

# Prioritizing Components of a Dyadic Physical Activity Intervention for People With Moderate to Severe Multiple Sclerosis and Their Care Partners: A Modified e-Delphi Study

Afolasade Fakolade, PhD; Odessa McKenna, BSc; Rachel Kamel, BSc; Mark S. Freedman, MD; Marcia Finlayson, PhD; Amy E. Latimer-Cheung, MSc; and Lara A. Pilutti, PhD

## ABSTRACT

**BACKGROUND:** People with moderate to severe multiple sclerosis (MS) and their family care partners do not engage in sufficient physical activity (PA) for health benefits. Dyadic PA interventions need to be developed to benefit each individual and the dyad. The objective of this study was to engage expert stakeholders in prioritizing and refining key intervention content, delivery methods, and the practical/logistical aspects of a dyadic PA intervention for persons with MS and their care partners.

**METHODS:** Thirty-two stakeholders (14 clinicians, 11 people with MS, 5 MS care partners, and 2 representatives of organizations that provide support services for people with MS and/or MS care partners) completed 2 rounds of a modified e-Delphi survey. In round 1, participants rated items across 3 domains: key intervention content ( $n = 8$ ), delivery methods ( $n = 9$ ), and practical/logistical aspects ( $n = 4$ ). Participants contributed additional ideas about these domains, which were incorporated into round 2. Items that did not reach consensus in round 1 were forwarded to round 2 for rerating. Data were analyzed using descriptive statistics and content analysis.

**RESULTS:** A 24-item list of recommendations was generated, including ensuring that presentation of the intervention content encouraged lifestyle activities in addition to exercise, using video-conferencing rather than teleconferencing as a delivery platform, and stressing the importance of flexibility during the support calls.

**CONCLUSIONS:** Feedback will be used to improve the quality of the intervention. The next step in this line of research involves evaluating the refined intervention in a pilot feasibility trial.

*Int J MS Care.* 2023;25(1):8-14. doi:10.7224/1537-2073.2021-079

The pathology of multiple sclerosis (MS), including neurotoxicity, inflammation, and neurodegeneration, contributes to a complex array of heterogeneous symptoms and disability.<sup>1</sup> With increasing disability, many people with MS have difficulty with completing daily activities and maintaining social relationships.<sup>1</sup> These individuals require ongoing support to manage associated life roles as the disease progresses and disability accumulates. Informal care partners (ie, family or close friends) are the main providers of support for people living with MS.<sup>2</sup> Many care partners, particularly those caring for persons with moderate to severe MS (ie, significant walking limitations that require support for gait), experience poor physical and mental health outcomes due to their caregiving role.<sup>2</sup> For example, approximately 50% to 70% of care partners of people with severe MS experience anxiety and depression.<sup>3</sup> This evidence points to the need for effective health promotion strategies for these groups.

Despite advances in the pharmacologic treatment of MS, disease-modifying therapies have limited long-term efficacy in preventing the accumulation of disability.<sup>4</sup> Best practices for comprehensive MS care recommend a combination of pharmacologic and nonpharmacologic approaches.<sup>5</sup> Physical activity (PA) is a health-promoting behavior in the general population, and a cost-effective, nonpharmacologic approach for managing the impact of MS.<sup>6</sup> Although there is growing evidence for the benefits of PA, people living with MS have consistently reported low PA levels compared with the general population.<sup>7</sup> There is also evidence that care partners of persons with moderate to severe MS disability do not engage in sufficient PA for health benefits.<sup>8</sup> These findings demonstrate the importance of acknowledging the unique interrelatedness of health outcomes among MS dyads. Findings also underscore an opportunity for dyadic PA to improve the health of both partners.

From the School of Rehabilitation Therapy (AF, MF) and the School of Kinesiology and Health Studies (AEL-C), Queen's University, Kingston, ON, Canada; the Interdisciplinary School of Health Sciences (OM, RK, LAP), Biomedical Sciences, Faculty of Science (RK), Faculty of Medicine (MSF), and Brain and Mind Research Institute (LAP), University of Ottawa, Ottawa, ON, Canada; and the Ottawa Hospital Research Institute, Ottawa, ON, Canada (MSF). Correspondence: Afolasade Fakolade, PhD, School of Rehabilitation Therapy, Louise D. Acton Building, 31 George St, Queen's University, Kingston, ON K7L 3N6, Canada; email: a.fakolade@queensu.ca.

Note: Supplementary material for this article is available at [IJMSC.org](http://IJMSC.org).

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In response, we developed Physical Activity Together for MS (PAT-MS), a group-based, remote-delivered, dyadic PA intervention for people with moderate to severe MS and their care partners. We applied the Medical Research Council (MRC) framework<sup>9</sup> to guide the design and development of PAT-MS. The MRC framework provides an iterative process to developing complex interventions. The framework consists of 4 cyclical phases: (1) development (identifying existing evidence and theory, applying theory to develop the intervention, and modeling processes and outcomes); (2) feasibility/piloting (testing procedures for feasibility and acceptability); (3) evaluation (understanding the process of change and assessing effectiveness and cost-effectiveness); and (4) implementation (assessing and monitoring long-term effectiveness and dissemination).<sup>9</sup> **FIGURE S1**, available online at [IJMSC.org](http://IJMSC.org), illustrates the MRC framework, highlighting the developmental process of PAT-MS.

The full details of the PAT-MS intervention content, including theoretical frameworks, are reported in the published protocol.<sup>10</sup> In brief, the content and processes of PAT-MS are theoretically grounded in the Theory of Dyadic Illness Management (TDIM),<sup>11</sup> with direction from social cognitive theory (SCT)<sup>12</sup> and self-determination theory (SDT).<sup>13</sup> The basic tenet of TDIM is that the way that dyads affected by chronic diseases (eg, MS) appraise disease impact as an interdependent team influences how they engage in health-promoting behaviors (eg, PA), which, in turn, influences dyadic health.<sup>11</sup> The TDIM emphasizes the importance of targeting both partners simultaneously to ensure sustainable change in health outcomes for each individual and for the dyad. We used SCT<sup>12</sup> and SDT<sup>13</sup> to identify key theoretical constructs (eg, self-efficacy from SCT; relatedness and intrinsic motivation from SDT) that influence PA behavior to be included in PAT-MS. Also, SCT<sup>12</sup> and SDT<sup>13</sup> provided guidance for selecting behavior change techniques (eg, goal setting, problem-solving, and behavioral practice)<sup>14</sup> to alter or redirect causal processes that regulate PA behavior (see Table 1 in the published protocol<sup>10</sup> for details of behavior change techniques in PAT-MS). PAT-MS includes 3 main components: (1) education (ie, provision of information about PA, shared disease appraisal, and benefits of shared participation in PA as a dyadic coping strategy); (2) guidance from a trained activity coach (ie, an activity coach will provide verbal and written instruction, including behavioral strategies commonly used in dyadic health interventions for persons with neurologic conditions and their care partners<sup>15</sup>); and (3) social support (ie, provision of practical, emotional, and informational support, including links to community resources for continued PA participation and opportunities to learn from other group members).

Initial works related to the development of PAT-MS have also been published, including a staged needs assessment process to explore dyadic PA<sup>8,16,17</sup> and a systematic review that provided theoretical understanding of behavioral strategies for change.<sup>15</sup> The present study represents step III (modeling processes and outcomes) of the developmental phase. This step involves defining and combining the components of the intervention and identifying potential intervention vulnerabilities.<sup>18</sup> Specifically, the most relevant intervention components and ways to tailor and refine intervention contents are identified during this step.<sup>18</sup>

Researchers have reported the use of various methods, including but not limited to a Delphi consensus process to prioritize and refine intervention components during the modeling step.<sup>19</sup> Importantly, the Delphi consensus process provides a pragmatic and flexible methodological tool for engaging a broad range of stakeholders in intervention development work.<sup>20</sup> The objective of this Delphi study was to engage people with MS, MS care partners, clinicians, and service providers in prioritizing and refining key content, delivery, and practical/logistical aspects of the PAT-MS intervention.

## METHODS

### Study Design

As a modified e-Delphi survey,<sup>20</sup> the design process involved creating initial survey items based on previous intervention development research<sup>8,15-17</sup> and the preliminary PAT-MS intervention manual.

### Participants

Heterogeneous groups (eg, stakeholders from different disciplines) of approximately 30 participants are recommended to provide a range of perspectives and to improve the reliability of the findings.<sup>21</sup> We aimed to recruit a purposive sample of 30 participants from 4 stakeholder groups to maximize patient, professional, and public engagement. The stakeholder groups included people living with MS, MS care partners, clinicians with MS-specific knowledge and practice, and representatives of community organizations that provide support services for people with MS and/or MS care partners. The recruitment strategies and inclusion criteria for each stakeholder group are outlined in **TABLE S1**.

### Procedures

We decided, a priori, to conduct a 2-round e-Delphi survey, with the possibility of a third round for items with no consensus after round 2. Prospective participants were sent electronic invitations that included a study summary, a PDF copy of the preliminary PAT-MS manual, and a personalized survey link via SurveyMonkey (Momentive, Inc). Participants confirmed eligibility and indicated consent online before completing the round 1 survey. Participants who completed the round 1 survey received a personalized email link to the round 2 survey. Participants were provided their previous responses and a summary of the group responses to items from the round 1 survey that required rerating. Each survey round took 20 to 30 minutes to complete and was open for 2 weeks. There was a 2-week interval between survey rounds for data analysis and subsequent survey development. The survey rounds were completed during the COVID-19 lockdown between August 2020 and October 2020. Three research team members tested each survey round to ensure face and content validity and accessibility for participants.<sup>22</sup> After the survey was developed, we used an online resource (<http://www.readabilityformulas.com/free-readability-formula-tests.php>) to improve the readability of the questions. Participants received up to \$100 in online gift cards for completing the study. Ethics approval was obtained from the University of Ottawa Science and Health Sciences Research Ethics Board.

## Surveys

The round 1 survey consisted of 4 sections. Section 1 collected demographic information, including evidence of relevant expertise. Section 2 presented 8 questions about content that should be included in PAT-MS and asked participants to rate the importance of each item using a 7-point scale (1 = not a priority and 7 = essential priority). Section 3 presented 9 questions about how PAT-MS should be delivered and asked participants to rate each item using the same 7-point scale. Section 4 presented 4 questions about practical/logistical aspects and asked participants to rate their level of satisfaction with each item on a 7-point scale (1 = very dissatisfied and 7 = very satisfied). Participants were asked to provide qualitative feedback, including rationale for ratings, proposed changes to key intervention components, and concerns with the overall intervention.

The round 2 survey presented 13 items, including 4 original items that did not reach consensus in round 1. These items were related to intervention content (n = 2) and delivery (n = 2). Participants rated these items with the same 7-point scale used in round 1. Six of the 13 items were modified based on participants' feedback in round 1. These items were related to intervention content (n = 1), delivery (n = 3), and practical/logistical aspects (n = 2). The remaining 3 items were new items suggested in round 1. These items were related to delivery (n = 1) and practical/logistical aspects (n = 2). Depending on the nature of the modified or new item, participants were presented with the same 7-point scale used in round 1 (for modified items) or multiple-choice or *yes/no* options (for new items). Participants provided qualitative feedback on their ratings.

## Data Analysis

Data analysis occurred at the conclusion of each survey round. Data were downloaded from SurveyMonkey and imported into IBM SPSS Statistics for Windows, version 27.0 (IBM Corp) for analysis. Descriptive statistics were used to summarize participants' characteristics and expertise and group responses. Consensus was defined a priori as 70% or more of participants rating the item within 2 points. Items achieving 70% or greater consensus in round 1 were automatically included in the final list of Delphi recommendations. Conversely, items rated by 50% to 69% of participants as *high/essential priority* or *satisfied/very satisfied* were retained in round 2 for rerating. Items rated by less than 50% of participants as *high/essential priority* or *satisfied/very satisfied* were excluded. The qualitative aspect of this study was framed by ontological relativism and epistemological constructionism.<sup>23</sup> As such, our assumption is that multiple realities and ways of understanding knowledge exist. These realities are subjective, differ between individuals, and are constructed based on multiple factors, including an individual's values and experiences. Guided by these philosophical assumptions, we provided opportunities to present participants' unique perspectives and realities through interpretation of the data and the quotes integrated within the presentation of the findings. A content analysis approach was applied to the qualitative feedback from participants. Specifically, an author (R.K.) read the free-text responses

**TABLE 1. Characteristics of the 32 Study Participants**

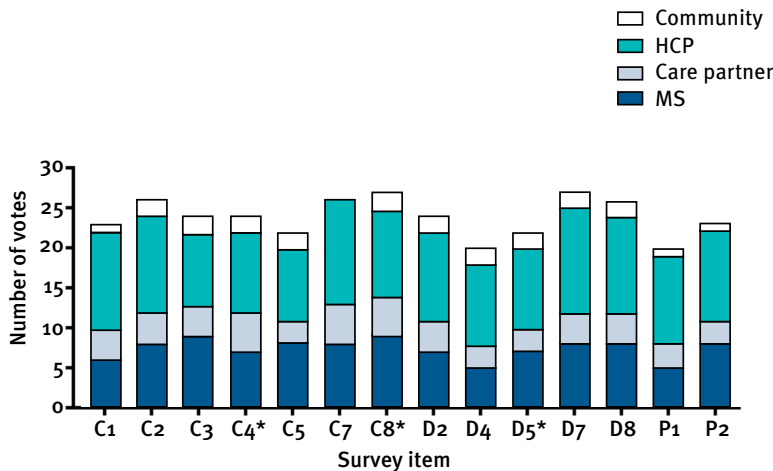
Variable	Value
Type of stakeholder, No. (%)	
Clinician (n = 14)	
Physiotherapist	6 (42.9)
Occupational therapist	5 (35.7)
Kinesiologist/exercise specialist	2 (14.3)
Physician/physiatrist	1 (7.1)
Person living with MS (n = 11)	
Relapsing-remitting MS	5 (45.5)
Primary progressive MS	2 (18.2)
Secondary progressive MS	2 (18.2)
Unknown	2 (18.2)
MS care partner (n = 5)	
Spouse of person living with MS	5 (100)
Representatives of organizations providing support for persons with MS (n = 2)	
Programs and service coordinator	1 (50)
Volunteer	1 (50)
Currently engaging in physical activity (yes), No. (%)	9 (56.3)
Persons with MS	7 (63.6)
MS care partner	2 (40.0)
Clinician years of experience, mean ± SD	10.9 ± 6.8
MS disease duration, mean ± SD y	15.5 ± 8.7
Caregiving duration, mean ± SD y	7.8 ± 4.9
Minutes of assistance per day, mean ± SD	138 ± 130.1

several times and generated codes with a focus on elucidating any reasons for mixed responses or arguments for inclusion/exclusion of items that did not reach consensus. Candidate themes were then developed by another author (A.E.) by grouping codes that coherently reflected participants' feedback. We compared the qualitative data with the extant literature on dyadic health interventions and the theoretical foundations of PAT-MS so that we could decide whether to include the item in the final list of recommendations. After a discussion process among the research team, the final list of recommendations was developed based on items reaching consensus in rounds 1 and 2 and on qualitative feedback.

## RESULTS

### Participants

Of the 201 stakeholders invited to participate in the study, 2 were ineligible, 6 declined, and 157 did not respond to the invitation. Thirty-six individuals agreed to participate and received the electronic invitation to complete the round 1 survey. After receiving this invitation, 2 individuals declined the invitation, and 2 individuals did not activate the survey link. Thirty-two individuals responded to the round 1 survey (89% response

**FIGURE 1.** Items Reaching Consensus Over Stakeholder Group Rounds 1 and 2

C, content item; D, delivery item; HCP, health care provider; MS, multiple sclerosis; P, practical item.  
\*Represents items reaching consensus in round 2.

rate): 14 clinicians, 11 people living with MS, 5 MS care partners, and 2 representatives of organizations that provide support services for people living with MS and/or MS care partners. A total of 27 participants responded to the round 2 survey (75% response rate). Participants lost to follow-up were 3 clinicians and 2 people living with MS. The characteristics of enrolled participants are presented in [TABLE 1](#).

### Survey Findings

For ease of reporting, findings from rounds 1 and 2 of the survey are combined. [FIGURE 1](#) presents a summary of items reaching consensus in rounds 1 and 2 according to stakeholder group. [TABLE S2](#) presents a summary of group responses to the items with multiple-choice or *yes/no* response options in round 2. The final list of recommendations for PAT-MS is presented according to intervention content, delivery, and practical/logistical aspects in [TABLE S3](#).

### Intervention Content

Five of 8 intervention content items (63%) reached consensus (70%-81%) in round 1 (C1-C3, C5, and C7). Of the remaining 3 items, 2 (C4 and C8) were rerated in round 2 and reached consensus (82% and 85%, respectively) in round 2. The remaining item (C6) was modified into a *yes/no* question. Most participants (78%) voted *yes* for this item.

### Intervention Delivery

Four of 9 delivery items (44%) reached consensus (70%-93%) in round 1 (D2, D4, D7, and D8). Of the remaining 5 items, 2 (D5 and D9) were rerated in round 2. One of these items (D5) reached consensus (74%) in round 2. The other item (D9) did not reach consensus (41% of participants rated the item as *high/essential priority*). However, given the congruity of this item to the design and theoretical foundations of PAT-MS, the research team

decided to include this item in the final list of recommendations. Participants' responses will be considered in modifying the delivery of PAT-MS (eg, by reducing the time allocated for this item during delivery).

The remaining 3 items were modified and presented to participants in round 2 as multiple-choice items (D1, D3, and D6). Most participants (70%) voted for videoconference (eg, Zoom [Zoom Video Communications, Inc]) as the optimal delivery platform (D1). Participants (41%-100%) voted to retain the original order of the module content (D3). Approximately one-third of the participants (33%) voted to include 2 options to track PA: paper-and-pen journaling and a software app (D6). One new multiple-choice item, added in round 2, asked participants about *the appropriate group composition for the intervention*

*sessions* (D1B). More than half of the participants (59%) voted for dyadic group sessions (ie, a person with MS and their care partner with 1 or 2 other dyads in each group).

### Practical/Logistical Aspects

Two of 5 practical/logistical items (40%) (P2 and P4) reached consensus (70% and 79%, respectively) in round 1. The remaining 3 items were modified and presented as multiple-choice items (P1, P3, and P5) in round 2. Most participants voted that an adequate amount of content was covered in each module (P1, 82%); selected 45 to 60 minutes for the duration of group sessions (P3, 41%); and chose a duration of 15 to 20 minutes for the 1-on-1 support phone calls (P5, 63%).

### Qualitative Feedback

Nearly all participants (93%) provided qualitative feedback with their rated responses. We present a narrative summary of participants' comments below with exemplar quotes for context.

### Intervention Content

Although participants acknowledged the value of including content about PA guidelines to help set benchmarks for PA during PAT-MS, they also acknowledged that they are not universal: "The guidelines are not conducive to everyone who has MS ... these suggestions (ie, guidelines) are flexible and general, not definitive - no need to dwell on them" (clinician). Other participants noted that PAT-MS needs to support lifestyle PA alongside exercise training: "...suggest to mention more lifestyle-oriented ways of exercise, indicate other activities that can count, and assure people that everyone is different and that is OK" (person living with MS).

Several participants commended the inclusion of content related to the safety of PA. These participants highlighted the importance of such information, particularly for people with MS,



who historically have been told not to engage in PA because of the belief that it can exacerbate the disease process and result in worsening of symptoms such as fatigue: “I find the perspective of exercise as dangerous still persists among clients, especially those not diagnosed recently. Fear can be a significant barrier and addressing it off the bat I think is very important” (clinician).

Participants further emphasized the importance of acknowledging the unpredictability of MS and using a strengths-based approach that highlights opportunities for personal growth and change rather than deficits and problems. This emphasis was particularly relevant to items about motivation, social support, and behavioral strategies. For instance, a participant noted: “Social support is important but as many people with MS lack a social support system and are too tired/fatigued to establish one, too much emphasis on this can be depressing” (person living with MS).

Other comments were related to the importance of ensuring that the additional resources provided in the PAT-MS manual are nationally available at subsidized rates to promote access, particularly for individuals living in small/rural areas: “Too often these services are ‘hidden’ within the community, and no one knows they are available” (person living with MS).

### Intervention Delivery

Although more than half of the participants voted for dyadic intervention group sessions, comments indicated a need for the PAT-MS research team to consider a hybrid format that includes a combination of individual (care partner/care recipient alone) and dyadic sessions/activities: “Possibly a blend, where some are specific to the person with MS or to the care partner and some are dyadic. This would allow for certain focus of messaging in the individual groups and then allow the collaboration and sharing between them during the dyadic sessions” (MS care partner).

The use of teleconference as a delivery platform for PAT-MS was a polarizing issue among the participants. Some participants considered teleconferencing “an accessible and realistic approach” (health care provider), stating that “teleconferencing is great for people who need the 2-way interaction” (person living with MS). Other participants were strongly opposed to the idea of teleconferencing, citing potential challenges regarding group engagement: “It [teleconferencing] is hellish ... unsure how the teleconference will work. My experience is that the facilitator will have to ensure engagement of all parties and that can be a challenge” (person living with MS). Several participants suggested videoconferencing with a telephone dial-in option for those with limited or no internet access to promote more group interaction and social support: “Zoom does allow far better relationship building, especially with a small group” (person living with MS).

Participants commended the inclusion of 1-on-1 calls as opportunities to offer additional support and promote engagement during the intervention: “I think this is one of the best options. Having someone who knows what you are doing and can help keep track of what you’re doing is great. Being able to answer your questions and having a bond so you are comfortable to ask anything” (MS care partner). Other comments were related to the need for flexibility during these support

calls: “The length of time should differ based on the needs and exhaustion felt by the person with MS or their caregiver that week” (person living with MS).

## DISCUSSION

The purpose of this Delphi study was to engage persons living with MS, MS care partners, clinicians, and service providers as experts in prioritizing and refining key intervention content, delivery, and practical/logistical aspects of PAT-MS. The modified e-Delphi process enabled the PAT-MS research team to clarify any uncertainty within the existing evidence. Specifically, before the Delphi study we had already completed a staged research process<sup>8,15-17</sup> that identified key components of PAT-MS. The Delphi process was then used to prioritize and refine the intervention content, delivery, and practical/logistical aspects. Below we situate our findings in the extant literature on PA promotion for people with neurodegenerative diseases, including MS, and their care partners.

### Intervention Content

Overall, the content recommended to include in PAT-MS corresponds with the literature about PA promotion among people affected by MS and care partners in general.<sup>24,25</sup> This content includes, for example, the inclusion of PA guidelines for people with MS and adults in the general population. However, participants cautioned against having a narrow focus on exercise training alone and recommended including content on the benefits of lifestyle PA in addition to exercise. Previous researchers have echoed the importance of a strengths-based approach to health promotion that focuses on a range of enjoyable lifestyle activities that incorporate PA and exercise training for lasting health behavior change.<sup>6</sup>

Other recommendations included providing high-quality information about the safety of PA and strategies for maintaining ongoing motivation; highlighting the importance of a strong social support network for PA; and emphasizing PA as a dyadic coping strategy. These recommendations have ample support in existing literature.<sup>26,27</sup> The recommendation to include behavioral strategies was not surprising, and it reflects current best practice guidelines for developing health interventions.<sup>14</sup> Similar to the present findings, people with MS<sup>28</sup> and their caregivers<sup>16</sup> have previously reported the need for resources to guide them to available community-based supports for PA. The present findings further emphasize that these resources need to be updated regularly, nationally available, and affordable to promote access for people with MS and their care partners.

### Intervention Delivery

In the literature specific to dyads with neurodegenerative diseases, there is growing popularity of dyadic interventions that involve both partners participating together in joint sessions and receiving the same intervention materials.<sup>29</sup> Although the use of dyadic sessions reached consensus in this study, participants emphasized the need to carefully consider a hybrid format, including a combination of individual (care partner/care recipient in separate sessions) and dyadic sessions/activities.

Participants' comments highlight the importance of retaining a pragmatic balance between issues, such as addressing individual needs and ideal study designs, and time and budgetary constraints. Going forward, we now plan to include some opportunities for individual activities while retaining the overall dyadic format of PAT-MS. This decision will ensure that PAT-MS retains the dyadic intervention approach and its theoretical foundations.

Participants indicated a preference for group-based video-conference delivery. Although telephone delivery has been one of the most widely available telerehabilitation modalities,<sup>30</sup> the current COVID-19 pandemic has increased endorsement and use of videoconferencing software (eg, Zoom) for virtual health care. Thus, this finding may reflect the current health care delivery climate, where participants may now have experience delivering and/or receiving health care online. This finding further highlights the importance of capitalizing on technological advancements that have occurred in the past few decades to promote participation in PAT-MS. Recent research indicates that more than 90% of people living with MS own at least 1 computer or a smartphone.<sup>31</sup> Incorporating more interactive technologies into rehabilitation interventions may improve participant engagement in these interventions. Nevertheless, when capitalizing on current technological advancements in intervention development, we must consider accessible approaches that meet the needs of diverse audiences (ie, considering e-literacy, access to the internet, and personal preferences) for long-term intervention success.

Overall, these Delphi recommendations helped us think about the way that we may need to approach discussions about PA in a PAT-MS intervention. The recommendations provide key guidance for future evaluation of PAT-MS in terms of understanding the most important components to different stakeholders and the types of content/indicators to include in the intervention. The findings of this study may provide some guidance for future researchers and clinicians interested in developing and implementing dyadic interventions in MS and other neurodegenerative diseases.

### **Strengths and Limitations**

This study is the first to provide recommendations for key components for a dyadic PA intervention for persons with moderate to severe MS and their care partners. Broad stakeholder involvement increases the possibility that the final intervention will be acceptable to all groups.<sup>32</sup> In addition, the present response rate is consistent with the literature that suggests a 10% response rate for survey-based studies.<sup>33</sup> Finally, there was a high level of participant retention between the 2 survey rounds (~85%) with the final sample size more than double the lower limit threshold of 12 participants.<sup>32</sup> These features promote the reliability and validity of the present findings.

There are some limitations worth noting. First, there is a possibility that the views of the present participants may differ from those of stakeholders who declined participation and, therefore, may not adequately represent experts in the field of interest. To minimize this risk, we used a comprehensive recruitment process involving a database of previous participants in the present

## PRACTICE POINTS



Recommendations from a broad range of experts provide key guidance to understand the essential components of a dyadic physical activity intervention to different stakeholder groups. Prioritized content and delivery methods are identified.

Study findings may provide guidance for researchers and practitioners interested in developing and implementing dyadic health interventions in multiple sclerosis and other neurodegenerative diseases. ■

research studies, our professional networks, and a snowballing technique to identify a representative range of stakeholders to participate in the study. Nevertheless, a small percentage of MS care partners (4%; n = 5 of 149 who were emailed a recruitment letter) participated in the study. The reasons for declining to participate are unclear; however, it is possible that the method of email invitation may not have been an effective or appropriate form of recruitment for this group. It is also possible that the COVID-19 pandemic may have affected MS care partners' ability to participate during this time (eg, additional time constraints, unpredictable changes in caregiving roles and responsibilities, etc). Furthermore, we recruited care partners for this Delphi study primarily from a sample of participants who had recently completed an online survey as part of a longitudinal study examining resilience among MS care partners with our research group. It is possible that these care partners may have perceived taking part in another study, particularly during the COVID-19 lockdown, as an additional burden and chose to opt out of the present study. Another possibility is that few care partners are interested in this type of intervention; however, previous needs assessment work<sup>8,16,17</sup> established the critical need to develop a dyadic PA intervention that supports joint engagement of people with moderate to severe MS disability and their care partners. Therefore, lack of interest from MS care partners in PAT-MS is unlikely to be a key issue. Nevertheless, several evidence-based strategies<sup>34,35</sup> are included in the PAT-MS intervention design to ensure "buy-in" from care partners and to maximize recruitment and retention.

Second, the use of PAT-MS intervention development research to focus the survey questions may have resulted in the inclusion of only components deemed to be important by the research team. There is a risk that potentially useful intervention components that may have been of interest to the stakeholder groups

were not included, as the round 1 questions were predefined. However, this approach is consistent with previous research.<sup>20</sup> Furthermore, given the breadth of earlier PAT-MS development research and the design of the modified Delphi survey that enabled participants to provide open-ended feedback, this approach is unlikely to have had a negative impact.

Finally, although there is a lack of consensus about the number of participants needed for each expert group in Delphi studies,<sup>36</sup> the exact composition of the panel can affect the results obtained. We attempted to minimize this bias by giving stakeholders the opportunity to provide qualitative feedback, including rationale for ratings, proposed changes to key intervention components, and concerns with overall intervention. We note that there was agreement across the different stakeholder groups for most survey items. The qualitative feedback was taken into consideration when interpreting the survey findings.

## CONCLUSIONS

Consensus was reached for a range of intervention components that will allow the content, format, delivery, and timing of PAT-MS to be finalized. The next step in this line of research will involve a pilot trial to evaluate procedures, feasibility, and acceptability of PAT-MS for people with moderate to severe MS and their family care partners. ■

**FINANCIAL DISCLOSURE:** The authors declare no conflicts of interest.

**FUNDING/SUPPORT:** None.

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