ORIGINAL RESEARCH

Perspectives of Persons with Memory Changes and Care Partners for Reducing Barriers to Community Wellness Programs

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ABSTRACT

Existing research demonstrates that community-dwelling persons with memory changes (PWMC) (including dementia) and care partners (CPs) benefit from nutrition and exercise, especially for frailty and sarcopenia prevention. However, needs and preferences for wellness programs are still unknown. The objective of this eight-month online survey study was to explore PWMCs' (n=24) and CPs' (n=46) perspectives on nutrition/exercise barriers and their preferences for program content and format to inform a community wellness program. PWMC self-reported, while CPs reported for themselves and their cared-for person with dementia (CPWD). Descriptive analyses revealed that 78% of PWMC, 64% of CPs, and 39% CPWDs were interested in a wellness program that combined nutrition and exercise. Content preferences varied (e.g., 45% of CPs were interested in yoga/Pilates, but only five percent of CPWD were interested). Over half of the participants preferred online delivery for nutritional information (55% PWMC, 54% CP). Group fitness was popular for exercise among all groups. In addition, participants prioritized attending as dyads twice or more per week, closeness to home, reasonable cost, knowledgeable instructors, a fun social environment, and beginner-friendliness. To conclude, greater consideration for flexibility in program content and format will help to meet these diverse needs and preferences.

INTRODUCTION

Globally, dementia is one of five major causes of death.[1] Healthy diet and exercise are associated with improved well-being of persons living with dementia, mild cognitive impairment (MCI), or other memory changes (together referred to as persons with memory changes (PWMC)).[2,3] Almost 60% of PWMC and one-third of their paid or family/friend care partners (CPs) are at nutrition risk, which is associated with higher levels of required care and hospitalization.[4,5] Nutritional concerns for PWMC include, but are not limited to weight loss, forgetting/refusing to eat, dysphagia, and appetite loss, which can lead to sarcopenia and frailty.[6,7] Food-related activities comprise a large proportion of CPs' care burden due to stress, tension, anxiety, and negative attitudes from pressure to provide nutritious meals for their loved one with dementia.[8-10] Furthermore, many older adults today are inactive, including those with memory changes[11], yet, both aerobic and resistance exercise improve functional abilities, cognitive function, mental health, and body composition, regardless of cognitive status.[12-14] Exercise is a key strategy in preventing sarcopenia and frailty[15,16], and programs that promote wellness and reduce frailty risk in PWMC are crucial.[17] Establishing a community program that unites exercise, nutrition, and social well-being can be beneficial for PWMCs and their CPs. Moreover, understanding CPs' and PWMCs' barriers to and preferences for wellness programs will help develop interventions that are likely to be adopted in practice.[18] This study explored perspectives on barriers for exercise/wellness programs, challenges in eating well and being active, and wellness program content and format preferences to inform a future community program.

METHODS

Population

A convenience sample of persons self-identifying as either a PWMC (dementia, MCI, or memory changes) or family or friend CP (unpaid, informal) was recruited using snowball and convenience sampling, a method used to identify hard-to-reach groups.[19] Notice of the online surveys was disseminated through stakeholders (e.g., the Alzheimer Society of Canada, Active Aging Canada, the Research Institute for Aging, and a Neurological Patient Database), Twitter, member email blasts,

newsletters, and website postings. Telephone or mail questionnaire options were provided. Ethics clearance was provided by an ethics review board at the University of Waterloo (ORE# 40753). A checkbox on the online form was used to indicate informed consent, and respondents were directed to the appropriate survey after identifying as a PWMC or a CP. As part of the ethics requirement, respondents could opt out of completing specific questions.

Design

After providing informed consent, respondents were directed to the appropriate survey: (1) PWMC survey and (2) CP survey wherein CPs provided answers for themselves and on behalf of their cared-for person with dementia (CPWD). A literature review informed questionnaire content (e.g., potential eating challenges) and program delivery modes (e.g., group vs. individual). Questions were vetted by the research team (authors of this study), doctorate-holding dementia experts, the Waterloo Regional Dementia Advisory Group, and researchers experienced in question construction.

For both PWMC and CPs, the survey consisted of three sections: demographics, food and nutrition, and exercise. The CP questionnaire also included items specific to their CPWD, which were consistent with questions from the PWMC version. The survey consisted of 24 (PWMC version) and 26 questions (CP version); demographic-related questions included gender, ethnicity (multiple select), age, time of dementia diagnosis (or time living with memory changes), province/territory of residence, and living arrangements. These questions had multiple choice answers for participants to select. There was one open-ended question at the end of the questionnaire. Nutrition challenges were self-reported from a list of 15 items. Exercise frequency was evaluated using a five-point scale (never to daily). Respondents also selected barriers to participation in exercise and reported preferences for exercise type, location, and format. An open-ended question allowed respondents to describe their ideal community wellness program. Questionnaires were uploaded to Qualtrics XM Survey Software, pretested by six older adults from a local care home (including one CP), and published in English and French on May 27th, 2019 (closed January 31st, 2020). Data collected did not encompass challenges that people may have faced due to the pandemic or associated countermeasures. Our survey did not include any pandemic-specific questions (e.g., challenges exercising due to recreation facility closures). As there was no primary outcome, a sample size estimation was not conducted; limitations of this small sample are discussed after Results.

Analyses

Question responses were summed for analyses where appropriate by totalling frequencies for each response per multiple choice question. Program preference was categorized as nutrition only, exercise only, combined lifestyle approach, and not interested. Exercise types were grouped as: class-based exercise, other structured exercise, other independent exercise (including walking), and sport-like exercise. Statistical analysis was primarily descriptive; associations explored whether desired program content and format varied by age, gender, and length of time since diagnosis, using the Fisher-Freeman-Halton test with adjusted standardized residuals (ASRs) for post-hoc testing. Statistical significance was determined by ASR>|1.96|. To determine differences in the number of challenges between PWMC and CPWD, independent t-tests were used ($p<0.05$). Researchers employed Microsoft® Excel Version 16.35 and IBM SPSS® Statistics Version 26. Content of open response text responses were also analyzed by grouping together similar responses (e.g staff, lack of time, scheduling, etc.) into descriptive categories (e.g., ability levels, staff, etc.).

RESULTS

Of the respondents, 46 were CPs (66%) and 24 were PWMCs (34%). All respondents completed online surveys, with the vast majority being completed (95%) in English. Response rates varied by question as participants were given the opportunity to opt out of any question. Table 1 summarizes demographic characteristics. About one-third (35%) of PWMC reported not being formally diagnosed with dementia/MCI, and 40% had been living with memory changes for under five years. Forty-five percent of PWMC were women and most CPs were women (93%). Most CPWD had been formally diagnosed (93%) with dementia/MCI, with 63% having received a diagnosis within the past five years. Approximately 45% of PWMC self-reported daily exercise, while CPs reported that only 14% of CPWD exercised daily. For a few of the respondents, exercise and nutrition were reported as having worsened after being a CP (82% excellent/good nutrition rating before and 73% rating after becoming a CP). Open text responses indicated that this change in self-rated nutrition for these CPs was due to lack of time and decreased motivation to cook.

Nutrition challenges and exercise barriers for PWMC and CPWD are indicated in Figure 1a, 1b, and 1c. Interest in making meals (69%), increased or decreased appetite (69%),

difficulty deciding what to make (65%), and weight change (65%) were the most frequent nutritional challenges for CPWD. Common challenges reported by CPs were: stress affecting motivation to eat well (19%), poor appetite (8%), lack of time for exercise (45%), low motivation (14%), and physical limitations (9%). PWMC reported weather (60%), limited mobility (47%), health condition(40%) and cost (40%) as key barriers to exercise, and difficulty in deciding what to eat/cook was their most common nutrition challenge (65%). Based on a Fisher-Freeman-Halton test, longer time since dementia diagnosis (more than five years, compared to being diagnosed within the past five years) was significantly associated with more overall reported nutritional or exercise challenges (p=0.049).

Respondent program preferences are indicated in Table 2. Over half of PWMC and CPs were interested in learning about nutrition, especially identifying nutritious food (53% and 52% respectively) and cooking easy, healthy meals (53% and 44% respectively). The preferred delivery method for nutrition education was online (PWMC 55%; CPs 54%). Print (50% PWMC, 38% CP) and in-person delivery with health professionals (40% PWMC, 38% CP) were also highly ranked. More than half of PWMC (58%) and most CPs (82%) were interested in being more active. Exercise preferences were diverse (e.g., 45% of CPs were interested in yoga or Pilates, but only 5% of CPWD reported this interest), although tretching, balance, walking, and lifting weights were most favoured across all three groups (PWMC, CPs, and CPWD). Many wanted to participate in an exercise group two or more times a week (61% of PWMC, 50% of CPs, and 47% of CPWDs, as reported by their CPs). PWMC were interested in group exercise classes (56%), although training with a friend (39%) or loved one (39%) was also popular. Similarly, most CPs (64%) preferred exercising with their CPWD. The most popular exercise locations for PWMC were fitness centres (61%), outdoors (44%) and community centres (44%). Ultimately, 78% of PWMC, 64% of CPs, and 39% CPWDs were interested in a wellness program that combined nutrition and exercise.

Open-text responses provided further insight into participant views. As with all questions on the survey, completion of open-text responses was optional. PWMC reported that their mental/emotional health challenges could influence participation in a community program. Social aspects, including supportive, understanding, and friendly instructors and classmates, were considered essential. CPs commented on lack of time, noting that appropriate scheduling was essential due to other commitments (e.g., work, children, etc.). The ideal community wellness program would be: age-appropriate; cater to different ability levels; close to home; taught in small groups by kind, helpful staff; and offer social opportunities. Some CPs indicated in this section that they would prefer a split program, where CPs and their CPWD learn different exercises.

TABLE 1. Demographic characteristics of respondents

	Persons with memory changes (%)	Care partners (%)	Cared-for persons with dementia, as reported by care partners (%)
Time since formal dementia diagnosis			
>5 years	25[a]	—	30[b]
<5 years	40	—	63
Not formally diagnosed	35	—	7
Age			
<60 years	40[a]	32[c]	4[d]
60-79 years	45	61	44
>80 years	15	7	52
Gender			
Women	45[a]	93[c]	39[c]
Ethnicity[e]			
Canadian	75[a]	68[c]	68[c]
European	45	50	64
Province or territory			
Ontario	90[a]	76[f]	—
Another Canadian province	5	24	—
Not from Canada	5	—	—
Living situation			
With spouse	40[a]	—	—
Alone	30	—	—
With spouse and other family	15	—	—
Other	10	—	—
With other family member(s)	5	—	—
Living situation			
Living with cared-for person	—	52[f]	—
Not living with cared-for person	—	48	—
Urban or rural dwelling			
Urban	80[a]	89[c]	—
Perception of current nutrition			
Excellent	21[g]	33[h]	23[i]
Good	47	40	19
Average or fair	32	9	39
Poor or terrible	—	18	19
Exercise over the past month			
Every day or almost every day	45[a]	50[j]	14[k]
A few times a week	55	29	54
Once per week	0	8	18
Never	0	13	14
Self-reported nutrition status before becoming a care partner			
Excellent/good	—	82[l]	—
Self-reported nutrition status after becoming a care partner			
Excellent/good	—	73[h]	—
Self-reported exercise status before becoming a care partner			
Excellent/good	—	64[l]	—
Self-reported exercise status after becoming a care partner			
Excellent/good	—	57[h]	—

— indicates that this question or option was not available

Number of respondents: [a]20; [b]30; [c]28; [d]27; [e]Text box for respondents to complete with categories not mutually exclusive; [f]29; [g]19; [h]33; [i]26; [j]24; [k]22; [l]34

FIGURE 1a - Bar graph demonstrating food-related challenges of people with memory changes and cared-for people with dementia

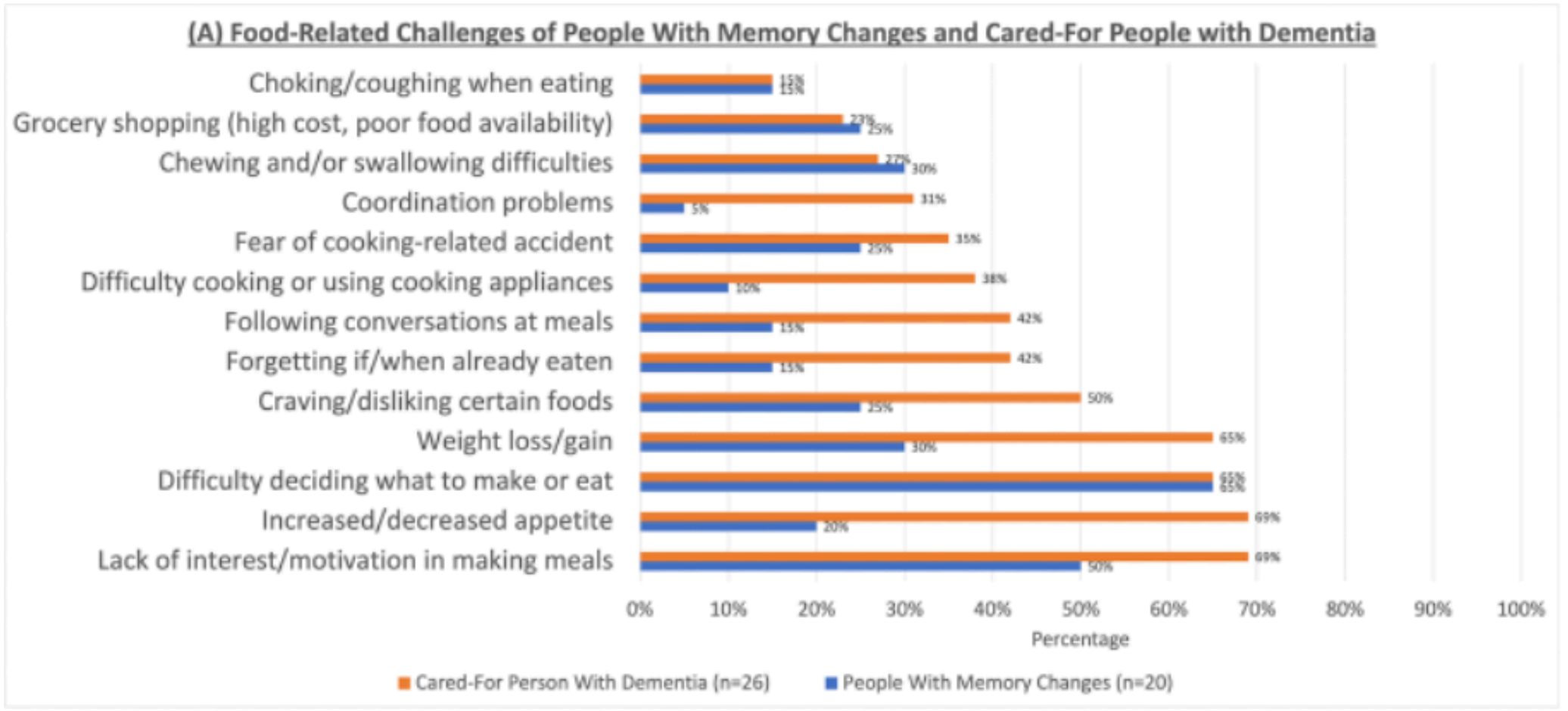

FIGURE 1b - Bar graph demonstrating exercise-related challenges of people with memory changes and cared-for people with dementia

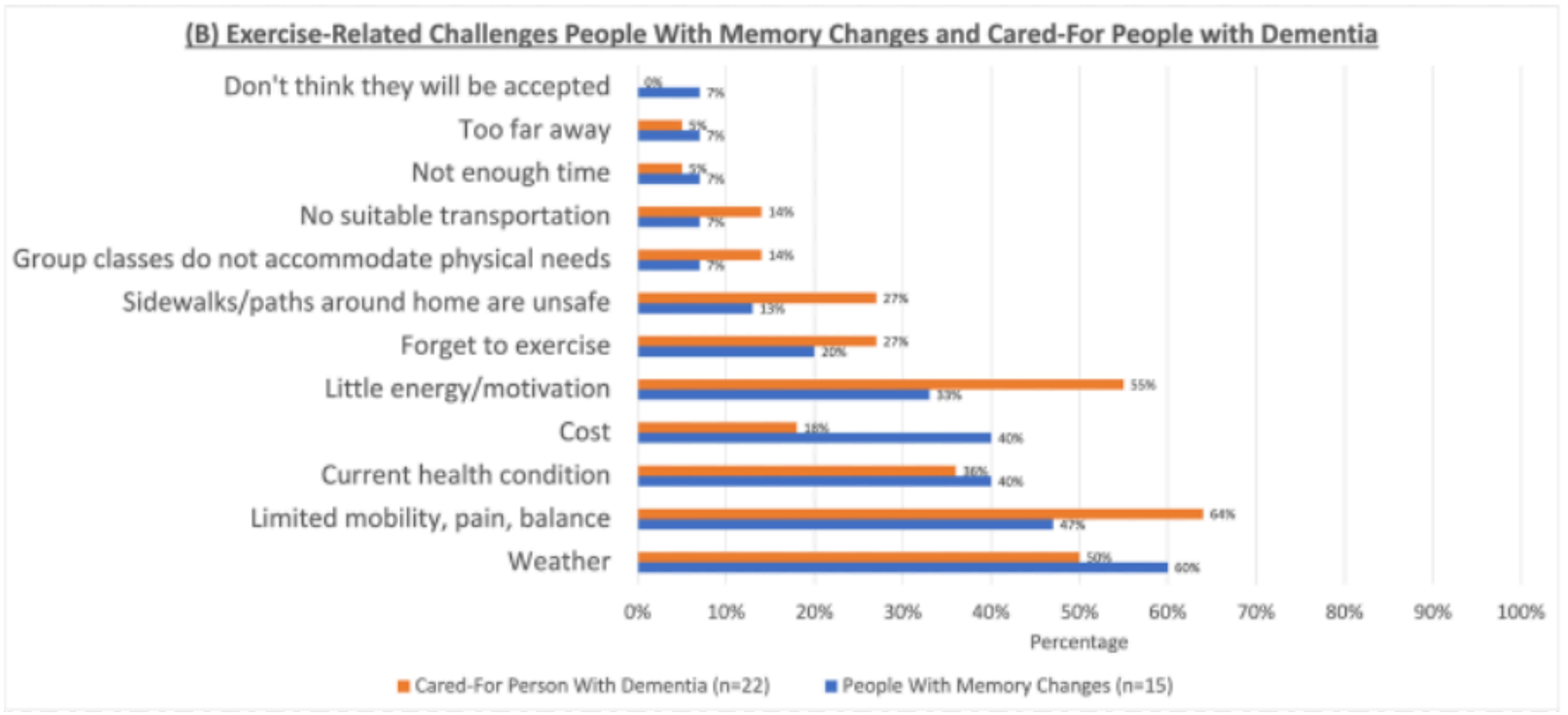

FIGURE 1c - Bar graph demonstrating care partner challenges

TABLE 2. Respondent preferences for community food, nutrition, and exercise wellness programs

	Persons with memory changes (%)	Care partners (%)	Cared-for persons with dementia, reported by care partners (%)
Nutrition topics of interest[a]			
Identifying nutritious foods	53[b]	52[c]	—
Cooking easy, healthy meals	53	44	—
Weight loss/gain	37	40	—
Hydration	37	44	—
Understanding nutrition labels	32	24	—
Managing eating challenges	32	36	—
Evaluating different diets	11	40	—
Preferred method of nutrition education delivery[a]			
Online	55[d]	54[e]	—
Print	50	38	—
In-person presentations	40	38	—
Health professional	55	35	—
Not interested	5	31	—
Interest in being more active			
Yes	58[b]	82[f]	18[f]
No	16	14	36
Not sure	26	4	46
Desired frequency of an exercise group			
Never	17[g]	18[f]	31[b]
<1 time per week	5	4	0
Once per week	6	14	11
≥2 times per week	61	50	47
Other	11	14	11
Exercises of interest[a]			
Stretching	79[h]	73[f]	50[f]
Balance exercises	68	68	41
Lifting weights	53	36	23
Walking	53	73	50
Cycling	47	14	0
Other strength exercises	32	55	36
Yoga or Pilates	32	45	5
Chair exercises	11	5	36
Most important factors for choosing an exercise group/program[a]			
Closeness to home	56[g]	73[f]	64[f]
Knowledgeable instructors	56	50	32
Reasonable cost	50	55	50
Fun, social environment	44	64	59
Beginner-friendly	28	36	59

Exercise companions[a]			
With loved one	39[g]	64[f]	—
Alone	33	14	—
Not interested	—	23	—
Group classes	56	—	—
Friend	39	—	—
Personalized individual training	33	—	—
Preferred exercise location[a]			
Fitness centre	61[g]	—	—
Outdoors	44	—	—
Community centre	44	—	—
Home or in my building	33	—	—

— indicates that this question or option was not available

[a]Multiple select

Number of respondents: [b]19; [c]25; [d]20; [e]26; [f]22; [g]18; [h]19

DISCUSSION

This study sought to investigate the perspectives of community-dwelling PWMC and CPs (reporting for themselves and CPWD) on nutrition/exercise challenges and wellness program preferences to inform a community program. For future planning of wellness programs, many participants were interested in attending as dyads two or more times per week, at sites that were close to home, and were of a reasonable cost. Having knowledgeable instructors and a fun, social, and beginner-friendly environment were also important to respondents.

In previous research, community wellness programs (although not always specific to PWMC and CPs) have improved mobility, functional ability, knowledge, confidence, and competence with healthy eating.[20–23] There also exists reasonable literature on exercise programming and their specific benefits for PWMC. With group classes, attendees would further benefit from social engagement and peer support, which increases feelings of inclusion (building a sense of community) and can improve quality of life.[24] CPs may also experience health benefits from such a program, especially since our survey results identified that perceived exercise and nutrition status worsened upon becoming a CP.

Moreover, in line with published literature, PWMC, CPs, and CPWD (CP-reported) listed challenges with appetite, weight change, low fruit and vegetable intake, chewing and swallowing, and dietary restrictions.[17,25] All three groups of participants (PWMC, CPs, and CPWD) may find strategy-driven education sessions useful and applicable. Mealtime routines and relationships between PWMC and their CPs change with dementia progression.[25,26] Specifically, as dementia progressively worsens, cooking- and food preparation-related abilities for PWMC may change and become more difficult. Therefore, it is important to bear in mind the variable experiences of individuals in their dementia journey, thereby highlighting the need for dynamic, adaptable, and tailored programming. Consistent with past research, major exercise barriers reported by PWMC and CPWD herein were consistent with those identified by a systematic review, including bad weather, poor health and function, decreased energy, and loss

of motivation and resources.22 In the present study, we observed that most of the challenges experienced by respondents — regarding both food/nutrition and exercise—were individual-level barriers (e.g., lack of time). With thorough planning, a well-structured and effectively delivered program may be able to overcome challenges associated with health and function, motivation, and energy.

Exercise barriers were similar among CPs and PWMC, although insufficient time was more frequently reported among CPs. Insufficient time is a common barrier reported by older adults more broadly.23 The most important factors for choosing an exercise group or program had varied between the three groups, although similiarities can be found between them as well. As all three groups (PWMC, CP, CPWD) valued having a program that was close to home, programs at specialty sites (rehabilitation or healthcare sites, for instance) are likely not sufficient to meet their needs. Therefore, all three groups (PWMC, CPs, and CPWD) may benefit from programs that take place in their local facilities, such as community or recreation centres. PWMC and CPs also prioritized the cost of the program, indicating the need for affordable and accessible community programming. CP and CPWD valued a fun and social environment. A beginner-friendly environment was most important among CPWD. Thus, it is important that program facilitators and instructors are well-trained in inclusive language and able to make new attendees feel welcome. These preferred elements should be taken into consideration for future program design and development to improve their feasibility and acceptability.

Ultimately, content and format of community programs to support PWMC, CPs, and CPWD need flexibility and tailoring to individual challenges and preferences.20,21,24 The CPs' role as a supportive partner for CPWD must also be considered in wellness programming.[17,26] In addition to adaptable content, these findings support the need to reduce barriers via flexible delivery (e.g., online). Technology-based tools as a means for educating PWMC and CPs on food, nutrition, and exercise may be of interest for future studies.

Strengths

Our online survey was available across Canada in both English and French (telephone and mail options also available), which addressed specific geographical and language barriers. Multiple-select answers provided respondents with the opportunity to choose all applicable answers. There are differences in the experience of living with dementia, and we addressed this by constructing one open-ended questions for respondents to elaborate on their own challenges and preferences surrounding food, nutrition, and exercise.

Limitations

Generalizability of these results is limited due to the small sample and that eligible participants required internet access and literacy.[25] Online questionnaires are a feasible method of surveying older adults, but they are limited in representing a sample size with internet access.[31] As such, due to the online nature of the survey, our findings may be biased towards tech-friendly solutions. Respondents were mostly English-speaking Ontarians (Table 1). Our sample is biased towards those already interested in health—particularly food, nutrition, and exercise. Self-report questionnaires are subject to social desirability bias and respondent interpretation. Furthermore, the predicted duration of our survey, according to Qualtrics Survey Software, was 15.5 minutes; Qualtrics indicates that questionnaires tend to have substantial respondent break-off if they take longer than twelve minutes.[32] Online questionnaires are also accompanied by the potential for misunderstanding. As there is no interviewer to make clarifications, questions may be interpreted differently by respondents. Due to limited research on community-dwelling PWMC, there is a need to recruit representative random samples of older adults in the community—especially from equity-deserving groups—in the future. Finally, our survey was created and conducted prior to the COVID-19 pandemic. Since then, online exercise programming, especially for groups with significant health or functional challenges, has seen ample improvement. Such improvements over the past two years have dramatically accelerated our ability to support persons living with dementia and their CPs in exercise programming online.33 Future researchers must be mindful of the aforementioned limitations and aim to recruit a more diverse sample in relation to technological literacy, geography, etc. Future studies may also wish to investigate how a low-cost program can be established and implemented to support this group.

CONCLUSION

This study aimed to understand nutrition and exercise-related challenges and program preferences of PWMC and their CPs to guide wellness program planning. Many PWMC, CPs, and CPWD (reported by their CPs) experienced challenges surrounding food intake, meal preparation, time, and motivation. In terms of exercise, participants seeked to exercise twice or more times per week, though many experienced challenges with weather, mobility, balance, pain,

energy, time, and existing health conditions. While most were interested in a community wellness program encompassing nutrition and exercise, specific preferences for activities and delivery modes were diverse; hence, future programs for this demographic require flexibility in both content and delivery.

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CONFLICTS OF INTREST

The authors have no conflicts of interest to declare.

OTHER DISCLOSURES

The authors have nothing to disclose.

Key Words: Community-dwelling; Older adults; Dementia; Caregiver; Nutrition; Exercise

REFERENCES

1. Nichols E, Szoeke CEI, Vollset SE, Abbasi N, Abd-Allah F, Abdela J, et al. Global, regional, and national burden of Alzheimer's disease and other dementias, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016.LancetNeurol.2019.https://www.thelancet.com/journals/laneur/article/PIIS1474-4422(18)30403-4/fulltext

2. George EK, Hemachandra Reddy P. Can healthy diets, regular exercise, and better lifestyle delay the progression of dementia in elderly individuals? J Alzheimer's Dis. 2019. https://pubmed.ncbi.nlm.nih.gov/31227652/

3. Zhao C, Noble JM, Marder K, Hartman JS, Gu Y, Scarmeas N. Dietary patterns, physical activity, sleep, and risk for dementia and cognitive decline. Curr. Nutr. Rep. 2018. https://pubmed.ncbi.nlm.nih.gov/30413973/

4. Rullier L, Lagarde A, Bouisson J, Bergua V, Barberger-Gateau P. Nutritional status of community-dwelling older people with dementia: Associations with individual and family caregivers' characteristics. Int J Geriatr Psychiatry. 2013. https://pubmed.ncbi.nlm.nih.gov/22821728/

5. Enoki H, Sugiyama M, Izawa S, Hirose T, Hasegawa J, Iguchi A, et al. Factors associated with malnutrition in Community-Dwelling disabled Elderly (the Kanagawa-Aichi disabled elderly cohort (Kaidec) study). Jpn J Geriatr. 2014. https://pubmed.ncbi.nlm.nih.gov/25749326/

6. Keller HH, Smith D, Kasdorf C, Dupuis S, Schindel Martin L, Edward G, et al. Nutrition education needs and resources for dementia care in the community. Am J.Alzheimers.Dis.Other.Demen.2008.https://pubmed.ncbi.nlm.nih.gov/18276954/

7. Kimura A, Sugimoto T, Niida S, Toba K, Sakurai T. Association between appetite and sarcopenia in patients with mild cognitive impairment and early-stage Alzheimer's Disease: a case-control study. Front Nutr. 2018. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6305366/

8. Atta-Konadu E, Keller HH, Daly K. The food-related role shift experiences of spousal male care partners and their wives with dementia. J Aging Stud. 2011. https://www.infona.pl/resource/bwmeta1.element.elsevier-ef5ad706-8dc9-3bbf-a20c-18196c7da1a3

9. Ball L, Jansen S, Desbrow B, Morgan K, Moyle W, Hughes R. Experiences and nutrition support strategies in dementia care: Lessons from family carers. Nutr Diet. 2015. https://onlinelibrary.wiley.com/doi/abs/10.1111/1747-0080.12107

10. Hsiao HC, Chao HC, Wang JJ. Features of problematic eating behaviors among community-dwelling older adults with dementia: family caregivers' experience.Geriatr.Nur.(Lond)..2013. https://pubmed.ncbi.nlm.nih.gov/23849671/

11. Miller MJ, Cenzer I, Barnes DE, Covinsky KE. Physical inactivity in older adults with cognitive impairment without dementia: room for improvement. Aging Clin Exp Res. \2022;34(4):837-845. doi:10.1007/s40520-021-01999-5

12. Northey JM, Cherbuin N, Pumpa KL, Smee DJ, Rattray B. Exercise interventions for cognitive function in adults older than 50: A systematic review with meta-analysis. BJSM. 2018. https://pubmed.ncbi.nlm.nih.gov/28438770/

13. Tremblay MS, Warburton DER, Janssen I, Paterson DH, Latimer AE, Rhodes RE, et al. New Canadian physical activity guidelines. APNM. 2011. https://pubmed.ncbi.nlm.nih.gov/21326376/

14. Forbes D, Forbes SC, Blake CM, Thiessen EJ, Forbes S. Exercise programs for peoplewithdementia.CDSR.2015.https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD006489.pub4/full

15. Angulo J, El Assar M, Álvarez-Bustos A, Rodríguez-Mañas L. Physical activity and exercise: Strategies to manage frailty. Redox Biology. 2020. https://pubmed.ncbi.nlm.nih.gov/32234291/

16. Watanabe Y, Yamada Y, Yoshida T, Yokoyama K, Miyake M, Yamagata E, et al. Comprehensive geriatric intervention in community-dwelling older adults: a cluster-randomized controlled trial. J Cachexia Sarcopenia Muscle. 2020. https://pubmed.ncbi.nlm.nih.gov/31997543/

17. Mole L, Kent B, Abbott R, Wood C, Hickson M. The nutritional care of people living with dementia at home: A scoping review. Health Soc. Care Community. 2018. https://pubmed.ncbi.nlm.nih.gov/29365369/

18. Tatangelo G, McCabe M, Macleod A, You E. "I just don't focus on my needs." The unmet health needs of partner and offspring caregivers of people with dementia: A qualitative study. Int J Nurs Stud. 2018. https://pubmed.ncbi.nlm.nih.gov/28982034/

19. Shaghaghi A, Bhopal RS, Sheikh A. Approaches to recruiting "hard-to-reach" populations into re-search: a review of the literature. Health Promot Perspect. 2011. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3963617/

20. Marshall S, Agarwal E, Young A, Isenring E. Role of domiciliary and family carers in individualised nutrition support for older adults living in the community. Maturitas. 2017. https://pubmed.ncbi.nlm.nih.gov/28274324/

21. Keller HH, Østbye T, Goy R. Nutritional risk predicts quality of life in elderly community-living Canadians. J Gerontol - Ser Biol Sci Med Sci. 2004. https://pubmed.ncbi.nlm.nih.gov/14718488/

22. Moreau M, Plourde H, Hendrickson-Nelson M, Martin J. Efficacy of nutrition education-based cooking workshops in community-dwelling adults aged 50 years and older. J Nutr Gerontol Geriatr. 2015. https://pubmed.ncbi.nlm.nih.gov/26571355/

23. Seino S, Nishi M, Murayama H, Narita M, Yokoyama Y, Nofuji Y, et al. Effects of a multifactorial intervention comprising resistance exercise, nutritional and psychosocial programs on frailty and functional health in community-dwelling older adults: A randomized, controlled, cross-over trial. Geriatr Gerontol Int. 2017. https://pubmed.ncbi.nlm.nih.gov/28393440/

24. Pedersen MT, Vorup J, Nistrup A, Wikman JM, Alstrøm JM, Melcher PS, et al. Effect of team sports and resistance training on physical function, quality of life, and motivation in older adults. Scand J Med Sci Sports. 2017. https://pubmed.ncbi.nlm.nih.gov/28144978/

25. Kai K, Hashimoto M, Amano K, Tanaka H, Fukuhara R, Ikeda M. Relationship between eating disturbance and dementia severity in patients with Alzheimer's disease. PLoS ONE. 2015. https://pubmed.ncbi.nlm.nih.gov/26266531/

26. Johansson L, Björklund A, Sidenvall B, Christensson L. Spouses ' Experiences of mealtime with a partner suffering from dementia. J Ageing Res Clin Pract. 2014. https://www.jarlife.net/715-spouses-experiences-of-mealtimes-with-a-partner-suffering-from-dementia.html

27. Kai K, Hashimoto M, Amano K, Tanaka H, Fukuhara R, Ikeda M. Relationship between eating disturbance and dementia severity in patients with Alzheimer's disease. PLoS ONE. 2015. https://pubmed.ncbi.nlm.nih.gov/26266531/

28. 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. https://pubmed.ncbi.nlm.nih.gov/27295140/

29. Franco MR, Tong A, Howard K, Sherrington C, Ferreira PH, Pinto RZ, et al. Older people's perspectives on participation in physical activity: A systematic review and thematic synthesis of qualitative literature. BJSM. 2015. https://pubmed.ncbi.nlm.nih.gov/25586911/

30. Vanoh D, Ishak IH, Shahar S, Manaf ZA, Ali NM, Noah SAM. Development and assessment of a web-based intervention for educating older people on strategies promoting healthy cognition. Clin Interv Aging. 2018. https://pubmed.ncbi.nlm.nih.gov/30271134/

31. Remillard ML, Mazor KM, Cutrona SL, Gurwitz JH, Tjia J. Systematic review of the use of online questionnaires of older adults. JAGS. 2014. https://pubmed.ncbi.nlm.nih.gov/24635138/

32. Qualtrics. Survey methodology & compliance best practices: predicted duration [Internet].https://subjectguides.uwaterloo.ca/c.php?g=695555&p=4933491

33. Nora CD, de Lima JD, Teixeira IA, et al. Online physical exercise and the neuropsychiatric symptoms in patients with dementia: a cross-sectional study during the COVID-19 pandemic. Dement Neuropsychol. 2022;16(3):253-260. doi:10.1590/19805764-DN-2021-0079

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