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A comparison of quality of life indicators during two complementary interventions: adaptive gardening and adaptive riding for people with dementia☆

Rebecca Lassell [a,*], Wendy Wood [b], Arlene A. Schmid [a], Jennifer E. Cross [c]

[a] Department of Occupational Therapy, Colorado State University, United States
[b] Departments of Animal Science and Occupational Therapy, Colorado State University, United States
[c] Department of Sociology, Colorado State University, United States

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ABSTRACT

Objectives: We sought to provide a fine-grain description and comparison of how people living with dementia responded to adaptive gardening and adaptive riding through durations of their observed participation and emotional well-being, two dimensions of quality of life.
Design: A descriptive case study design enabled in-depth description and comparison of participation and emotional well-being, two quality of life indicators, observed during four videotaped sessions of adaptive gardening and adaptive riding.
Interventions: Eight people living with dementia self-selected into one of two complementary interventions, community-based adaptive gardening (n = 4) or adaptive riding (n = 4), in Northern Colorado. Both occurred for hour-long, weekly sessions for eight-weeks.
Outcome Measure: Durations of observed quality of life indicators of participation and apparent affect were documented using a modified version of the Activity-in-Context-in-Time on 31 hours of videotaped data. Durations for each quality of life indicator were averaged per participant and aggregated by group for comparison using a Wilcoxon Mann-Whitney *U* test
Results: Both interventions supported emotional well-being and participation. Longer durations of active participation were observed during adaptive riding with significantly higher durations of complex active participation ($U = 16$, $p = 0.029$).
Conclusion: Both interventions supported quality of life and merit continued development. Adaptive riding appeared to support longer durations of active participation with more complex forms when compared to adaptive gardening. Findings can inform healthcare providers' recommendations for adaptive gardening and adaptive riding for people with dementia. More research is needed with a larger sample size to further examine similarities and differences.

1. Introduction

Quality of life (QoL) is an important outcome in dementia care. Best practices recommend the use of complementary interventions to address QoL, recognizing that participation in meaningful activities and positive emotional experiences are crucial to the QoL of people living with dementia.[1] In this descriptive case study, we compare and contrast two complementary interventions, adaptive gardening and adaptive riding and other horsemanship activities, that were designed to support the QoL of their respective participants with dementia.

QoL is a complex concept with numerous definitions.[2] In this study, we draw from an environmental perspective of QoL for people with dementia.[3,4] This perspective recognizes that a person's experiences of QoL are influenced by physical, interpersonal, cultural, and socio-political environmental elements of their prevailing situations. More exactly, everyday situations may offer *occupational opportunities,* or

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* Corresponding author at: Department of Occupational Therapy, Colorado State University, 1573 Campus Delivery, Fort Collins, CO 80523, United States.
E-mail address: rebecca.lassell@colostate.edu (R. Lassell).

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opportunities to participate in activities that, if accepted and acted upon by the person with dementia, may support or elicit positive emotional experiences.[3] Participation in activities of a person's choosing is therefore linked to their emotional well-being,[5] an important dimension of QoL in dementia care. *Participation* is understood as a person's "involvement in a life situation."[6] Accordingly, when a person participates in activities they find interesting or meaningful, they use various retained cognitive, physical, and social capacities. These existing capacities are most robustly tapped when a person participates in more complex activities. Altogether, participation in simple or comparatively more complex activities may enhance functioning,[7,8] and thereby help to prevent excess disability, or an unnecessary loss of capacities, due to lack of opportunities for use.[9]

Opportunities to participate in nature-based activities, especially gardening[10–13] and horsemanship activities including riding,[14,15] show promise for supporting the QoL of people with dementia. Such activities may foster attention to the present moment,[16,17] positive emotional experiences of interest and pleasure,[14,15,18,19] and personal identity.[17,20] Moreover, gardening may provide chances to socialize with and contribute to others,[16] and can also culminate in a tangible product.[18] Similarly, access to activities with horses may promote interactions with horses and other people,[14,15] and offer opportunities to contribute to caring for a horse. Such access can also foster participation.[14,18] Moreover, participation can also be supported by adapting gardening and horsemanship activities to fit a range of cognitive, physical, and social needs.[17,18] Therefore, providing opportunities to garden, or to ride and engage in other horsemanship activities, can be consistent with best practices in dementia care. Yet, to our knowledge, no studies have directly compared these complementary nature-based activities and their respective influences on the QoL of people with dementia. Therefore, we aimed to provide a fine-grain description and comparison of how people with dementia responded to opportunities to participate in two nature-based interventions, adaptive gardening and adaptive riding. We asked: (1) To what extent do people with dementia participate and evidence emotional well-being during adaptive gardening and adaptive riding?, and (2) Are observed durations of participation and emotional well-being similar and different across these interventions?

2. Methods

2.1. Design

We used a descriptive case study design, which allows researchers to describe a phenomenon in its natural setting.[21] In this study, we described and compared observed durations of participants' QoL indicators averaged across four videotaped sessions of adaptive gardening and adaptive riding.

2.2. Participants

Participants were recruited from several local organizations and self-selected into adaptive gardening or adaptive riding. To be included in the study, participants had to speak English, be 45 years or older, diagnosed with dementia, and on a stable regimen of medications. Additional inclusion for adaptive riding were not having horse allergies, obtaining a physician's approval to participate, and passing a screening at the therapeutic riding center.[15] During the study, participants were accompanied by one family member who provided care to them, referred to as their care partner. Either care partner assent, or if able, participant consent was obtained. The Institutional Review Board of Colorado State University approved this study.

2.3. Interventions

The two interventions, adaptive gardening and adaptive riding, aimed to support QoL for people with dementia and occurred in Northern Colorado. Both interventions were held for hour-long, weekly sessions, for eight weeks. Each intervention contained five distinct occupational opportunities with a focus on the experience of these opportunities versus an acquisition of skills (see Table 1). Within each opportunity, staff adapted activities to each participants' abilities and needs. An effort was made to keep the same staff and for adaptive riding, the same horse, with each participant.

2.3.1. Adaptive riding

Adaptive riding is the modification of horsemanship and riding activities for people with diverse needs and is provided by a trained instructor.[22] The adaptive riding intervention was based on a previously studied program that was found to support QoL for participants with dementia.[14,15,17] In this study, the intervention was modified to invite participants' primary care partner to participate. The intervention took place at an accredited Professional Association of Therapeutic Horsemanship (PATH) Intl. riding center and was held in an indoor arena and adjacent barn. Two PATH certified therapeutic riding instructors offered adaptive riding with trained staff who were volunteers from the community. Staff adapted activities for each participant's needs with modified directions from one to multiple steps, or the control of the horse during riding, from leading to supervision. Three horses and one donkey participated in adaptive riding. The adaptive riding intervention served as a template for creating the adaptive gardening intervention.

2.3.2. Adaptive gardening

Adaptive gardening, as defined in this study, is the modification of gardening activities to meet participants' levels of functioning. Adaptive gardening took place outdoors at a local senior center on a paved patio and indoors during inclement weather. The first author and a trained gardening educator led the intervention with trained staff who were undergraduate and graduate students and volunteers from the

Table 1
Occupational Opportunity Descriptions and Codes.

Adaptive Gardening	Adaptive Riding
Planting: Staff presented opportunities to prepare the soil, start seeds, water, label, and transplant herbs, house plants, flowers, and vegetables with chances to take plants home.	Grooming: Staff invited participants to brush the horse, untack and put away equipment (e.g. saddle and grooming supplies).
Weeding: Staff provided chances to pull weeds from outdoor garden beds.	Petting: Staff offered participants chances to pet their horse with no access to grooming supplies.
Harvesting: Staff provided opportunities to harvest, explore, and eat a full-grown herb, flower, or vegetable planted during the session.	Riding: Staff offered chances to mount a horse and play games, such as weaving through cones and tossing a beanbag into a bucket.
Observing: Unstructured time where staff did not present opportunities for structured activities and included chances to socialize, explore the garden, and watch ongoing activities.	Observing: Unstructured time where staff did not present opportunities for structured activities and included chances to socialize and watch ongoing horsemanship activities.
Transitions: Staff offered chances to move from the end of an opportunity to a new one.	Transitions: Staff offered chances to move from the end of an opportunity to a new one. Included opportunities to take the horse to his stall or pasture.

community. Staff adapted activities to each participants' needs with different choices for plants and seeds, varied the number of steps in directions, applied bright tape to planting containers as a visual aide, and used decomposable seed tape for an easier grasp.

2.4. Data collection

Demographic data were collected before the interventions and included age, type of dementia reported by their care partner, years diagnosed, and observed mobility (e.g. walking independently, with an assistive device, wheelchair bound). The status of participants' neurocognitive function was assessed using index scores from the Repeatable Battery Assessment of Neuropsychological Status (RBANS).[23] The RBANS index scores summarize five domains of cognitive function: immediate memory, visuospatial/constructional abilities, language, attention, and delayed memory. Higher scores indicate higher function, while lower scores indicate greater impairment.

To address the research questions, videotaped data were systematically collected and coded. To collect video data, one trained assistant was assigned to videotape one participant during four sessions in each intervention. Altogether, 31 hours of videotapes were collected and uploaded into Noldus Observer XT 13 (www.noldus.com), a behavioral analysis software. The study's primary outcome measure was also entered into Noldus to guide all subsequent coding of the videotapes. In each videotape, observed durations of each participants' QoL indicators within the occurring occupational opportunity were coded, as next described.

2.5. Outcome measure

A modified version of the *Activity-in-Context-in-Time (ACT)* was the primary outcome measure (see supplementary table). The *ACT* is a direct-observational tool that uses codes to systematically capture observed behaviors of people with dementia that are indicative of positive, neutral, and negative indicators of QoL in specific contexts.[24,25] The *ACT* is consistent with Ostrov and Hart's[26] recommendations for systematic behavioral observations with clear codes, systematic sampling and recording methods, and evidence of reliability and validity. Whereas, most of the ACT's codes directly measure participation and emotional well-being, we used an established process[15] to modify the ACT by creating new codes that were specific to adaptive riding and adaptive gardening.

New codes were created for *occupational opportunities* to characterize the specific opportunities that were offered in the context of adaptive riding and adaptive gardening. Additionally, *participation* was modified within the *ACT* to be a separate domain with the codes *gaze*, *communication*, and *active participation*. The code, *yes-engaged gaze*, was a positive QoL indicator suggestive of basic environmental engagement by intentional scanning, watching, or visually orienting; conversely, *unengaged gaze* and *eyes closed* were negative QoL indicators. The code, *yes-communication* was a positive QoL indicator describing verbal or nonverbal exchanges of information or interactions with people or animals; conversely, *no-communication* was a neutral QoL indicator. The code, *yes-participation*, was a positive QoL indicator characterizing active participation in freely chosen activities; conversely, *no-participation* was a neutral QoL indicator. For this study, modifiers of *yes-participation* were created to describe the singular activity in which a person was participating (e.g. *planting*). When multiple modifiers were coded, they delineated more complex forms of active participation (e.g. *ride and pet a horse*).

Emotional well-being was measured within the *ACT* with the domains of apparent affect and agitation. Apparent affect included codes of *interest, pleasure*, *anger, fear or anxiety*, and *sadness*.[27,28] *Interest* documented deliberate attention toward an event, object, person, or animal and *pleasure* characterized smiling and laughing, both codes were positive QoL indicators. Whereas, *anger* was evidenced by shouting or clenching teeth; *anxiety or fear* through eyes wide or sudden withdrawal; and *sadness* with frowning or crying and all were considered negative QoL indicators. Agitation contained two codes. *Yes-agitation* characterized inappropriate verbal, vocal, or motor activity (pacing, repetitive sentences, etc.) and was a negative QoL indicator.[29] Conversely, *no-agitation* was considered a positive QoL indicator.

A continuous time sampling method[26] was used to document the observed occupational opportunity, and to record whether each QoL indicator code was present or absent within. For example, at the start of each videotape, the first author coded the occupational opportunity first and then simultaneously documented the observed QoL indicators within the domains of participation, apparent affect, and agitation immediately afterwards. For example, the rater coded observing (occupational opportunity); then engaged gaze, no-communication, and no-active participation (participation); while simultaneously documenting interest (apparent affect); and no-agitation (agitation). These codes would run continuously in Noldus until the rater entered a different code to denote any changes. Using pre-determined coding rules,[15] two raters established inter-rater reliability with a kappa of 0.85 on 20 min of videotapes from both interventions.

2.6. Data analysis

Proportions of the durations of each QoL indicator were calculated in Excel for individual participants. Individual proportions were aggregated by intervention and by occupational opportunity within each intervention. A Wilcoxon Mann-Whitney *U* test was used to compare proportions of QoL indicators by intervention in SPSS Version 26. Proportions were converted to percentages.

3. Results

3.1. Demographics

Eight participants completed the study; four in each intervention (Table 2). In both interventions, two care partners identified their respective participant as in the early to moderate stages of dementia and two in the moderate to later stages. Care partners identified all participants as white and as having experience riding or gardening. RBANS scores suggested that all participants had serious cognitive impairments. No significant differences in RBANS scores or mobility were found between groups (Table 2).

3.2. QoL indicators

Participants in both adaptive gardening and adaptive riding expressed a preponderance of positive QoL indicators (Table 3).

Table 2
Participant Demographics.

Participant	Group	Age	Sex	Years dx	Type	RBANS	Observed Mobility
1	AR	57	F	5	PCA	41	I
2	AR	67	F	1	EO	41	WC
3	AR	74	M	5	MCI	55	I
4	AR	67	F	<1	VAS	68	I
5	AG	60	F	2	EOAD	65	I
6	AG	96	F	<1	NOS	51	AD
7	AG	74	M	2	NOS	51	WC
8	AG	98	F	6	NOS	51	AD

AG, adaptive gardening, AR, adaptive riding, AD, assistive device (e.g. walker), EO, early onset, EOAD, Early onset Alzheimer's disease, I, independent, MCI, mild cognitive impairment, NOS, not otherwise specified, PCA, posterior cortical atrophy, and WC, wheelchair. RBANS, Repeatable Battery Assessment of Neuropsychological Status, total index scores reported. Scores <69 are categorized as extremely low cognitive function.

Table 3
Median Percentages of Quality of Life Indicators Averaged Across Four Sessions.

Domain	Codes and sub codes	Adaptive Gardening Median (min-max)	Adaptive Riding Median (min-max)	Wilcoxon Mann-Whitney *p* value
Apparent Affect	Anxiety or fear	–	- (0–0.10 %)	0.69
	Interest	88.70 % (63.10–94.60 %)	65.90 % (31.90–73.50 %)	0.20
	Pleasure	9.70 % (1.50–33.90 %)	25.60 % (19.50–59.60 %)	0.20
Participation	Gaze			
	Yes, Engaged Gaze	98.90 % (98.80–99.80 %)	98.50 % (95.7–99.60 %)	0.686
	No, Engaged Gaze	0.10 % (0–0.30 %)	–	0.343
	Communication			
	Yes Communication	42.60 % (18.5–59.10 %)	39.40 % (29.7–49.60 %)	0.886
	No Communication	57.10 % (39.7–81.10 %)	60.20 % (48.7–70.20 %)	1.00
	Active Participation			
	Yes Active Participation	33.80 % (9.80–56.20 %)	60.80 % (43.20–62.80 %)	0.057
	Singular	33.79 % (9.80–56.17 %)	47.29 % (42.95–52.50 %)	0.343
	Complex	–	9.33 % (0.17–18.76 %)	0.029*
	No Active Participation	67.30 % (42.80–89.40 %)	38.60 % (27.40–56.70 %)	0.057

Percentages do not add up to 100 % due to missed observations. Apparent Affect codes of sadness or depression and anger were not observed. No signs of agitation were observed.

Participants in both interventions were observed to *participate* through visual engagement with their environments nearly continuously and by communicating with care partners, staff, or their horse or donkey nearly half of the time. A Wilcoxon Mann-Whitney *U* test showed a trend toward higher durations of active participation in adaptive riding (Median = 60.80%) compared to adaptive gardening (Median = 33.80%), ($U = 15$, $p = 0.057$). Furthermore, participants in adaptive riding observably engaged in complex active participation (Median = 9.33%) significantly more than those in adaptive gardening, where no complex active participation was observed ($U = 16$, $p = 0.029$). Additionally, participants were observed to express *emotional well-being* with either interest or pleasure in both interventions. While expressions of interest were more prevalent in adaptive gardening, expressions of pleasure were more common in adaptive riding. With the exception of one fleeting episode of apprehension when a horse's head bumped a participant, no signs of ill-being or agitation were observed during both interventions. Moreover, both interventions appeared to support social interactions with similar durations of communication. Variations in positive QoL indicators across the two interventions and their respective occupational opportunities are next described.

3.3. Active participation

Participants in adaptive gardening were observed to actively participate in singular activities (one-at-time) (Table 4, Fig. 1). For example, during the opportunity of harvesting, participants ate herbs and vegetables as they shared recipes or reminisced with care partners and staff. Within the opportunity of planting, participants planted flowers, herbs, plants, and vegetables in raised garden beds or small pots, watered plants, and sometimes donned or doffed garden gloves. When transitioning between opportunities, participants transported plants or engaged in hygiene activities like handwashing. During the opportunity of observing, participants watched ongoing activities and drank water. Within the opportunity of weeding, one participant chose to weed and the other three opted to explore the garden instead. Staff and three of the four care partners collaboratively engaged with participants in all opportunities. Care partners provided encouragement, direction, and physical assist to their respective participant to support their engagement in singular activities, varying from hand-over-hand assist during watering to stabilizing containers during planting.

Comparatively during adaptive riding, participants engaged in a greater range of singular activities and also participated in two or more activities simultaneously (Table 5, Fig. 2). For instance, during the opportunity of riding, participants were observed to ride their horse or donkey, while petting it or playing various games involving obstacle courses or tossing bean bags. Within the opportunity of grooming, one participant pet and groomed her horse concurrently; participants also brushed, petted, and untacked their horse, and put away riding and grooming equipment. During the opportunity of petting, participants were observed to stroke their horse's or donkey's face, nose, chest, and neck; one participant repeatedly kissed her donkey's nose. When transitioning, participants donned and doffed helmets and two participants accompanied staff to take their horse to the pasture. Within the opportunity to observe, participants sipped coffee and watched ongoing activities. Active participation was also collaborative as staff and three of the four care partners co-participated throughout all opportunities, including walking alongside their participant during riding. Care partners encouraged, directed, and provided physical assist to their respective participant, supporting their participation in singular and complex activities. For instance, care partner involvement ranged from physical support during riding (singular) to offering a bean bag during mounted games (complex).

Therefore, both interventions supported positive and neutral QoL indicators and provided chances for collaborative participation with care partners and staff. The difference between adaptive gardening and adaptive riding was observed through complex active participation,

Table 4
Adaptive Gardening Average Percentages of Positive Quality of Life Indicators by Opportunity Per Session.

Occupational Opportunities	Time Offered % of session	Apparent Affect		Participation		
		Interest	Pleasure	Engaged Gaze	Communication	Active Participation
Harvesting[a]	11 min 18 %	86 %	10 %	99 %	33 %	58 %
Weeding[a]	23 min[b] 38%	89 %	10 %	99 %	20 %	39 %
Planting[a]	27 min 45 %	85 %	14 %	99 %	47 %	35 %
Transitioning	6 min 9 %	75 %	14 %	94 %	57 %	12 %
Observing	11 min 19 %	79 %	20 %	99 %	42 %	8 %

Opportunities are presented in order of the longest durations of active participation to the least. Percentages do not add up to 100 % due to missed observations.
[a] Involved direct interactions with plants.
[b] Average time offered for weeding was calculated using the two sessions it was offered.

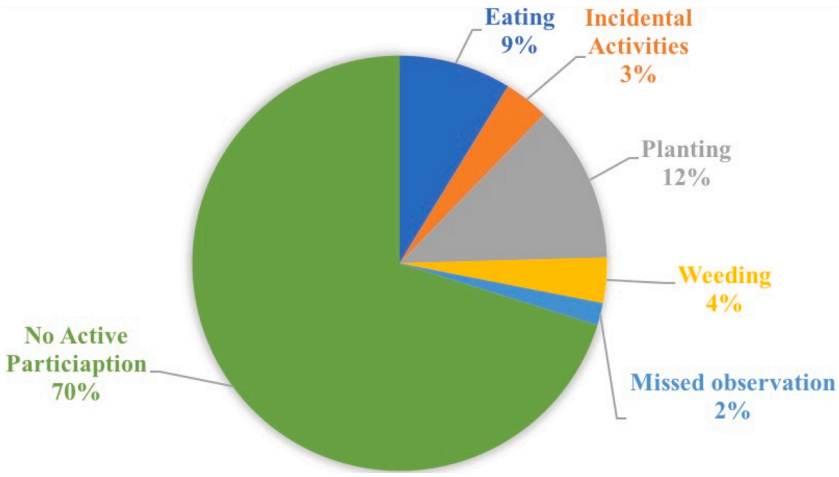

Fig. 1. Adaptive Gardening Average Percentage of Active Participation Per Session.
Incidental Activities captured activities occurring for <1 min a session: drinking, exploring the garden, hygiene, putting on taking off gloves, transporting, and watering.

Table 5
Adaptive Riding Average Percentages of Positive Quality of Life Indicators by Opportunity in Per Session.

Occupational Opportunities	Time Offered % of session	Apparent Affect		Participation		
		Interest	Pleasure	Engaged Gaze	Communication	Active Participation
Riding[a]	21 min 35 %	73 %	24 %	99 %	34 %	95 %
Grooming[a]	13 min 21 %	50 %	45 %	99 %	45 %	75 %
Petting[a]	4 min 8 %	32 %	60 %	99 %	45 %	60 %
Transitioning	10 min 17 %	42 %	27 %	94 %	57 %	15 %
Observing	12 min 20 %	66 %	27 %	96 %	27 %	2 %

Opportunities are presented in order of the longest durations of active participation to the least. Percentages do not add up to 100 % due to missed observations.
[a] Involved direct interactions with horses.

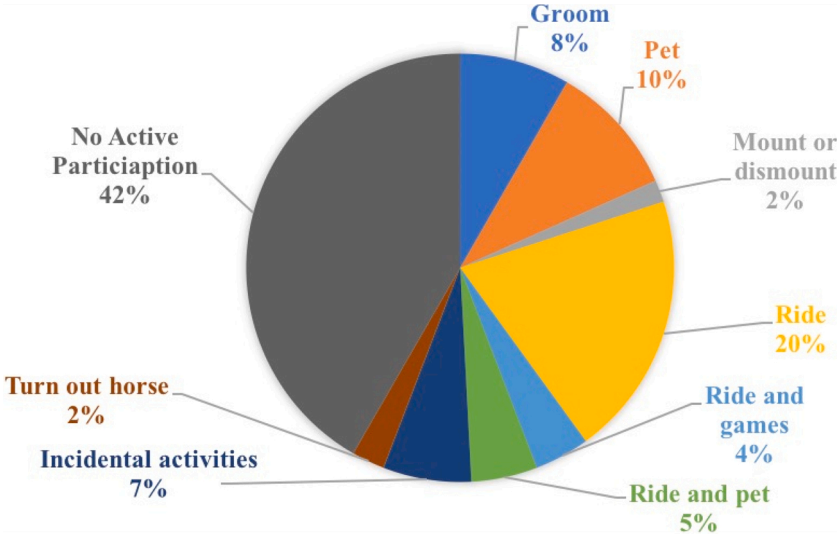

Fig. 2. Adaptive Riding Average Percentage of Active Participation Per Session.
Incidental Activities captured activities that occurred for <1 min a session: drinking, grooming and petting, hygiene, putting on or taking off helmet. Missed observations averaged less than 20 s a session.

underscoring that adaptive riding involved more opportunities for complex activity.

4. Discussion

This was the first study using systematic behavioral observations to describe and directly compare QoL indicators during adaptive gardening and adaptive riding for people with dementia. Our findings underscore that both self-selected interventions supported positive and neutral QoL indicators in participants with differing types of dementia and a broad range of physical and cognitive needs. Thereby, both interventions merit continued scientific development. Moreover, our findings build on the evidence supporting nature-based interventions for people with dementia.[13,30,31]

Our findings align with previous research of gardening and QoL for people with dementia. Specifically, Jarrott et al.[18] observed people with dementia as they participated in a gardening day program and also documented more expressions of interest with less pleasure. Higher expressions of interest may be linked to the creative nature of gardening. Smith-Carrier and colleagues[16] found, for instance, that people with dementia who participated in gardening experienced curiosity, wonder, and learning. Furthermore, our findings align with Hall et al.,[19] who observed a diverse range of participation from more relaxed with watching ongoing activities to active participation in leisure activities during a 10-week gardening intervention at a day program. Both active participation and relaxation in gardens can be beneficial as they are linked to increased physical function and decreased stress.[32] Yet, no previous studies, to our knowledge, have examined the forms of participation during gardening in-depth. This study adds to the literature with a basic understanding of the singular and often collaborative forms of active participation during an adaptive gardening intervention for people living with dementia, and is the first published study to invite care partner participation, to our knowledge.

Also, our findings confirm previous research of the adaptive riding program replicated in this intervention as supporting QoL for people with dementia,[14,15] and adds to the literature with a basic understanding of the horse's role. Namely, interactions with a horse seemed to support expressions of pleasure. Similarly, Fields et al.[14] documented participants' QoL indicators during the adaptive riding program compared to routine activities at their care facility and found that adaptive riding was associated with higher frequencies of pleasure. Additionally, Lassell et al.[15] documented durations of QoL indicators during each occupational opportunity in the adaptive riding program and consistent with our findings, found that grooming and petting elicited the highest durations of pleasure. Yet, we observed longer durations of pleasure during these opportunities. Unlike previous studies of the adaptive riding program, participants were often accompanied by their care partners, and paired with the same horse, which may have created a greater sense of comfort and familiarity. The comforting and calming nature of human-animal interactions, particularly physical contact, has been recognized as potential mechanisms of change for improving mood,[33] and may help explain our findings. One other equine-gardening comparison exists: Peters et al.[34] found occupational therapy (OT) involving activities related to gardening and horses beneficial for children with autism spectrum disorder. Yet, only OT incorporating horses significantly reduced irritability. Coupled with our findings, activities with a horse may elicit a more uplifted emotional state when compared to activities indoors and in a garden.

Additionally, we found that opportunities that involved direct interactions with horses appeared to require a higher level of active complex participation, particularly during grooming and riding. Thereby, participants in adaptive riding were observed to utilize their retained capacities at a higher level as they participated in more complex activities with horses. Whereas, participants in adaptive gardening appeared to tap into their retained capacities at a lower level with shorter durations of singular active participation. Perhaps the horse,[35] or the dynamic nature of horse-human interactions, served as motivators to participate. In sum, participating in activities with a horse may support positive emotional experiences and provide more opportunities to utilize a person's retained capacities at a higher level through complex active participation.

4.1. Limitations, implications, and future directions

Systematic behavioral observations do not capture a person's subjective experience. Therefore, our observations serve only as indicators and may not accurately correspond with participants' perceived experiences of QoL. Yet, behavioral observations are often used to capture a person's experience when they are unable to describe it,[26] and can be particularly useful for people with later-stage dementia. Behavioral observations are a very time-intensive research method; however, this method can yield a rich and rigorous description of what occurs during an intervention. Additionally, our findings should be interpreted with caution due to a small and non-diverse sample and should not be generalized to the larger population. Participants also self-selected into the interventions instead of being randomized. Self-selection was chosen to support participants' preferences and safety as undesired interactions with horses could be harmful. Lastly, opportunities for complex participation were built into adaptive riding with mounted games; whereas, adaptive gardening did not naturally lend this chance, presenting a limitation to the comparability of the two interventions. Notably, all other complex participation occurred spontaneously in adaptive riding and appeared to be a form of self-expression.

Our findings can inform healthcare providers' recommendations for adaptive gardening and adaptive riding, knowing that both may offer benefits of emotional well-being and participation for people with dementia. Our findings also provide a rich description of the QoL indicators associated with each occupational opportunity in both interventions. This description can inform healthcare providers' recommendations for specific activities related to adaptive gardening and adaptive riding. When recommending these interventions based on client choice, healthcare providers should consider cost and access. Adaptive riding can be costly and may not be accessible to those in underserved or urban areas who have limited resources. Whereas, adaptive gardening is less costly and can be more readily accessed.

More research is needed to investigate how adaptive gardening and adaptive riding may support QoL similarly and differently for people with dementia with a larger sample. Additionally, research examining the perceived experiences of community-dwelling people with dementia and their care partners during gardening remains scarce,[16,20,36] and has yet to be explored during adaptive riding. Thereby, an acceptability study is needed to capture care partners and participants' experiences of these interventions. Moreover, the first author's training as an OT, occupational scientist, and rehabilitative scientist brought emphasis to the different forms of participation in relation to QoL. Future research should include broader interdisciplinary perspectives of QoL and explore other nature comparisons. These findings could further inform healthcare providers' recommendations to support QoL for people with dementia.

5. Conclusion

This was the first study to compare adaptive gardening and adaptive riding for people living with dementia. Both positively shaped QoL through participants' observed emotional experiences and participation. Adaptive riding seemed to offer greater opportunities for active and more complex forms of participation and may utilize a person's retained capacities at a higher level. More research is needed to further untangle the similarities and differences between the two.

CRediT authorship contribution statement

Rebecca Lassell: Conceptualization, Methodology, Software, Investigation, Formal analysis, Visualization, Writing - original draft. **Wendy Wood:** Funding acquisition, Supervision, Conceptualization, Methodology, Investigation, Writing - review & editing. **Arlene A. Schmid:** Writing - review & editing. **Jennifer E. Cross:** Conceptualization, Writing - review & editing.

Declaration of Competing Interest

The authors report no declarations of interest.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ctim.2020.102658.

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