

University of Groningen

Ranking Barriers, Motivators, and Facilitators to Promote Physical Activity Participation of Persons With Dementia

Karssemeijer, Esther G A; de Klijn, Fleur H; Bossers, Willem J R; Rikkert, Marcel G M Olde; van Heuvelen, Marieke J G

Published in:
Journal of geriatric physical therapy (2001)

DOI:
[10.1519/JPT.0000000000000210](https://doi.org/10.1519/JPT.0000000000000210)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2020

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Karssemeijer, E. G. A., de Klijn, F. H., Bossers, W. J. R., Rikkert, M. G. M. O., & van Heuvelen, M. J. G. (2020). Ranking Barriers, Motivators, and Facilitators to Promote Physical Activity Participation of Persons With Dementia: An Explorative Study. *Journal of geriatric physical therapy (2001)*, 43(2), 71-81. <https://doi.org/10.1519/JPT.0000000000000210>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



Ranking Barriers, Motivators, and Facilitators to Promote Physical Activity Participation of Persons With Dementia: An Explorative Study

Esther G. A. Karssemeijer, MD^{1,2}; Fleur H. de Klijn, MSc³;
Willem J. R. Bossers, PhD³; Marcel G. M. Olde Rikkert, MD, PhD^{1,2};
Marieke J. G. van Heuvelen, PhD³

ABSTRACT

Background and Purpose: Community-dwelling persons with dementia are inactive most of the day. The purpose of this study was to rank the barriers, motivators, and facilitators that hamper or promote physical activity (PA) participation for persons with dementia. This could provide knowledge that can be used to design effective interventions to promote PA participation for persons with dementia.

Methods: Twenty community-dwelling persons with dementia, mean (SD) age = 79 (5.4) years, 25% female, mean (SD) Mini-Mental Status Examination score = 23 (3.5); their informal caregivers, N = 20, mean (SD) age = 70 (11.5) years, 85% female; and an expert group of physiotherapists, N = 15, mean (SD) age = 41 (12.4) years, 73% female, were asked to rank preselected barriers, motivators, and facilitators of PA participation for persons with dementia. These statements were categorized at the intrapersonal, interpersonal, and community levels.

Results and Discussion: Persons with dementia and their informal caregivers selected only motivators and facilitators as being important for PA participation, with the motivator

“beneficial health effects” considered the most important. The experts had a different perspective on PA participation; half of their ranked top 10 most important factors were barriers to PA participation for persons with dementia. This could be explained by the more critical role of a therapist, focusing on symptom control and treatment of disability; in this case, the elimination of barriers to maintain PA participation in their patients. Furthermore, all groups prioritized statements at the intrapersonal level.

Conclusions: The results of this study suggest a difference in perspective between the more optimistic view of persons with dementia and their informal caregivers and the more critical view of physiotherapy experts regarding the most important factors that influence PA participation. In addition, there was a strong focus on the individual characteristics that influence PA behavior that warrant personalized interventions to promote PA in dementia.

Key Words: barrier, dementia, motivator, physical activity

(*J Geriatr Phys Ther* 2018;00:1-11.)

INTRODUCTION

Older age is the strongest risk factor for developing dementia and, due to the aging population, the number of older adults living with dementia is predicted to increase.^{1,2} More than 9.9 million people are diagnosed with dementia each year, and the total number of persons with dementia is expected to reach 131.5 million by 2050, making prevention of dementia an international health, social, and economic priority.³

Dementia is characterized by progressive cognitive decline, motor deficits, and/or behavioral problems, which complicate activities of daily living leading to higher care demands.⁴⁻⁶ No cure or effective disease-modifying therapy for dementia exists.^{7,8} Pharmacological treatment focuses on managing dementia-related symptoms, but its effectiveness is limited.⁹ Therefore, recent research has focused on developing nonpharmacological interventions such as physical activity (PA) as alternative or add-on therapies to prevent dementia progression.¹⁰

The levels of PA decline progressively with age, and a stronger decline is observed in older adults with dementia than in their peers without this disease.^{4,11-13} Recent research showed that community-dwelling persons with

¹Radboud university medical center, Donders Institute for Brain Cognition and Behaviour, Department of Geriatric Medicine, Nijmegen, The Netherlands

²Radboud university medical center, Radboudumc Alzheimer Center, Nijmegen, The Netherlands.

³Center for Human Movement Sciences, University Medical Center Groningen, University of Groningen, Groningen, the Netherlands.

This work was previously presented as a poster at the International Congress of the European Union Geriatric Medicine Society (EUGMS) in Nice, France, September 2017.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The authors disclose there are no potential conflicts of interest.

Address correspondence to: Marcel G.M. Olde Rikkert, MD, PhD, Radboud university medical center, Donders Institute for Brain Cognition and Behaviour, Department of Geriatric Medicine, PO 9101 (hp 925), 6500 HB Nijmegen, the Netherlands (Marcel.OldeRikkert@radboudumc.nl).

Copyright © 2018 The Academy of Geriatric Physical Therapy, APTA.

DOI: 10.1519/JPT.0000000000000210

dementia spent 66% of the day sedentary.¹¹ Besides, daily PA levels of community-dwelling persons with dementia were 21.6% lower than PA levels of healthy older adults.¹¹ Physical activity may have beneficial effects on cognitive and physical abilities of persons with dementia,^{14,15} which can lead to functional improvements and an increased quality of life.^{16,17} It is therefore important to implement PA into the daily routines of persons with dementia.⁴

Different studies have identified barriers, motivators, and facilitators for persons with dementia to participate in PA.^{4,15} Van Alphen et al⁴ identified 26 motivators, 35 barriers, and 21 facilitators and classified them using the socioecological model. This model demonstrates that factors from a variety of levels could affect an individual's participation in PA; for example, factors from the intrapersonal level (health effects, individual preferences), interpersonal level (social support), and community level (organizational or environmental factors).¹⁸⁻²⁰ However, the relative importance of these factors in influencing PA in persons with dementia is still unknown and such knowledge could elucidate why persons with dementia are physically active or inactive. This could lead to the development of more effective strategies to promote PA. Thus, the primary objective of our study was to rank the barriers, motivators, and facilitators influencing PA participation for persons with dementia, as judged by the patients themselves, their informal caregivers, and an expert group of physiotherapists.

METHODS

Study Design

A qualitative design was used to rank the importance of factors for their influence on PA participation of persons with dementia. These factors were ranked by 3 different groups of participants: persons with dementia, informal caregivers, and an expert group of physiotherapists. All

participants gave their oral and written informed consent prior to the study. The study protocol was approved by the Medical Ethical Committee of Radboud University Medical Center (Ref No. NL52581.091.15/2015-1857) and was conducted in compliance with the Declaration of Helsinki ethical standards.

Setting and Participants

This study was conducted from October to December 2016 in Nijmegen, the Netherlands. Persons with dementia, their informal caregivers (spouse, children, or other family members), and physiotherapists were included in the study. The persons with dementia participated in a larger trial, studying the effect of combined cognitive-aerobic training on cognitive function.²¹ Inclusion criteria were as follows: (1) a clinically confirmed diagnosis of dementia with a Mini-Mental Status Examination (MMSE) score of 17 or more,²² and (2) age 60 years or older. Exclusion criteria were as follows: (1) incapable of giving written informed consent; (2) a comorbidity that limited exercising, including severe cardiovascular, musculoskeletal, or neurological diseases; (3) diagnosis of a depression, bipolar disorder, or psychotic disorder at the moment of inclusion; (4) drug or alcohol dependency; (5) exercising more than 5 times per week for at least 30 minutes at a moderate intensity; (6) wheelchair bound; and (7) severe hearing or visual problems that could not be corrected with the use of hearing aids/glasses. Figure 1 illustrates the flow of included participants. Twenty persons with dementia and their informal caregivers gave oral and written consent to participate in this study. Forty physiotherapists who work with persons with dementia on a regular basis were approached, and 15 consented to participate (37.5%). Eight of these participating physiotherapists (53%) had a specialization in geriatrics. See Table 1 for the demographics of the 3 groups.

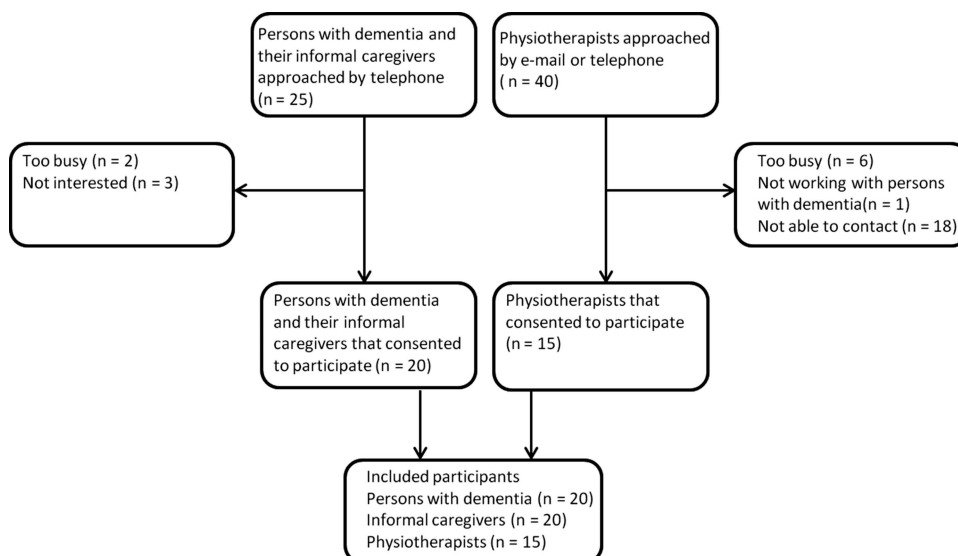


Figure 1. Flow diagram of the study's sample.

Table 1. Demographic Data of All Participants

Characteristics	Persons With Dementia (n = 20)	Informal Caregivers (n = 20)	Experts (n = 15)
Age, mean (SD), y	79 (5.4)	70 (11.5)	41 (12.4)
Gender, woman, n (%)	5 (25)	17 (85)	11 (73)
Education level, n (%)			
Primary school education or lower	2 (10)	1 (5)	0 (0)
Incomplete higher education	14 (70)	12 (60)	0 (0)
Higher education	4 (20)	7 (35)	15 (100)
Mini-Mental State Examination, mean (SD)	23 (3.5)	n/a	n/a
Dementia type, n (%)			
Alzheimer	11 (55)	n/a	n/a
Vascular	1 (5)	n/a	n/a
Mixed	8 (40)	n/a	n/a
Functional Comorbidity Index, ^a mean (SD)	2.3 (1.5)	n/a	n/a
Living situation, n (%)			
Independent	20 (100)	n/a	n/a
Type of informal caregivers, n (%)			
Spouse	n/a	15 (75)	n/a
Child	n/a	3 (15)	n/a
Other family member	n/a	2 (10)	n/a

Abbreviation: n/a, not applicable.
^aTheoretical range 0 to 18 and a higher score indicates more comorbidities.²³

Statement Set

Factors that influence PA participation of persons with dementia were formulated as statements, which were sorted by participants along a continuum to represent their opinion. The barriers, motivators, and facilitators identified by van Alphen et al⁴ were used to define the statements in this study, resulting in the inclusion of 51 statements. To ensure the statement set covered all relevant factors, additional data were collected by interviewing 7 persons with dementia and their informal caregivers (data not published), leading to the inclusion of 12 additional statements.

This initial set of 63 statements was discussed within the research team (E.K., E.K., W.B.), after which 5 statements were rephrased and 10 statements were excluded to prevent overlap between statements and ensure completeness. This resulted in a final set of 53 statements. The statements were categorized into intrapersonal-, interpersonal-, and community-level factors (see Appendix 1 for an overview of all statements).

Ranking Methods

The statements were ranked using 2 different methods. The informal caregivers and experts employed a ranking method from the Q-methodology,²⁴ sorting the statements along a continuum to represent their opinion. The Q-method is shown to be reliable, and because of its qualitative aspects, each individual’s rank-ordered set of statements is considered a valid expression of his or her opinion.²⁴ A pilot study was conducted with 3 participants to assess the feasibility of using this ranking method in persons with dementia. This method was found to be too complicated because participants became confused because of the higher number of statements that were presented to them. A simplified scoring method was used for this group consisting of a series of binary questions (disagree/not important or agree/important) with corresponding scores of 0 or 1.

Ranking Method Used by Informal Caregivers and Experts

Participants were asked how important they thought the different statements on barriers, facilitators, and motivators were for influencing PA participation in persons with dementia, sorting the set of statements along a chosen continuum on a fixed grid that resembled a Likert scale. See Figure 2 for the sorting grid used for ranking by the informal caregivers and experts. The columns had different values, ranging from the “not important at all” column (−5) to the “very important” column (+5). The rows were not assigned values, and the shape of the sorting grid was determined by the expected opinions. We did not expect very strong opinions, so more space was available for statements in the center, with only limited space for statements at the ends. The participants were allowed to place statements outside of the sorting grid, if necessary, and they could make changes or replace statements during the sorting process. Scores given by the caregivers and experts were

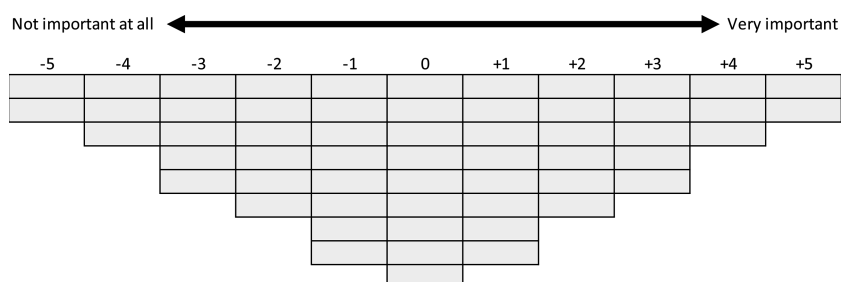


Figure 2. Representation of the grid used in the sorting procedure. Participants assigned all 53 statements to one of the places on the grid, representing how important each statement was for physical activity participation.

calculated and collated for each statement. See Appendix 2 for a more detailed explanation of this ranking method.

Ranking Method Used by Persons With Dementia

The statements were randomly presented to the persons with dementia in a maximum of 5 rounds. In every round, the participants were asked to agree or disagree with the presented statements. The participant was told that it was a matter of opinion, so there was no wrong or right answer. In the first round, every statement was read out loud and the participant had to answer “yes” or “no,” meaning that he or she agreed or disagreed with the statement being important for PA participation. The statements were placed on a “yes” or “no” pile. When there were difficulties understanding a statement or the participant could not decide, the statement was placed on a “neutral”/“don’t know” pile. These statements were treated the same as the statements on the “no” pile. In the second round, all the statements in the “yes” pile were again divided by the participants into “very important” or “less important” piles, using the same procedure as the first round. The question that was asked was as follows: “Is this very important to you, or just a little bit important?” If more than 10 statements were categorized as “very important,” the statements were subjected to another round of ranking by the participants until only 10 or fewer statements were classified as “very important.” The number of rounds required varied between 3 and 5. For every round, the statement could receive a score of 0 (not important/disagree) or 1 (important/agree), and the final statement scores given by each participant were divided by the number of rounds taken to sort them. For example, if a participant took 4 rounds to reduce the number of statements, the scores were 0 for statements that did not move through the first round (0/0), 0.25 for statements that moved through the first round (1/4), 0.5 for statements that moved through the second round (2/4), 0.75 for statements that moved through the third round (3/4), and 1 for the statements that were considered “very important” in the fourth and final round (4/4). This resulted in an ordinal scale, with scores ranging from 0 to 1.

Data Analysis

IBM SPSS Statistics 22 for Windows was used for data analysis. A ranking was created for each group. Median, interquartile range, and minimum and maximum scores were calculated for each statement. Since use of the median results in a lower discriminative power for ranking the statements than use of the mean, we present the statements in order of the mean only if the median is exactly the same.

RESULTS

The 10 most important barriers, motivators, and facilitators ranked by each group are listed in Table 2. See Appendix 3 for the ranking of all statements. “Beneficial health effects” was the most important motivator to engage in PA according to both the informal caregivers and the persons with dementia. Moreover, informal caregivers and persons with

dementia selected only motivator and facilitator statements in their top 10. In contrast, the experts selected 5 barriers in their top 10: “loss of initiative,” “suffering from pain,” “feeling tired,” “physical problems,” and “negative feelings.” In all groups, “pleasant” and “enjoyment” were selected as the 2 most important facilitators.

A majority of the 10 most important statements were classified as intrapersonal factors (see Figure 3). Six of the top 10 statements selected by informal caregivers were intrapersonal factors, whereas 8 of the top 10 from the experts and 9 of the top 10 selected by the persons with dementia were intrapersonal statements. The informal caregivers was the group that selected most community factors in their top 10: “good weather,” “outdoors,” and “person leading the activity.” Both experts and informal caregivers selected 1 statement from the interpersonal level in their top 10: “spouse support and support professional.”

The statements ranked lowest by the informal caregivers and experts are presented in Table 3. For persons with dementia, there were 12 statements that never got through the first round. These statements were “transportation,” “unfamiliar,” “dejected,” “decreased energy levels,” “inactive,” “lack of trust,” “caregivers doubts about potential benefits,” “away from home,” “being dependent,” “time consuming,” “lack of understanding,” and “health problems of caregiver.” Both the persons with dementia and the informal caregivers ranked only barriers in their bottom 10, which represented the least important statements.

DISCUSSION

The aim of this study was to rank barriers, motivators, and facilitators that hamper or promote PA participation for persons with dementia. Results of the current study may be used to increase the adherence rate of exercise prescriptions and interventions in persons with dementia. The 3 main findings of the current study are as follows: (1) substantial differences in perspective exist between persons with dementia and their informal caregivers versus the expert physiotherapists regarding the factors that determine PA participation; (2) persons with dementia, caregivers, and experts all chose intrapersonal level factors as being important for promoting PA participation; and (3) the motivator “beneficial health effects” was the most important factor selected by persons with dementia and their informal caregivers. These 3 main findings are discussed in more detail.

In the present study, the persons with dementia and their informal caregivers selected only motivators and facilitators as important factors for PA participation. Selecting positive and stimulating factors to maintain PA participation is in line with previous findings of Preston et al.²⁵ They showed that patients with early-stage dementia focus on positive characteristics that are largely unaffected by the disease. The researchers argued that, by doing so, patients maintain feelings of continuity and self-control.²⁵ In contrast, the physiotherapy experts in the current study chose a different perspective on PA participation; 5 of the 10 top-ranked

Table 2. Ten Most Important Barriers, Motivators, and Facilitators for Physical Activity Participation According to Persons With Dementia, Their Informal Caregivers, and Physiotherapy Experts

Ranking	Statement	Median	Interquartile Range	Min	Max	Level ^a
Persons with dementia						
1	Beneficial health effects	1.0	1.0-1.0	0.5	1.0	Intrapersonal
2	Physical benefits	1.0	0.5-1.0	0.0	1.0	Intrapersonal
3	Retain flexibility	1.0	0.5-1.0	0.0	1.0	Intrapersonal
4	Outdoors	0.6	0.5-1.0	0.0	1.0	Community
5	Retain self-reliance	0.6	0.5-1.0	0.0	1.0	Intrapersonal
6	Enjoyment	0.5	0.4-1.0	0.0	1.0	Intrapersonal
7	Enjoyed physical activity in the past	0.5	0.5-0.9	0.0	1.0	Intrapersonal
8	Pleasant	0.5	0.5-1.0	0.0	1.0	Intrapersonal
9	Feel useful	0.5	0.3-1.0	0.0	1.0	Intrapersonal
10	Feel free	0.5	0.0-1.0	0.0	1.0	Intrapersonal
Informal caregivers						
1	Beneficial health effects	3.0	2.0-5.0	0	5	Intrapersonal
2	Physical benefits	2.5	1.0-4.0	-1	5	Intrapersonal
3	Person leading the activity	2.5	0.3-3.0	-3	5	Community
4	Enjoyment	2.0	1.0-3.0	-2	5	Intrapersonal
5	Good weather	2.0	1.3-3.0	-2	5	Community
6	Pleasant	2.0	1.0-3.8	-1	4	Intrapersonal
7	Outdoors	2.0	0.3-3.8	-2	5	Community
8	Retain flexibility	2.0	0.0-3.0	-3	5	Intrapersonal
9	Mental benefits	1.5	0.3-3.0	-1	5	Intrapersonal
10	Support professional	1.5	0.3-2.8	-5	5	Interpersonal
Experts						
1	Loss of initiative	3.0	2.0-4.0	0	5	Intrapersonal
2	Pleasant	3.0	1.0-3.0	0	5	Intrapersonal
3	Retain self-reliance	3.0	1.0-5.0	-2	5	Intrapersonal
4	Suffering from pain	3.0	1.0-4.0	-1	5	Intrapersonal
5	Feel tired	3.0	1.0-5.0	-1	5	Intrapersonal
6	Enjoyment	3.0	1.0-3.0	-1	5	Intrapersonal
7	Dejected	3.0	1.0-3.0	-2	5	Intrapersonal
8	Physical problems	2.0	1.0-4.0	-3	5	Intrapersonal
9	Spouse support	2.0	0.0-4.0	-1	4	Interpersonal
10	Person leading the activity	2.0	1.0-3.0	0	4	Community

^aStatements are classified by the socioecological model, which demonstrates that factors at multiple levels could affect an individual's participation in physical activity, including intrapersonal factors, interpersonal factors, and community factors.¹⁹

items by professionals were barriers for PA participation. This may be explained by the more critical role of a therapist focusing on symptom control and treatment of disability; in this case, by eliminating barriers to maintain PA participation in their patients. The transfer of knowledge on potential barriers and how to eliminate them from professionals to persons with dementia and their informal caregivers may

lead to higher PA participation in persons with dementia. On the contrary, a stronger focus on motivational aspects by professionals could positively influence PA behavior.

We found that persons with dementia, informal caregivers, and professionals all considered intrapersonal factors to be most important for PA participation. Thirty statements (58%) in our study were characterized as

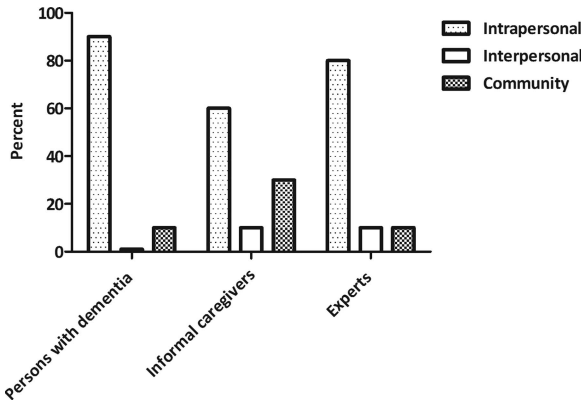


Figure 3. Percentage of statements in the top 10 that belong to the intrapersonal, interpersonal, and community levels. Different groups are presented on the x-axis and the percentage on the y-axis.

intrapersonal, which comprised 77% of the top 10 ranked items. Thus, from the perspective of persons with dementia, informal caregivers, and professionals, PA participation may be strongly influenced by individual characteristics,

suggesting the necessity of using a personalized approach synchronized with the individual needs of the patient. Research showed that personalized psychosocial interventions have positive effects on behavioral and psychological symptoms of dementia.²⁶ The effectiveness of personalized interventions to promote PA in persons with dementia is unknown; therefore, future research is warranted.

The motivator “beneficial health effects” was the priority choice of informal caregivers and persons with dementia. This finding is in line with a systematic review from Baert et al,²⁷ who showed that “health status” was the most commonly reported barrier and motivator for PA in older adults. In addition, the perceived health benefits were more salient in older adults than in younger adults.²⁸ This indicates that emphasizing health benefits may be a decisive element for the promotion of PA.

Limitations

The generalizability of the results may be limited because only persons with dementia who had already participated in an exercise study were included.²¹ Therefore, these participants could be more motivated to be physically active

Table 3. Ten Least Important Barriers, Motivators, and Facilitators, According to Informal Caregivers and Experts

Ranking	Statement	Median	Interquartile Range	Min	Max	Level ^a
Informal caregivers						
44	Dependent	-1.5	-3.0 to 1.0	-5	4	Intrapersonal
45	Structural exercises	-1.5	-3.0 to 1.0	-4	0	Community
46	Feeling forced	-2.0	-3.0 to 0.0	-5	4	Intrapersonal
47	Lack of trust	-2.0	-2.8 to 0.0	-4	4	Intrapersonal
48	Reduces feelings of frustration	-2.0	-3.0 to 2.5	-4	4	Intrapersonal
49	Caregiver's doubts about potential benefits	-2.0	-3.8 to -1.0	-5	0	Interpersonal
50	Inactive	-2.5	-4.0 to -1.0	-5	2	Intrapersonal
51	Concerned about well-being	-2.5	-4.0 to -1.0	-5	0	Intrapersonal
52	Burden on others	-3.0	-4.0 to -1.0	-5	2	Interpersonal
53	Loss of freedom	-4.0	-5.0 to -2.0	-5	0	Intrapersonal
Experts						
44	Lack of understanding	-1.0	-3.0 to 0.0	-5	2	Intrapersonal
45	Knowledge	-1.0	-3.0 to 0.0	-5	1	Intrapersonal
46	Knowledge about memory problems	-2.0	-3.0 to 0.0	-4	2	Intrapersonal
47	Mental benefits	-2.0	-3.0 to 0.0	-4	2	Intrapersonal
48	Structural exercises	-2.0	-3.0 to 0.0	-5	1	Community
49	Reduces feelings of frustration	-2.0	-3.0 to -1.0	-5	0	Intrapersonal
50	Concerned about well-being	-2.0	-3.0 to -1.0	-5	1	Intrapersonal
51	Time consuming	-2.0	-4.0 to -2.0	-5	0	Community
52	Caregiver has health problems	-3.0	-3.0 to 2.0	-5	5	Interpersonal
53	Loss of freedom	-4.0	-5.0 to -2.0	-5	2	Intrapersonal

^aStatements are classified by the socioecological model, which demonstrates that factors at multiple levels could affect an individual's participation in physical activity, including intrapersonal factors, interpersonal factors, and community factors.¹⁹

or could experience fewer barriers, leading to a sampling bias. Second, the reliability and validity of our simplified ranking method used in persons with dementia are unknown and require future research. We did show that this method was feasible, as all persons with dementia were able to complete the process, and the procedure was efficient, safe, and low in cost. Third, we assigned no weightings to the individual factors that influence PA. Such weightings are needed to model how removing a barrier or adding a facilitator would affect PA behavior of persons with dementia. Fourth, the distribution between men and women (75% male) in our sample does not reflect the known Western-world population of persons with dementia, the majority of whom are female (61%).²⁹ Since gender has an effect on the degree of PA, with older women generally being more sedentary and less active than older men,³⁰ this could have influenced our results. The final limitation is the questionable use of the MMSE as a cognitive screening instrument due to its potential failure to detect significant cognitive deficits.²² A more recent and reliable measure such as the Montreal Cognitive Assessment (MoCA) may have been more appropriate.³¹

Practical Implications

The results of this study suggest that the transfer of knowledge from professionals to persons with dementia and their informal caregivers regarding the elimination of potential barriers to PA may lead to higher participation levels. This dissemination of information could be implemented through personal intakes with health care professionals, organizing educational meetings, or publishing news items on this topic. In addition, since individual characteristics seem to most influence PA participation, personalized plans to promote PA behavior should be developed and synchronized with each individual's needs. Future research should investigate the effect of these personalized interventions on PA participation for persons with dementia.

CONCLUSIONS

Differences in perspective may exist between the more optimistically oriented persons with dementia and informal caregivers and the more critically oriented physiotherapy experts concerning the most important factors influencing PA participation. Persons with dementia focus mainly on positive characteristics that are unaffected by dementia, whereas professionals focus on symptom control and treatment of disability. In addition, there is a strong focus on individual characteristics that influence PA behavior, which warrant personalized interventions to promote PA in dementia.

REFERENCES

1. Wortmann M. Dementia: a global health priority—highlights from an ADI and World Health Organization report. *Alzheimers Res Ther.* 2012;4(5):40.
2. van der Flier WM, Scheltens P. Epidemiology and risk factors of dementia. *J Neural Neurosurg Psychiatry.* 2005;76(5):2-7.
3. Prince M, Wimo A, Guerchet M, Ali G, Wu Y, Prina M. *World Alzheimer Report 2015: The Global Impact of Dementia.* London, England: Alzheimer's Disease International; 2015:1-5. <https://www.alz.co.uk/research/WorldAlzheimerReport2015.pdf>. Accessed June 30, 2016.
4. van Alphen HJM, Hortobágyi T, van Heuvelen MJG. Barriers, motivators, and facilitators of physical activity in dementia patients: a systematic review. *Arch Gerontol Geriatr.* 2016;66:109-118.
5. Burton CL, Strauss E, Bunce D, Hunter MA, Hultsch DF. Functional abilities in older adults with mild cognitive impairment. *Gerontology.* 2009;55(5):570-581.
6. Makizako H, Shimada H, Doi T, et al. The association between decline in physical functioning and atrophy of medial temporal areas in community-dwelling older adults with amnesic and nonamnesic mild cognitive impairment. *Arch Phys Med Rehabil.* 2011;92(12):1992-1999.
7. Leshner AI, Landis S, Stroud C, Downey A. *Preventing Cognitive Decline and Dementia: A Way Forward.* Washington, DC: National Academy of Sciences, Engineering, and Medicine; 2017.
8. Cummings J, Morstorf T, Lee G. Alzheimer's drug-development pipeline: 2016. *Alzheimers Dement.* 2016;2(4):222-232.
9. Livingston G, Sommerlad A, Orgeta V, et al. Dementia prevention, intervention, and care. *Lancet.* 2017;390(10113):2673-2734.
10. Ahlskog JE, Geda YE, Graff-Radford NR, Petersen RC. Physical exercise as a preventive or disease-modifying treatment of dementia and brain aging. *Mayo Clin Proc.* 2011;86(9):876-884.
11. van Alphen HJM, Volkens KM, Blankevoort CG, Scherder EJA, Hortobágyi T, van Heuvelen MJG. Older adults with dementia are sedentary for most of the day. *PLoS One.* 2016;11(3):e0152457.
12. Paavilainen P, Korhonen I, Löjtönen J, et al. Circadian activity rhythm in demented and non-demented nursing-home residents measured by telemetric actigraphy. *J Sleep Res.* 2005;14(1):61-68.
13. Burns JM, Cronk BB, Anderson HS, et al. Cardiorespiratory fitness and brain atrophy in early Alzheimer disease. *Neurology.* 2008;71(3):210-216.
14. Groot C, Hooghiemstra AM, Raijmakers PG, et al. The effect of physical activity on cognitive function in patients with dementia: a meta-analysis of randomized control trials. *Ageing Res Rev.* 2016;25:13-23.
15. Stubbs B, Eggermont L, Soundy A, Probst M, Vandenbulcke M, Vancampfort D. What are the factors associated with physical activity (PA) participation in community dwelling adults with dementia? A systematic review of PA correlates. *Arch Gerontol Geriatr.* 2014;59(2):195-203.
16. Bossers WJR, van der Woude LHV, Boersma F, Hortobágyi T, Scherder EJA, van Heuvelen MJG. A 9-week aerobic and strength training program improves cognitive and motor function in patients with dementia: a randomized, controlled trial. *Am J Geriatr Psychiatry.* 2015;23(11):1106-1116.
17. Hauer K, Schwenk M, Zieschang T, Essig M, Becker C, Oster P. Physical training improves motor performance in people with dementia: a randomized controlled trial. *J Am Geriatr Soc.* 2012;60(1):8-15.
18. Bauman AE, Reis RS, Sallis JF, et al. Correlates of physical activity: why are some people physically active and others not? *Lancet.* 2012;380(9838):258-271.
19. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. *Health Educ Behav.* 1988;15(4):351-377.
20. Sallis JF, Cervero RB, Ascher W, Henderson KA, Kraft MK, Kerr J. An ecological approach to creating active living communities. *Annu Rev Public Health.* 2006;27:297-322.
21. Karssemeijer EGA, Bossers WJR, Aaronson JA, Kessels RPC, Olde Rikkert MGM. The effect of an interactive cycling training on cognitive functioning in older adults with mild dementia: study protocol for a randomized controlled trial. *BMC Geriatr.* 2017;17(1):73.
22. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res.* 1975;12(3):189-198.
23. Groll DL, To T, Bombardier C, Wright JG. The development of a comorbidity index with physical function as the outcome. *J Clin Epidemiol.* 2005;58(6):595-602.
24. Watts S, Stenner P. *Doing Q Methodological Research: Theory, Method & Interpretation.* London, England: Sage; 2012.
25. Preston L, Marshall A, Bucks RS. Investigating the ways that older people cope with dementia: a qualitative study. *Ageing Ment Health.* 2007;11(2):131-143.
26. Testad I, Corbett A, Aarsland D, et al. The value of personalized psychosocial interventions to address behavioral and psychological symptoms in people with dementia living in care home settings: a systematic review. *Int Psychogeriatr.* 2014;26(7):1083-1098.
27. Baert V, Gorus E, Mets T, Geerts C, Bautmans I. Motivators and barriers for physical activity in the oldest old: a systematic review. *Ageing Res Rev.* 2011;10(4):464-474.
28. Pan SY, Cameron C, DesMeules M, Morrison H, Craig CL, Jiang X. Individual, social, environmental, and physical environmental correlates with physical activity among Canadians: a cross-sectional study. *BMC Public Health.* 2009;9:21.
29. Dementiafacts. DEMENTIAConsortiumWebsite. <http://www.dementiaconsortium.org/dementia-facts>. Published 2017. Accessed July 13, 2017.
30. Lee YS. Gender differences in physical activity and walking among older adults. *J Women Aging.* 2005;17(1/2):55-70.
31. Stewart S, O'Riley A, Edelstein B, Gould C. A preliminary comparison of three cognitive screening instruments in long term care: the MMSE, SLUMS, and MoCA. *Clin Gerontol.* 2012;35(1):57-75.

Appendix 1. Overview of Statements

Intrapersonal Level Statements

1. I want to be physically active, because it helps me to **retain my flexibility**.
2. I want to be physically active, because I have **knowledge about its potential benefits for my memory problems**.
3. I want to be physically active, because I **enjoyed physical activity in the past**.
4. I want to be physically active, because it has **beneficial health effects**.
5. I want to be physically active, because it makes me feel like **having a purpose**.
6. I want to be physically active, because I have **knowledge about the positive effects** of exercise.
7. I want to be physically active, because it makes me **feel free**.
8. I want to be physically active, because I **enjoy** it.
9. I want to be physically active, because it helps me **retain my self-reliance**.
10. I want to be physically active, because it helps me **retain my self-confidence**.
11. I want to be physically active, because it has **mental benefits**.
12. I want to be physically active, because it is **pleasant**.
13. I want to be physically active, because it has **physical benefits**.
14. I want to be physically active, because it **reduces feelings of frustration**.
15. I want to be physically active, because it helps making **new social contacts**.
16. I want to be physically active, because it **improves my mood**.
17. I want to be physically active, because it makes me **feel useful**.
18. I don't want to be physically active, because I am **unfamiliar** with the situation.
19. I don't want to be physically active, because I feel **dejected**.
20. I don't want to be physically active, because I have **loss of initiative**.
21. I don't want to be physically active, because I have **problems with my attention and memory**.
22. I don't want to be physically active, because I have **decreased energy levels**.
23. I don't want to be physically active, because I have been **inactive my entire life**.
24. I don't want to be physically active, because I have **loss of motivation**.
25. I don't want to be physically active, because I **feel forced**.
26. I don't want to be physically active, because of **physical problems**.
27. I don't want to be physically active, because I **suffer pain**.

28. I don't want to be physically active, because of **lack of trust**.
29. I don't want to be physically active, because I am **concerned about my well-being**.
30. I don't want to be physically active, because I **feel tired**

Interpersonal Level Statements

1. I want to be physically active, because my **spouse supports me**.
2. I want to be physically active, because a **professional supports me**.
3. I want to be physically active, because **professionals said** it would be good for me.
4. I want to be physically active, because then I can be with other people with whom I can **identify**.
5. I don't want to be physically active, because my **caregiver has health problems**.
6. I don't want to be physically active, because I **do not know many other people**.
7. I don't want to be physically active, because my **caregiver has doubts about potential benefits**.
8. I don't want to be physically active, because I feel like I am a **burden on others**.
9. I don't want to be physically active, because I **don't want to depend on others**.
10. I don't want to be physically active, because of others people **lack of understanding**.

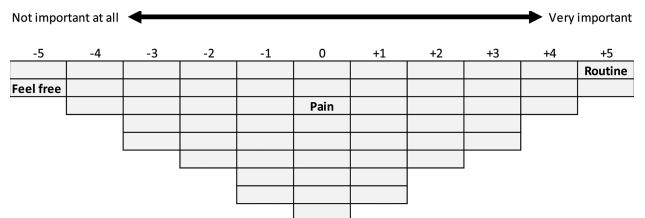
Community Level Statements

1. I want to be physically active, because I want to go **outdoors**.
2. I want to be physically active, because the **weather is good**.
3. I want to be physically active, because a **person is leading the activity**.
4. I want to be physically active, because it is a **routine**.
5. I want to be physically active, because the **environment is inviting**.
6. I don't want to be physically active, because I don't have any **transportation**.
7. I don't want to be physically active, because it is **time consuming**.
8. I don't want to be physically active, because I have **concerns regarding safety**.
9. I don't want to be physically active, because I am **afraid to get lost**.
10. I don't want to be physically active, because I **don't like structural exercises**.
11. I don't want to be physically active, because I **don't want to be away from home**.
12. I don't want to be physically active, because it makes me **lose my freedom**.
13. I don't want to be physically active, because the **weather is bad**.

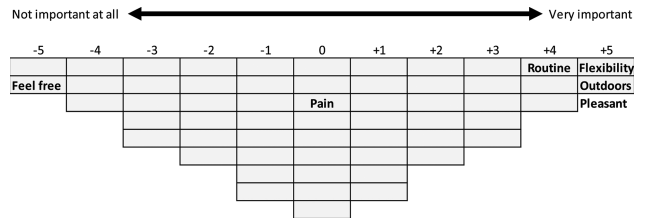
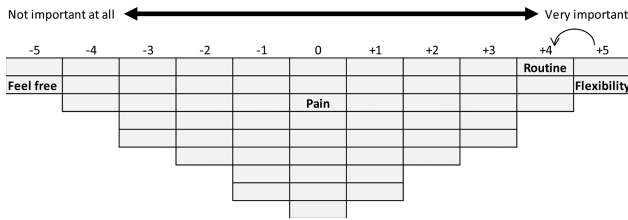
Appendix 2. Ranking Method Used by Informal Caregivers and Experts

Step 1: Fifty-three statements on barriers, motivators, and facilitators for PA participation were presented to the participants.

Step 2: Participants were instructed to sort the statements along a chosen continuum on a fixed grid. Participants assigned all 53 statements to one of the places on the grid, representing how important each statement was for PA participation. The columns have different values ranging from -5 (not important at all) to +5 (very important). The rows were not assigned values. For example, if participants thought that an activity *being a routine* was an important motivator, they placed this card in the last column. If participants thought that *feeling free* was not important for PA participation, they placed this card in the first column. If they did not have a strong opinion on the barrier *having pain*, they placed this card in the center.



Step 3: Participants were allowed to make changes or replace statements during this process. For example, if participants thought that the statement *retain flexibility* was more important than the statement *routine*, they could replace this statement.



Step 4: The grid was just a format, and participants were allowed to place statements outside the grid if necessary. For example, if they thought that the statements *retain flexibility, outdoors, and pleasant* were equally important, they could place them all in the last column.

Step 5: After participants placed all statements on the grid, statement scores were calculated. Each statement could receive a score of -5 (not important at all) to +5 (very important).

Appendix 3. Ranking of Persons With Dementia, Informal Caregivers, and Physiotherapy Experts

Ranking	Statement	Median	Interquartile Range	Min	Max
Persons with dementia					
1	Beneficial health effects	1.0	1.0-1.0	0.5	1.0
2	Physical benefits	1.0	0.5-1.0	0.0	1.0
3	Retain flexibility	1.0	0.5-1.0	0.0	1.0
4	Outdoors	0.6	0.5-1.0	0.0	1.0
5	Retain my self-reliance	0.6	0.5-1.0	0.0	1.0
6	Enjoyment	0.5	0.4-1.0	0.0	1.0
7	Enjoyed physical activity in the past	0.5	0.5-0.9	0.0	1.0
8	Pleasant	0.5	0.5-1.0	0.0	1.0
9	Feel useful	0.5	0.3-1.0	0.0	1.0
10	Feel free	0.5	0.0-1.0	0.0	1.0
11	Having a purpose	0.5	0.0-1.0	0.0	1.0
12	Mental benefits	0.5	0.0-1.0	0.0	1.0
13	Retain self-confidence	0.5	0.0-0.9	0.0	1.0
14	Improves mood	0.5	0.0-0.7	0.0	1.0
15	Good weather	0.5	0.0-0.9	0.0	1.0
16	Knowledge	0.5	0.0-0.6	0.0	1.0
17	Inviting environment	0.4	0.0-0.5	0.0	1.0
18	Knowledge about memory problems	0.3	0.0-0.7	0.0	1.0
19	New social contacts	0.3	0.0-0.6	0.0	1.0
20	Professional said	0.0	0.0-0.7	0.0	1.0
21	Support professional	0.0	0.0-0.5	0.0	1.0
22	Identify	0.0	0.0-0.5	0.0	1.0

(continues)

Ranking	Statement	Median	Interquartile Range	Min	Max
23	Person leading the activity	0.0	0.0-0.5	0.0	1.0
24	Spouse support	0.0	0.0-0.5	0.0	1.0
25	Routine	0.0	0.0-0.5	0.0	1.0
26	Bad weather	0.0	0.0-0.0	0.0	1.0
28	Reduces feelings of frustration	0.0	0.0-0.0	0.0	1.0
29	Problems with attention and my memory	0.0	0.0-0.0	0.0	1.0
30	Feel forced	0.0	0.0-0.0	0.0	1.0
31	Physical problems	0.0	0.0-0.0	0.0	1.0
32	Loss of initiative	0.0	0.0-0.0	0.0	0.5
33	Feel tired	0.0	0.0-0.0	0.0	0.5
34	Loss of motivation	0.0	0.0-0.0	0.0	0.5
35	Suffering from pain	0.0	0.0-0.0	0.0	0.5
36	Concerned about my well-being	0.0	0.0-0.0	0.0	0.5
37	Know other people	0.0	0.0-0.0	0.0	0.5
38	Structural exercises	0.0	0.0-0.0	0.0	0.5
39	To get lost	0.0	0.0-0.0	0.0	0.3
26	Concerns regarding safety	0.0	0.0-0.0	0.0	0.3
40	Burden on others	0.0	0.0-0.0	0.0	0.3
41	Loss of freedom	0.0	0.0-0.0	0.0	0.3
42	Time consuming	0.0	0.0-0.0	0.0	0.0
43	Caregiver has health problems	0.0	0.0-0.0	0.0	0.0
44	Transportation	0.0	0.0-0.0	0.0	0.0
45	Unfamiliar	0.0	0.0-0.0	0.0	0.0
46	Dejected	0.0	0.0-0.0	0.0	0.0

(continues)

Ranking	Statement	Median	Interquartile Range	Min	Max
47	Decreased energy levels	0.0	0.0-0.0	0.0	0.0
48	Inactive	0.0	0.0-0.0	0.0	0.0
49	Lack of trust	0.0	0.0-0.0	0.0	0.0
50	Doubts about potential benefits	0.0	0.0-0.0	0.0	0.0
51	Away from home	0.0	0.0-0.0	0.0	0.0
52	Dependent	0.0	0.0-0.0	0.0	0.0
53	Lack of understanding	0.0	0.0-0.0	0.0	0.0
Informal caregivers					
1	Beneficial health effects	3.0	2.0-5.0	0	5
2	Physical benefits	2.5	1.0-4.0	-1	5
3	Person leading the activity	2.5	0.3-3.0	-3	5
4	Enjoyment	2.0	1.0-3.0	-2	5
5	Good weather	2.0	1.3-3.0	-2	5
6	Pleasant	2.0	1.0-3.8	-1	4
7	Outdoors	2.0	0.3-3.8	-2	5
8	Retain flexibility	2.0	0.0-3.0	-3	5
9	Mental benefits	1.5	0.3-3.0	-1	5
10	Support professional	1.5	0.3-2.8	-5	5
11	Routine	1.0	0.0-2.8	-1	5
12	Enjoyed physical activity in the past	1.0	0.0-2.8	-4	5
13	Having a purpose	1.0	-0.8 to 3.0	-3	4
14	Knowledge about memory problems	1.0	-0.8 to 2.0	-3	5
15	Feel free	1.0	0.0-2.8	-3	4
16	Bad weather	1.0	-0.8 to 3.0	-5	5
17	Feel useful	1.0	-0.8 to 2.8	-4	5
18	Spouse support	1.0	0.0-2.8	-3	4
19	Inviting environment	1.0	0.0-2.0	-2	3
20	Professional said	1.0	0.0-2.0	-5	3
21	Retain my self-reliance	1.0	-1.8 to 2.0	-3	4
22	Feel tired	1.0	-3.8 to 2.8	-5	4
23	Retain self-confidence	0.5	-1.0 to 1.8	-3	5

(continues)

Ranking	Statement	Median	Interquartile Range	Min	Max
24	New social contacts	0.0	-1.0 to 3.0	-4	5
25	Loss of initiative	0.0	-0.8 to 3.0	-2	5
26	Knowledge	0.0	-0.8 to 2.0	-4	3
27	Improves mood	0.0	-2.0 to 2.0	-4	5
28	Transportation	0.0	-2.0 to 1.0	-5	4
29	Unfamiliar	0.0	-1.0 to 1.0	-4	5
30	To get lost	0.0	-2.0 to 2.8	-5	4
31	Decreased energy levels	-0.5	-1.8 to 1.5	-3	4
32	Dejected	-0.5	-2.0 to 1.0	-4	3
33	Physical problems	-0.5	-2.8 to 2.0	-5	4
34	Loss of motivation	-0.5	-2.0 to 1.0	-4	4
35	Identify	-0.5	-1.8 to 0.0	-5	2
36	Suffering from pain	-1.0	-2.8 to 2.0	-4	5
37	Know other people	-1.0	-2.8 to 0.0	-4	5
38	Problems with attention and my memory	-1.0	-2.0 to 0.0	-5	2
39	Concerns regarding safety	-1.0	-2.0 to 0.0	-5	2
40	Away from home	-1.0	-3.0 to -1.0	-4	4
41	Caregiver has health problems	-1.0	-4.0 to 0.0	-5	2
42	Lack of understanding	-1.5	-3.0 to 0.0	-5	3
43	Time consuming	-1.5	-2.0 to 0.0	-5	2
44	Dependent	-1.5	-3.0 to 1.0	-5	4
45	Structural exercises	-1.5	-3.0 to 1.0	-4	0
46	Feel forced	-2.0	-3.0 to 0.0	-5	4
47	Lack of trust	-2.0	-2.8 to 0.0	-4	4
48	Reduces feelings of frustration	-2.0	-3.0 to 2.5	-4	4
49	Caregivers doubts about potential benefits	-2.0	-3.8 to 1.0	-5	0
50	Inactive	-2.5	-4.0 to 1.0	-5	2
51	Concerned about my well-being	-2.5	-4.0 to 1.0	-5	0
52	Burden on others	-3.0	-4.0 to 1.0	-5	2
53	Loss of freedom	-4.0	-5.0 to 2.0	-5	0

(continues)

Ranking	Statement	Median	Interquartile Range	Min	Max
Experts					
1	Loss of initiative	3.0	2.0-4.0	0	5
2	Pleasant	3.0	1.0-3.0	0	5
3	Retain my self-reliance	3.0	1.0-5.0	-2	5
4	Suffering from pain	3.0	1.0-4.0	-1	5
5	Feel tired	3.0	1.0-5.0	-1	5
6	Enjoyment	3.0	1.0-3.0	-1	5
7	Dejected	3.0	1.0-3.0	-2	5
8	Physical problems	2.0	1.0-4.0	-3	5
9	Spouse support	2.0	0.0-4.0	-1	4
10	Person leading the activity	2.0	1.0-3.0	0	4
11	Loss of motivation	2.0	0.0-4.0	-3	5
12	Enjoyed physical activity in the past	2.0	1.0-3.0	-2	4
13	Decreased energy levels	2.0	0.0-3.0	-2	5
14	Inactive	2.0	0.0-3.0	-3	3
15	Beneficial health effects	1.0	0.0-1.0	-2	4
16	Support professional	1.0	1.0-3.0	-3	4
17	Concerns regarding safety	1.0	-1.0 to 3.0	-4	4
18	Professional said	1.0	0.0-1.0	-3	3
19	Physical benefits	1.0	0.0-1.0	-1	2
20	Routine	1.0	-1.0 to 2.0	-4	4
21	Inviting environment	1.0	-1.0 to 2.0	-3	4
22	Retain self-confidence	1.0	-1.0 to 1.0	-4	5
23	Feel forced	1.0	-2.0 to 2.0	-4	3
24	Outdoors	0.0	0.0-2.0	-1	5
25	Unfamiliar	0.0	-1.0 to 2.0	-3	4
26	Feel free	0.0	-1.0 to 1.0	-3	3

(continues)

Ranking	Statement	Median	Interquartile Range	Min	Max
27	Lack of trust	0.0	-1.0 to 1.0	-4	5
28	Dependent	0.0	-1.0 to 2.0	-4	5
29	Feel useful	0.0	-1.0 to 2.0	-4	4
30	Know other people	0.0	-2.0 to 2.0	-4	4
31	Having a purpose	0.0	-2.0 to 2.0	-3	3
32	Doubts about potential benefits	0.0	-2.0 to 2.0	-5	3
33	Improves mood	0.0	-1.0 to 0.0	-3	1
34	New social contacts	0.0	-4.0 to 1.0	-5	3
35	Identify	0.0	-4.0 to 0.0	-5	1
36	Transportation	-1.0	-2.0 to 4.0	-4	5
37	Retain flexibility	-1.0	-2.0 to 2.0	-4	3
38	Problems with attention and my memory	-1.0	-2.0 to 1.0	-3	2
39	To get lost	-1.0	-2.0 to 1.0	-4	3
40	Burden on others	-1.0	-2.0 to 0.0	-4	3
41	Away from home	-1.0	-2.0 to 1.0	-3	1
42	Good weather	-1.0	-3.0 to 0.0	-4	3
43	Bad weather	-1.0	-2.0 to 1.0	-4	1
44	Lack of understanding	-1.0	-3.0 to 0.0	-5	2
45	Knowledge	-1.0	-3.0 to 0.0	-5	1
46	Knowledge about memory problems	-2.0	-3.0 to 0.0	-4	2
47	Mental benefits	-2.0	-3.0 to 0.0	-4	2
48	Structural exercises	-2.0	-3.0 to 0.0	-5	1
49	Reduces feelings of frustration	-2.0	-3.0 to 1.0	-5	0
50	Concerned about my well-being	-2.0	-3.0 to 1.0	-5	1
51	Time consuming	-2.0	-4.0 to 2.0	-5	0
52	Caregiver has health problems	-3.0	-3.0 to 2.0	-5	5
53	Loss of freedom	-4.0	-5.0 to 2.0	-5	2