time resources without having a direct benefit. In our opinion, this is an unjustified expenditure of time for the caregiver. Second, we were concerned about a negative influence on the recruiting success, because possible participants may not have wanted to participate in the study if there were a 50% chance to be enrolled in the control group (Polit & Beck, 2016).

2.2 | Participants

Participants were recruited by presenting the study to the local association of Alzheimer's disease and in geriatric clinics around the study centre. Flyers were delivered to possible participants. Further,

we published advertisements in local district newspapers. Interested persons (person suffering from dementia) and their caregivers were requested to contact the primary investigator and were invited to an information session during which we explained the study details. Persons who were included in the study had dementia (as measured by a Mini-Mental State Examination (MMSE) score between 10 and 26), lived in the community, were attended to partially or permanently by a relative and were able to walk with or without a walking aid. Excluded were persons with a very pronounced elopement tendency, persons who were dependent on a wheelchair or lived in a nursing home. We decided not to calculate the sample size a priori because it was clear that the timeline, the number of volunteers and financial resources of the project were enough for three seasons with ten to fifteen participants each.

2.3 | Ethical consideration

The responsible ethical committee approved the study (EKSG 14/150), and the Swiss federal legal basis and the Declaration of Helsinki were observed. The study is registered in the German Clinical Trials Register (DRKS00007974). If an eligible participant and particularly their relatives decided to take part in the study, they signed written informed consent. This study was guided by the TREND statement (see Supplementary File S1): the reporting quality of non-randomized evaluations of behavioural and public health interventions (Des Jarlais et al., 2004).

2.4 | Intervention

We conducted easy walking tours in an urban area in Switzerland with a group of people with dementia. A single walk lasted three and a half hours, which included a short rest at a restaurant in the middle of the tour. The tempo was adapted on the individual performance of the person, which means that the walking route was very individual, between approximately three and seven kilometres. The walks were biweekly and performed in three consecutive seasons; each season had a duration of 28 weeks. Each walk was led by a nurse which was member of the study team, and each person with dementia had support from one or, if necessary, two trained volunteer helpers. The volunteers were trained by the project leader, who has a lot of nursing experience in interacting with people with dementia. The training lasted three hours and focussed in particular on communication with people with dementia. Some of the volunteers were nurses, but there were also many who had no experience in dealing with dementia. The volunteers were supported throughout the walk by the nurse who led the walk, especially in challenging situations. When assigning the volunteers, it was ensured that they were allowed to accompany the same person as far as possible so that a relationship could be built up. During the project, a relatively large pool of volunteers was built up, who could then be called upon for each hike (approx. 12 people per hike).

2.5 | Measures

All data were collected during a personal appointment by one member from the study team with the participant and their relative. The study variables were recorded direct before and after a season. If a person with dementia took part in more than one season, the data after one season were used as data before the next season and no pretest data collection were performed for that participant. All measures used the German versions.

The health-related quality of life was assessed by the 36-Item Short Form Survey (SF-36) (Bullinger, 1995; Bullinger & Kirchberger, 1998). Each item was rated between one and a maximal five points. All items except one single item "change in health" were summarized in nine subscales according to the manual from Bullinger and Kirchberger (1998). The subscales were expressed in values from 0 to 100 points, and the higher the score, the better the state of health. The single item could reach the values 1–5 points, and the lower the score, the better the change in health. The internal consistency (Cronbach's alpha) for the eight subscales was in a large norm sample for the eight subscales between 0.74 and 0.94 (Bullinger, 1995). The health and disability of the participants were recorded according to the WHO Disability Assessment Schedule 2.0 (WHODAS 2.0) (Üstün, Chatterji, et al., 2010; Üstün et al., 2010; World Health Organization, 2017b). This measurement consists of 36 items with questions concerning impairments in different daily tasks. Each item was rated with 1–5 points belonging to the impairment. The items could be grouped into six domains, from which only the domain "participation in society" was evaluated in this trial. The first 12 items build the 12-item version from the WHODAS 2.0, which was also assessed. This included two items from each domain. The whole analysis followed the complex scoring from the manual (Üstün, Kostanjsek, et al., 2010). The 12-item version and also the domain "participation in society" ranged from 0 to 100 points. A lower score indicates a lower impairment. The test-retest reliability was 0.98 (intraclass correlation coefficient ICC) for the overall WHODAS 2.0 (36 items); for the participation domain, 0.75–0.80; and Cronbach's alpha was in a large norm sample 0.96 or rather 0.84 (Üstün, Chatterji, et al., 2010). The 12-item version can explain 81% of the variance (Üstün, Kostanjsek, et al., 2010). To evaluate the person's everyday expertise, the Instrumental Activities of Daily Living (IADL) scale was assessed (Lawton & Brody, 1969). The scale describes eight functions about life skills. For each function, one statement about the performance of this skill was selected and each statement was credited with 1 or 0 points. After adding all the points, there was a possible score between 0 and 8 points. A higher score represents higher independence in the IADLs. Cronbach's alpha was between 0.5 and 0.8 (Graf, 2008). To record challenging behaviour, a questionnaire was constructed by the study team. The questionnaire contained six common challenging behaviours based on the definition of James (2013). Each behaviour was judged with 1 to 5 points. The following summarization resulted in a total score from 6 to 30 points. A lower score indicates less challenging behaviour. To assess the caregivers' burden, we chose the Zarit Burden

Interview consisting of 22 items and a 5-point Likert scale from 0 (never) to 4 (nearly always). The internal consistency of the Zarit Burden Interview was high with a Cronbach's alpha of 0.91 (Braun et al., 2010).

2.6 | Statistical Analysis

The participants' characteristics were analysed with the standard measures of means and standard deviations, frequencies and proportions. Missing values in the measuring instruments were replaced when necessary and possible: In the SF-36, on the basis of the manual; in the WHODAS 2.0 also on the basis of the manual, with imputation of the mean, if not more than one item was missed in the 12-item scale or the participation domain; in the IADL, content-wise; the challenging-behaviour questionnaire had no missing values; and in the Zarit Burden Interview, missing data were not replaced. The study variables were also analysed with standard measures before and after the intervention for each season separately and for all seasons together. Differences in the study variables and the MMSE from before the walks to after the walks in every season and in all season together were assessed by a test for non-parametric variables with related samples, Wilcoxon test. A two-tailed alpha of 0.05 described statistical significance. If there was a significance, effect size according to Cohen (1992) was calculated. Statistical analyses were performed using SPSS, version 24.

3 | RESULTS

In total, 32 persons with dementia were enrolled in the study. Because of missing values in the study variables, the sample size of the different variables varied. On average, the participants had dementia for almost 4 years. The mean age was about 75 years, and about a third were female (Table 1). Four participants did not participate in the whole season. In all cases, a major deterioration in general condition was the reason. Two of the four participants temporarily entered a nursing home. The MMSE mean score before the walks was 16.7 and had decreased to 14.8 after the walks. The

TABLE 1 Participant characteristics (N = 32)

Characteristic	Value
Age, M years (SD)	74.5 (7.9)
Female sex, n (%)	12 (37.5)
Duration of dementia, M years (SD)	3.8 (2.1)
MMSE ^a , M score (SD)	
Before walks	16.7 (6.8)
After walks	14.8 (8.0)

Note: A higher score indicates higher cognitive dysfunction. Data were missing (n = 27, 84%).

Abbreviations: M, Mean; SD, Standard Deviation.

^aMMSE, Mini-Mental State Examination, score ranging 0–30.

decline was statistically significant, $Z = -2.00$, $p = .045$, but the p -value 0.045 is close to the significance limit alpha. The effect size according to Cohen (1992) is $r = .35$. There were missing data from the four participants which did not participate to the measurement after the intervention and one participant refused to take part on the MMSE measurement due to mental reasons.

The before–after comparison results are presented in Table 2. The subsequent report will focus only on the results of all seasons.

Considering the health-related quality of life (SF-36), the scores of the subscales "social role functioning", 73.1 ± 37.2 versus 75.0 ± 35.2 , $p = .746$, and "emotional role functioning", 77.1 ± 36.4 versus 84.0 ± 30.5 , $p = .477$, had a statistically non-significant increase. In contrast, the "physical functioning", 84.4 ± 15.2 versus 77.2 ± 22.3 , $p = .003$, demonstrated a statistically significant decrease. The impairments measured with the WHODAS 2.0 12-item increased statistically significantly, 38.4 ± 22.8 versus 44.7 ± 23.3 , $p = .005$. In addition, the impairments in the domain "participation" showed a statistically significant increase, 38.0 ± 16.8 versus 43.1 ± 14.6 , $p = .030$. The activities of daily living, measured with the IADL scale, showed a statistically significantly higher dependence after the intervention, 3.1 ± 1.9 versus 2.7 ± 1.9 , $p = .046$. There was less challenging behaviour in the subscale "withdrawn, apathetic, depressed," no change in the subscale "eating and drinking excessively," and more challenging behaviour in all other subscales and in total as well. All changes were statistically non-significant. The caregiver burden showed a statistically non-significant increase.

4 | DISCUSSION

The goal of the present research was to test a group-walking intervention for people with dementia. In general, the quality of life was stable through all seasons, except "physical functioning." The secondary outcomes were uneven. While impairment (WHODAS) and the dependence (IADL) increased, challenging behaviours and the burden on the caregivers were stable through all seasons.

In the community setting, the quality of life decreases with progression of the disease. In our study, quality of life was stable over the intervention period of 28 weeks. This can be perceived as a success because over such a period dementia symptom usually becomes worse. Compared with other studies that have tested walking or training interventions (Andrade et al., 2013; Vreugdenhil et al., 2012; Wishart et al., 2000), quality of life has only been measured in the present study. We could show that all subscales except "physical functioning" were stable. The reason for the subscales "social role functioning" and "emotional role functioning" was probably that the intervention was a group intervention, giving the participants an opportunity to get in touch with the trained volunteer and other participants. Especially during the break in the restaurant, we noted that interaction was accelerated on each "walking event." With participants having the opportunity to build their own social network in which dementia was not a barrier, could have forced the participants' confidence.

TABLE 2 Findings of the study variables

Variable	Season 1			Season 2			Season 3			All Seasons		
	M(SD) (N = 9)	p*	r	M(SD) (N = 11)	p*	r	M(SD) (N = 12)	p*	r	M(SD) (N = 32)	p*	r
SF-36 ^a												
Physical functioning	B	80.0 (17.9)	.844	89.1 (10.4)	.070		83.3 (16.7)	.021	.67	84.4 (15.2)	.003	.50
	A	78.3 (21.8)		81.8 (19.1)			72.1 (25.8)			77.2 (22.3)		
Physical role functioning	B	80.6 (34.9)	.375	95.5 (10.1)	.500		91.7 (28.9)	.125		89.9 (26.1)	.480	
	A	94.4 (11.0)		100.0 (0.0)			62.5 (47.1)			84.4 (33.5)		
Bodily pain ^e	B	84.6 (25.4)	.625	91.3 (19.9)	.563		91.7 (16.1)	.500		89.7 (19.7)	.498	
	A	91.4 (17.8)		84.7 (23.9)			82.8 (33.2)			85.9 (25.9)		
General health perceptions	B	64.3 (14.7)	.570	79.8 (13.6)	1.000		78.2 (17.8)	.043	.59	74.8 (16.5)	.356	
	A	69.3 (19.9)		78.7 (17.3)			69.2 (21.9)			72.5 (18.6)		
Vitality	B	56.7 (24.2)	.711	55.0 (18.6)	.941		55.0 (19.9)	.330		55.5 (20.1)	.358	
	A	51.1 (18.5)		56.8 (19.0)			48.3 (21.8)			52.0 (19.7)		
Social role functioning	B	68.1 (40.6)	1.000	73.9 (44.9)	.813		76.0 (28.9)	.398		73.1 (37.2)	.746	
	A	66.7 (47.2)		71.6 (28.0)			84.4 (31.6)			75.0 (35.2)		
Emotional role functioning	B	55.6 (47.1)	.125	78.8 (34.2)	.500		91.7 (20.7)	.313		77.1 (36.4)	.477	
	A	88.9 (23.6)		90.9 (21.6)			75.0 (40.5)			84.4 (30.5)		
Mental health	B	76.0 (12.7)	.844	73.1 (18.4)	.070		75.3 (22.9)	.106		74.8 (18.4)	.087	
	A	70.2 (19.1)		70.9 (23.8)			67.0 (19.8)			69.3 (20.5)		

(Continues)

TABLE 2 (Continued)

Variable	Season 1			Season 2			Season 3			All Seasons		
	M(SD) (N = 9)	p*	r	M(SD) (N = 11)	p*	r	M(SD) (N = 12)	p*	r	M(SD) (N = 32)	p*	r
Single item: Change in health	B	4.0 (0.9)	.016	.80	3.2 (0.6)	.375	3.6 (0.8)	1.000		3.6 (0.8)	.507	
	A	3.1 (0.6)			3.5 (0.8)		3.7 (0.9)			3.4 (0.8)		
WHODAS 2.0 ^b												
	B	34.6 (20.0)	.004	.89	38.6 (23.9)	.578	41.2 (25.4)	.170		38.4 (22.8)	.005	.48
Participation Domain	A	45.7 (22.5)			39.7 (25.3)		48.2 (23.6)			44.7 (23.3)		
	B	32.3 (20.6)	.125	.313	39.1 (17.5)	.313	41.1 (13.8)	.516		38.0 (16.8)	.030	.38
IADL ^c	A	42.8 (16.1)			41.2 (14.6)		45.2 (14.5)			43.1 (14.6)		
	B	3.3 (2.3)	.344	.64	3.5 (2.0)	.027	2.7 (1.6)	.344		3.1 (1.9)	.046	.37
A	3.0 (2.4)			2.6 (1.8)		2.5 (1.7)			2.7 (1.9)			
Challenging behaviour ^d												
Total	B	11.4 (3.1)	.203	.67	9.6 (2.9)	.033	11.6 (2.9)	.328		10.8 (3.1)	.323	
	A	9.6 (2.7)			11.3 (3.1)		12.5 (4.2)			11.3 (3.6)		
Withdrawn, apathetic, depressed	B	3.2 (1.3)	.500	.332	2.3 (1.1)	.332	3.1 (1.5)	.422		2.8 (1.4)	.656	
	A	2.6 (1.0)			2.9 (1.5)		2.7 (1.6)			2.7 (1.4)		
Eating and drinking excessively	B	2.0 (1.7)	.375	1.000	1.6 (1.0)	1.000	1.8 (1.4)	.250		1.8 (1.3)	.997	
	A	1.2 (0.4)			1.7 (1.4)		2.2 (1.8)			1.8 (1.4)		
Unadjusted handling of subjects	B	1.4 (1.0)	.875	.750	1.6 (0.9)	.750	1.7 (1.2)	.500		1.6 (1.1)	.277	
	A	1.7 (1.0)			1.7 (1.3)		2.1 (1.4)			1.8 (1.3)		
Verbal aggression	B	1.2 (0.4)	.500	.438	1.4 (0.8)	.438	1.7 (1.1)	1.000		1.4 (0.8)	.652	
	A	1.0 (0.0)			1.7 (1.1)		1.7 (0.9)			1.5 (0.9)		
Physical aggression	B	1.0 (0.0)	1.000	1.000	1.1 (0.3)	1.000	1.0 (0.0)	1.000		1.0 (0.2)	1.000	
	A	1.1 (0.3)			1.0 (0.0)		1.1 (0.3)			1.1 (0.3)		
Increased urge to move	B	2.6 (1.6)	.500	.125	1.7 (1.3)	.125	2.4 (1.5)	.313		2.2 (1.5)	.583	
	A	2.0 (1.5)			2.2 (1.6)		2.8 (1.6)			2.4 (1.6)		
Zarit Burden ^e												

(Continues)

TABLE 2 (Continued)

Variable	Season 1			Season 2			Season 3			All Seasons		
	M(SD) (N = 9)	p*	r	M(SD) (N = 11)	p*	r	M(SD) (N = 12)	p*	r	M(SD) (N = 32)	p*	r
Total	A 29.0 (18.1)	1.000		34.3 (9.7)	.375		27.3 (16.3)	.172		30.6 (14.3)	.809	
	B 32.0 (12.5)			24.9 (14.7)			35.2 (14.6)			31.5 (14.2)		

Note: *Wilcoxon signed-rank test, significance level 0.05, r = effect size.

Bold values are statistically significant.

Abbreviations: A, After the walks; B, Before the walks; M, Mean; SD, Standard Deviation.

^aSF-36 = 36-Item Short Form Survey ranged from 0 to 100. A higher score indicates a better state of health, except a change in health from 1 to 5 where a lower score indicates a better change.

^bWHODAS 2.0 = WHO Disability Assessment Schedule, ranged from 0 to 100. A lower score indicates a lower impairment.

^cIADL = Instrumental Activities of Daily Living scale, ranged from 0 to 8. A higher score indicates a higher independence.

^dTotal score ranged from 6 to 30, variables from 1 to 5. A lower score indicates less challenging behaviour.

^eTotal score ranged from 0 to 88. A lower score indicates less burden.

In contrast to the studies with Andrade et al. (2013) and Vreugdenhil et al. (2012), our study showed no improvements in "activities of daily living" or "mobility." Perhaps this is because our group-walking intervention took place only every second week. This suggests that the interval was too long to compare with intervals of daily training or training three times a week to achieve improvements. Also the NHS guideline recommends weekly trainings (NHS, 2018). Another factor could be that the participants in our study were not pushed, according to their mobility, to reach goals. We considered the level of their mobility and adapted the walking distance, as well as the support of the trained volunteer. However, there were no activities, for example, to explicitly improve muscle strength.

Caregivers' burden was stable through all seasons. The results of a statistically significant decrease in the burden on caregivers in the "special steps" study (Wishart et al., 2000) could not be confirmed. However, it is expected that caregivers' burden increases over a period of 28 weeks as a result of the progression of dementia; therefore, the stable results over this time can be regarded as a success. A review showed that the physical limitations of a person with dementia are a contributing factor to the caregivers' burden (Chiao et al., 2015). Therefore, an intervention could significantly decrease the caregivers' burden if it targeted the physical functioning of the affected person and if the interval of the intervention was shorter than every second week.

Acceptance of the intervention was high. In none of the seasons did a participant leave the walking group and all participants always wanted to come for the walk. Therefore, we conclude that the intervention is highly accepted by persons with dementia. Four participants did not participate in the whole season. In all cases, a major deterioration in general condition was the reason. Two of the four participants temporarily entered a nursing home. Some of the family caregivers were not sure at the beginning of the season whether their relative would enjoy the group-walking intervention. In this case, the family caregivers had the opportunity to attend the walk to ensure that all would be fine. This opportunity was highly appreciated by the caregivers and gave a good opportunity to build trust with the trained volunteers and the project team.

Several limitations should be noted. First, the study had design limitations, which included a small sample size and no control group. The reasons were discussed in the study design section. Second, measuring the quality of life of people with dementia is challenging. We chose a measuring instrument that is available for self- and external-assessment, with the limitation that the instrument is not especially for assessments in the field of dementia. Third, symptoms of dementia fluctuate. We did all the assessments for one measurement point on the same day. That single day may not be representative of the actual state. In general, another critical point is that according to Harrison et al. (2016), the traditionally popular outcome assessments like the MMSE are not designed as study outcome measures and their psychometric properties have been poor. Therefore, the authors recommend using the Oxford Cognitive Screen or the Addenbrooke's Cognitive Assessment III for further research (Harrison et al., 2016).

5 | CONCLUSION

This study showed that a group-walking intervention over a 28-week period for people with dementia held the quality of life stable over all seasons and the burden on their relatives did not worsen significantly. Further, the intervention was highly accepted by the people with dementia and by their caregiving relatives as well. Further research is needed to explore group-walking interventions for people with dementia, for example, according to their experiences. Obviously, there is a need for stronger study designs with control groups, which also compare different dose of interventions (duration and interval) and which investigate the effect of a group intervention compared with individually adapted intervention. Further, it is important to use different outcome measures for example to measures cognitive changes.

For the implementation of the intervention, respectively, the leadership and assumption of responsibility of the walking group, competences in leadership, communication with people with dementia and their relatives, training and coaching of laypersons, reaction in case of accidents (e.g. fall in uneven terrain, weeping stitches) and in the assumption of primary care (e.g. toilet assistance and changing of pads) are necessary. All these competences are brought by nurses with the necessary practical experience and are therefore predestined to carry out or lead this intervention.

6 | RELEVANCE TO CLINICAL PRACTICE

In practice, it is important to expand leisure activities for people with dementia. Movement is a central need of persons who have dementia, and enhancing mobility interventions are important therapies in dementia care. Walking is a physical activity that can be easily adapted to the performance of the individual and has low cost. This study tested easy walking tours with a duration of three and a half hours in a biweekly period. The results were diverse, most of the outcomes were stable during the 28 weeks. Therefore, in practice, it is recommendable to implement walking-activity interventions in practice although there is still a lack of evidence. There were no serious adverse findings reported and the acceptance of the intervention by the person suffering on dementia and by their caregiving relatives is high. Further, it has been observed that people with dementia felt comfortable in the group and their social competencies could be encouraged.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS

Kohler: Study concept and design, carried out the intervention, collected and analysed the data, and wrote the manuscript. Mullis:

Carried out the intervention and collected and analysed the data. Burgstaller: Carried out the intervention and collected data. Schwarz: Study concept and design, data analysis. Saxer: Study concept and design, carried out the intervention and collected and analysed the data. All authors read and approved the final manuscript. **Sponsor's role:** University of Applied Sciences St. Gallen was the sponsor of this study, with principal investigator S. Saxer. The sponsor had no role in the study design, data collection, data analysis, data interpretation, writing of the report or the decision to submit for publication.

ETHICAL APPROVAL

The responsible ethical committee approved the study (EKSG 14/150), and the Swiss federal legal basis and the Declaration of Helsinki were observed. The study is registered in the German Clinical Trials Register (DRKS00007974). If an eligible participant and particularly their relatives decided to take part in the study, they signed written informed consent.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on reasonable request from the corresponding author. The data are not publicly available due to patient privacy reasons.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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