

**RUNNING HEAD: END USER ADOPTION AND MAINTENANCE**

Exploring end user adoption and maintenance of a telephone-based physical activity counseling service for individuals with physical disabilities using the Theoretical Domains Framework

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**Keywords:** Theoretical domains framework, behavioural counseling.

## Abstract

**Purpose:** In Canada, two counselling services are offered to facilitate physical activity participation among persons with physical disabilities, yet both have encountered concerns related to the recruitment and retainment of clients. The purpose of this paper is to explore factors related to service adoption among non-users, and the barriers and facilitators to maintaining service participation among adopters.

**Methods:** Individuals who had never enrolled in the services (non-users,  $n=13$ ) as well as current/previous service clients (adopters,  $n=26$ ) participated in interviews based on the Theoretical Domains Framework. Transcripts were subjected to deductive thematic analysis according to participant group.

**Results:** Fifteen themes relating to service adoption within 10 of the 12 theoretical domains were identified for non-users, while 23 themes relating to maintenance of service participation were identified across all 12 theoretical domains for adopters.

**Conclusions:** The findings provide strategies to improve recruitment, adoption and retention of clients in counselling services and to enhance the experiences of targeted service users.

## Introduction

Despite the physical, psychological, social and quality of life benefits that physical activity (PA) has to offer to persons with physical disabilities [1-5], few evidence-based services meet the unique PA needs of this population [6]. In Canada, two applied counseling services are offered to facilitate PA participation among persons with physical disabilities: *Get In Motion* (GIM) and *Passez à l'action* (PAL). GIM is a national evidence- and theory-based PA tele-counseling service that was first established in June 2008 for adults with spinal cord injury (SCI; [7] by SCI Action Canada. This partnership between community-based organizations and university-based researchers provided opportunities for these sectors to work together to advance PA knowledge and behaviour among adults with SCI [8]. In the Fall 2011, PAL was established as a satellite GIM service in Québec City. Run through *Adaptavie*, a community-based organization that promotes PA in Québec, PAL serves local French-speaking persons living with various physical disabilities, including but not limited to people with SCI. To overcome the commonly-reported financial, resource, and knowledge-related barriers to PA participation among persons with physical disabilities [9], both of these counseling services are offered at no cost to individuals with physical disabilities, are delivered by Kinesiologists with experience in PA programming for persons with physical disabilities, provide equipment such as resistance bands for engaging in strengthening-based PA, and teach behaviour change skills that will help clients initiate and maintain their PA behaviour. Together, these two innovative counseling services hold promise for promoting PA participation among Canadians with physical disabilities.

Despite the organizations' best efforts at delivering GIM and PAL, both of these counseling services have encountered concerns with the recruitment and retainment of clients.

First, these services are not reaching a large proportion of their target audience. Together, GIM and PAL have served 165 clients with physical disabilities in Canada between 2008 and 2013. However, the potential clientele base for these types of counseling services is large (i.e., 12% of Canadian adults are reported to be living with a physical disability; [10]), indicating that the recruitment of clients has not yet been optimized. As such, it is important to better understand the specific factors that foster participation in a counseling service, such as GIM or PAL, to help facilitate recruitment and maximize future service enrollment. Secondly, session adherence has been low and service attrition is high for both services. With the GIM service, clients have completed an average of 46% of available sessions and most clients withdraw from the service within the first two months of their enrollment [11]. An evaluation has yet to be conducted on the service retention for PAL, although anecdotal evidence suggests that users tend to abandon the program after four or five sessions, or to shift the goals of the counseling sessions to meet different needs that arise in the course of the program. Understanding the barriers and facilitators to continued service participation among clients who have enrolled would enable tailoring of both GIM and PAL when moving forward with dissemination; thus, we took a theoretical qualitative approach that focused on potential and previous clients' perceptions of the barriers and facilitators of using these two PA behavioural counselling services. A qualitative data collection approach was selected as it allows for a deeper understanding of a particular experience through the perspectives of individuals who are involved in the research [12], in this case, persons with disabilities. Given the exploratory nature of the study, it was decided that interviews would allow participants to reveal a multitude of factors that the research team alone may not have been able to predict, and thus prepare a quantitative questionnaire to assess all factors.

Drawing on the Theoretical Domains Framework (TDF; [13]), the overall purpose of this paper is to examine the individual-level factors that are associated with participation and retention in a PA behavioural counselling service aimed at individuals with physical disabilities. In particular, we aimed to (i) explore factors related to the initial adoption of a PA behavioural counseling service and (ii) examine barriers and facilitators to maintenance of service participation. The first objective relates to participants from the target population (i.e., individuals with physical disabilities) who have not used either of the GIM or PAL services, while the second objective is associated with the clients who have used one of these PA behavioural counseling services. We chose to examine the factors, barriers, and facilitators in relation to potential users' initiation and previous users' maintenance of participation in these two PA behavioural counseling services, rather than looking at the differences between the GIM and PAL clients, to inform future development of these types of counseling services for individuals with physical disabilities.

## **Methods**

### **Participants**

To be included in the study, all participants had to: (a) be between the ages of 18 to 70 years; (b) live with a permanent disability (i.e., a SCI for GIM or any physical disability for PAL); (c) be able to speak fluently in English (GIM) or French (PAL); (d) be able to actively engage in a one-hour interview; (e) be capable of providing informed consent; and (f) have no cognitive impairments that may influence their ability to participate in an interview. This study eligibility criteria is identical to the client enrollment criteria for the two services.

The research team worked with the coordinators of the two services to identify potential participants. Using participant databases of the organizational bodies of GIM and PAL (i.e., SCI Action Canada and *Adaptavie*, respectively), researchers identified “non-users” as individuals who would be eligible to enroll and participate in either GIM or PAL, but to date had not yet enrolled, or had refused to enroll. Additionally, using current GIM and PAL participant databases, “adopters” were identified by the research team as individuals who had enrolled and received counseling from one of the two services.

### **Procedure**

Ethical approval was obtained from the Research Ethics Boards at the Institut de réadaptation en déficience physique de Québec, University of Toronto, and McMaster University.

### **Recruitment**

Non-users were contacted directly by the research assistant to confirm interest in participating in the current study, to schedule a follow-up telephone interview, and to obtain informed consent. Meanwhile, adopters were first contacted by their respective service coordinator to explore their interest in participating in the interview. Those consenting to participate were contacted by a research assistant to schedule a follow-up telephone interview. Recruitment of participants in each group continued until data saturation was reached, which is the point when novel themes ceased to emerge with subsequent interviews [14].

Interviews with participants recruited through GIM were conducted in English and over the telephone due to the large geographic region that GIM serves (all of Canada, excluding the province of Québec). Meanwhile, PAL participant interviews were all conducted in French and in person, given that PAL serves individuals with disabilities in one geographic region (Québec

City). All interviews were digitally recorded, transcribed verbatim, and anonymized. Interviews conducted in French were translated into English by a bilingual research assistant.

## **Interviews**

The interviewer began each interview by collecting participant demographics (e.g., age, years post injury, type of disability, etc.), and current PA behaviour. The 7-day, self-report Leisure Time PA Questionnaire for People with SCI (LTPAQ-SCI), an instrument demonstrated to be valid and reliable for measuring PA behaviour in adults with SCI [15], was used to assess the moderate-to-vigorous PA behaviour of all clients to ensure measurement consistency. Only moderate-vigorous PA was examined as activity at these intensities is required to achieve fitness benefits [16-18].

The semi-structured interview guides were developed based on Michie and colleagues' TDF [13]. The TDF simplifies 33 theories and 128 constructs relevant to behaviour change into 12 theoretical domains that can be used to investigate behavioural determinants [13].<sup>a</sup> The behaviour of interest for the current study was enrollment in and participation in either service; thus, the TDF was used to obtain greater detail about the role of each theoretical domain in influencing participants' decision to either participate (for adopters) or not participate (for non-users) in either the GIM or PAL service. The questions in the guide were developed to reflect the behaviour of interest and the context within which the service operates. Separate versions of the interview guides were created for the non-user and adopter groups so that questions would be relevant to the participants' level of experience with the service. For example, in the *Environmental context and resources* domain, a focus of the interviews for non-users was on the physical aspects of their environment that facilitated and/or hindered their choice to not participate in the service. The adopter equivalent of the questions in this domain focused on

participants' opinions of the physical aspects of their environment that facilitated and/or hindered their participation in the service throughout their enrollment. The interview guides are available from the first author upon request. The interview guide was developed in French and pilot-tested with four French-speaking adults with physical disabilities for its clarity, length, and overall comprehension. The guide was then translated into English by a bilingual member of the research team (MEL).

### **Analyses**

Transcripts were subjected to deductive thematic analysis [19] according to participant group (adopters and non-users), with themes centering around each of the 12 TDF domains. Transcripts were initially coded and collapsed into themes that were organized into relevant TDF domains by one coder (EP), with all data gathered relevant to each potential theme. Two other coders (JT, KAN) each reviewed the themes against 50% of the adopter and non-user transcripts. In discussions amongst the three coders, themes were refined and complete agreement was reached across all TDF domains using an iterative consensus process (i.e., all coders agreed on key themes and the theoretical domain under which the theme fits). Representative quotes highlighting each theme within each domain were selected and agreed upon by all three coders.

## **Results**

### **Participants**

Participants were individuals with a SCI from GIM and individuals with a variety of types of physical disabilities from PAL who were either eligible to enroll in the service but had not yet done so (non-users;  $n = 13$ ) or were current or past users of the two services (adopters;  $n = 26$ ). This sample size is in line with previous studies that have used the TDF to explore barriers and facilitators to other behaviours (e.g., [20, 21]) and consistent with conventions of sampling

in qualitative methods [22, 23]. The majority of non-users were male (76.9%) while most adopters were female (69.2%), with respective mean ages of 49 and 53 years old. Non-users consisted of participants with a SCI ( $n = 8$ ) and other types of physical disabilities (e.g., multiple sclerosis, amputation, traumatic brain injury;  $n = 5$ ). Among adopters, 10 reported a SCI while 16 reported a range of other types of physical disabilities (e.g., fibromyalgia, arthritis, visual impairment). In terms of current PA levels between the two groups, non-users self-reported participating in more moderate to vigorous PA than adopters ( $M = 385.20$  vs.  $M = 107.28$  weekly minutes of moderate-to-vigorous PA). Complete participant demographic data is summarized in table 1.

*Insert table 1 about here*

### **Themes identified within relevant domains**

Fifteen themes within 10 of the 12 domains of the TDF were identified for service non-users; *Memory, attention and decisional processes*, and *Motivation and goals* were not applicable domains among this group. Twenty-three themes were identified across all 12 domains for service adopters. Findings are summarized in tables 2 (non-users) and 3 (adopters), and relevant domains are noted throughout the results section (italicized text in parentheses).

*Insert table 2 about here*

*Insert table 3 about here*

**Themes related to initial service adoption.** The non-user group reported a high perceived need and value for a PA behavioral counselling service for individuals with physical disabilities. Participants perceived components of the PA behavioral counselling services to meet the needs of individuals with a physical disability who are interested in increasing their PA participation (*Social role/identity; Belief about consequences*). However, service non-users

reported possessing adequate knowledge and experience with many of the behavioural and self-regulatory skills that are built into the service's counselling sessions (*Nature of behaviours; Behavioural regulation*). Specifically, non-users stated that an ideal PA behavioural counselling service would be flexible, adaptable, and tailored to the individuals' PA needs (*Skills; Social role/ identity*). For example, some non-users felt they would benefit less from counselling sessions focused on behavioural skills and more from sessions that involve physical skill development (*Skills*). For most non-users, PA was described as a daily life routine (*Nature of behaviours*), and as such, advanced exercises and strategies would be most suitable for their needs (e.g., learning adapted sport skills and techniques to engage underdeveloped muscle groups). However, despite being regularly active, non-users stated that access to tangible resources (e.g., fitness trainers) would make participation in the service more appealing.

In terms of fostering further recruitment, non-users noted the importance of ensuring that targeted service users (i.e., individuals with physical disabilities aiming to increase PA) could self-identify with the service's promotional efforts. For example, it was suggested that the services' purpose should be clarified and highlighted within their advertisements to showcase how the service caters to a wide range of abilities, skills, and PA levels (*Knowledge; Social role/ identity*). Additionally, opportunities for social engagement were highly sought by the non-user group, across several aspects of the two services. For example, non-users suggested that the service should engage local community resources to help meet individuals' needs for social engagement to supplement the service (*Social influence; Social role/identity*).

**Themes related to service participation maintenance.** Adopters also reported a high perceived need and value for a behavioural PA counselling service that targets the physical disability population (*Social role/identity; Belief about consequences*). Notably, adopters

reported that the behavioural skill development (e.g., action planning and goal-setting) gained through their participation in the service was important to the adoption (initiation) and maintenance of their PA participation (*Nature of behaviours; Behavioural regulation*). Adopters also described an ideal PA behavioural counselling service to be adaptable and tailored (*Skills; Social role/identity*), specifically discussing a need for a PA service that aims to enhance behavioural skills for a diverse range of physical disabilities. Additionally, adopters described a need for further motivation and management of difficult emotions and psychological struggles (*Motivation and goals; Emotions*), which impede service participation and PA indirectly.

Adopters stated that finding access to suitable facilities, equipment and transportation was a challenge for them to fully participate in PA and indirectly impeded service participation. The equipment provided to adopters through the services (e.g., resistance bands) facilitated their ability to carry out strength-training PA when no other equipment was available (*Belief in capability; Environmental context and resources*). However, they indicated that they required further support to independently use this type of equipment (e.g., how to set up the resistance bands within their home environment; *Environmental context & resources*).

The opportunity for social engagement was highly salient across many of the theoretical domains for the adopter group. For example, the telephone delivery format of GIM, although highly pragmatic for a national service and effective for the discussion of behavioural strategies, limited important social engagement and learning opportunities that are integral to continuing to engage in a PA behavioural counselling service (*Social influence; Social role/identity*). Additionally, adopters stated that peers should be integrated within the service, as they are a necessary part of any service that promotes PA within populations with complex needs. For

example, a peer counsellor or local peer-matching service would greatly enhance the opportunity for social engagement in the service.

### **Discussion**

This qualitative study uses the TDF [13] to generate an understanding of the barriers and facilitators to using applied PA behavioural counselling services for individuals with physical disabilities. In particular, we examined (i) specific factors related to initial service adoption among non-users and (ii) barriers and facilitators to service participation maintenance among adopters. Grounded in the TDF, the findings will be extended to provide strategies to improve recruitment and initial adoption of the GIM and PAL services, along with strategies to improve service retention and better meet the needs of service users.

#### **Initial service adoption**

Important factors related to initial service adoption emerged within the TDF themes. For example, given that the current sample of service non-users were highly engaged in moderate-to-vigorous PA ( $M=385.20$  minutes/week), they had less need for behavioural skills training and already possessed important behavioural regulation strategies (*Skills; Behavioural regulation; Nature of behaviours*) that were the focus of both PA behavioural counselling services. Service non-users also indicated a need for a PA service that targets advanced skill development (e.g., advanced exercises, strategies for athletes) and which provides tangible resources (e.g., face-to-face personal trainers) that are beyond the scope of the current GIM and PAL service offerings.

**Implications for service promotion and recruitment.** Emergent themes from discussions with the non-users suggest a number of implications for future promotion and delivery of the GIM and PAL services. In particular, future promotional efforts should clarify each service's purpose in advertisements, with an emphasis on providing information about how

GIM and PAL foster the development of behavioral skills for increasing PA participation. Effectively identifying the aims of these two services at recruitment onset will better target non-users who could benefit from behavioural skills counselling and overcome misperceptions regarding what these services can (and cannot) provide to its clientele (e.g., support for developing behavioural strategies rather than face-to-face personal trainers). Care should also be taken to ensure that potential clients are able to identify with the particular service. For example, advertisements should demonstrate how these services can meet the needs of persons with physical disabilities, and how the service can be tailored for a variety of physical abilities.

### **Maintenance of service participation**

Although the GIM and PAL services were successful at promoting behavioural skills for PA and integrating PA in daily life (*Behavioural regulation; Nature of behaviour; Belief about consequences*) among its users, adopters had additional needs that were inadequately addressed by the GIM and PAL services. To better address these needs, participants identified the importance of enhancing social engagement (*Social influence; Social role/identity*), mitigating environmental barriers to utilizing provided equipment (*Environmental context and resources*), and tailoring of the service to match individual PA level (*Skills*).

**Implications for service delivery.** The findings also suggest a number of implications for further refinement of the GIM and PAL service delivery model. First, both of these services would benefit from making use of the influence of peer support on PA behaviour. Peers have been shown to enhance self-efficacy and motivation for individuals' PA behaviour [24]. Within the GIM and PAL services, it may be possible to have a peer act as the counselor, or to provide opportunities for peer-to-peer interaction through group-mediated processes (e.g., [25]). This peer interaction could take place via an online platform, such as Skype©, to eliminate some of

the limitations to telephone-based contact that some of the participants experienced in the current study (e.g., difficulty remembering the exercises discussed, minimal social interaction).

Researchers have begun pilot-testing the use of peer counselors and group-mediated processes as a way to capitalize on the power of peers in promoting PA to individuals with physical disabilities [26]. GIM and PAL are currently exploring ways to incorporate peers into service delivery.

A second recommendation for service refinement would be to provide greater support to clients for use of the resistance bands that are distributed when clients enroll. Currently, the counselor describes how to use the bands during telephone and/or face-to-face sessions, while directing those who are interested to [online manuals and videos](#) that explain strengthening exercises using the bands. However, many of the adopters interviewed indicated that they required greater support for using the bands in their home environment. One potential strategy would be for the counselor to suggest that the clients ask family and friends for support in setting up the bands (e.g., tie loops in ends, find appropriate spots in the clients' home to use the bands). Additionally, the counselor can foster greater discussion with the clients about other opportunities to use their home and local environments for engaging in PA.

Finally, the GIM and PAL service providers should consider modifying the service protocol to provide more suitable programming for clients who are already engaging in PA. Currently, counseling sessions are tailored to the client's stage of change within the Health Action Process Approach model [27] by providing specific content depending on the client's intentions to be physically active [7]. However, the present findings reveal that the GIM and PAL services are only adequately tailored for individuals who are novices in the domain of PA (i.e., non-intenders and intenders), and are unable to fully meet the needs of individuals who are

already physically active (i.e., actors). Both services already connect clients to health professionals and fitness trainers in their local community, where available, which may help serve the needs of non-users. However, in order to adequately meet the needs of non-users who are already engaged in PA, the GIM and PAL services would have to provide more advanced exercise-based tailoring beyond basic behavioural counselling strategies (e.g., advanced exercise routines, sport-specific training programs and local sport engagement opportunities). Tailoring the service in this way is currently not within the objectives of the services, but is a direction for future consideration.

Along with suggestions for refining the current service delivery, this study provides important evidence to support current components of the GIM and PAL services that should continue to be implemented. Generally, both of these PA counseling services should remain free, easily accessible, and continue to provide basic equipment. The counselor was a strong internal pillar of support that was highly important to all adopters in order to effectively utilize these services. As such, end-users would continue to benefit from a supportive and understanding counselor who is highly knowledgeable about the PA needs of individuals with physical disabilities. The aforementioned service components address commonly cited barriers to PA among individuals with physical disabilities [6, 28]. Lastly, it is essential that both of these PA services maintain a strong focus on behavioural skills counseling, allow for gradual building of behavioural skills and promote the integration of PA in daily life [29].

### **Study strengths and limitations**

To our knowledge, this is the first study to use the TDF to examine factors influencing previous and potential end-users' adoption of an applied PA-enhancing intervention. As suggested by Stoutenberg and colleagues [30], a barrier to implementing applied services that

promote PA is that there is often a formal lack of assessment and reporting of barriers to implementation, as few community-based programs have evaluations built into them once they have been implemented. This study provides an example of a theory-informed approach to examining end-users' perceived barriers and facilitators of service adoption. Through the use of intervention mapping [31], the domains within which the themes arise can now be linked to behaviour change technique strategies that can mitigate barriers and enable facilitators. These resulting behaviour change techniques can inform the development of a refined version of the services. This study also provides lessons learned that will be useful to future iterations of the GIM and PAL services, as well as to other researcher and practitioner teams that aim to translate evidence-based PA-promoting services into additional contexts.

A limitation to the study is that the self-selected non-user sample tended to be a highly active group of individuals with disabilities (e.g., classified as “actors” within the Health Action Process Approach model; [27]). Non-users were recruited from participant databases of SCI Action Canada and *Adaptavie*, using a recruitment script that included “PA counseling service” which likely caught the attention of already physically active participants, thus potentially leading to participation bias. Non-users who can be classified as “intenders” or “non-intenders” within the Health Action Process Approach model were not sampled; thus, the sample in this study only represents one group of non-users who has not yet been reached by GIM and PAL. Inclusion of persons with physical disabilities who are not yet active (i.e., non-intenders and intenders) would provide a more comprehensive perspective on how to best target future recruitment and service refinements for these samples.

A second limitation is that we did not examine client differences between the two services; thus we do not have a comparison between the GIM and PAL participants' responses.

However, our sample size was relatively small to split the data in this way, and this was not the overall focus of this study.

### **Conclusion**

Grounded by the TDF, the study findings provide strategies to improve recruitment and initial adoption of the GIM and PAL services, along with strategies to improve service retention and better meet the needs of current service users. The theoretically-informed feedback received from non-users and previous service adopters has provided the GIM and PAL researchers and staff with insight into how to refine the services moving forward.

### **Endnote**

<sup>a</sup>The study was designed and interviews were conducted prior to the release of the updated version of the TDF (TDF 2 [32]); hence, our reasons for using the original TDF released in 2005 [13].

### **Acknowledgements**

The authors would like to thank Tanya Scarapicchia for conducting the French to English translations of the PAL interview transcripts.

### **Declaration of Interest**

The research was supported by COM-QOL and its funding through the Ontario Neurotrauma Foundation (ONF) and the Provincial Rehabilitation Research Network (REPAR) Ontario/Québec Inter-Provincial Partnership grant, a University of Toronto Faculty of Kinesiology and Physical Education Research Grant awarded to KAN and by a Knowledge

Translation Canada postdoctoral grant awarded to MEL. Preparation of the manuscript was supported by a Knowledge Translation Canada fellowship awarded to JRT. FR is a *Fonds de recherche du Québec – Santé (FRSQ)* Research Scholar (Junior 1). AELC is a Tier II Canadian Institutes for Health Research (CIHR) Canada Research Chair. At the time the study was conducted, funding for the GIM service was provided by the Rick Hansen Institute and the Ontario Neurotrauma Foundation. GIM is currently funded by Human Resources and Skills Development Canada. PAL is funded by *Adaptavie*.

## References

1. Cooper RA, Quatrano LA, Axelson PW, Harlan W, Stineman M, Franklin BA, et al. Research on physical activity and health among people with disabilities: A consensus statement. *J Rehabil Res Dev.* 1999;36(2):142-59.
2. Durstine JL, Painter P, Franklin BA, Morgan D, Pitetti KH, Roberts SO. Physical activity for the chronically ill and disabled. *Sports Med.* 2000;30(3):207-19.
3. Giacobbi PR, Stancil M, Hardin B, Bryant L. Physical activity and quality of life experienced by highly active individuals with physical disabilities. *Adapt Phys Activ Q.* 2008;25:189-207.
4. Heath GW, Fentem PH. Physical activity among persons with disabilities: A public health perspective. *Exerc Sport Sci Rev.* 1997;25:195-233.
5. Tomasone JR, Wesch N, Martin Ginis KA, Noreau L. Spinal cord injury, physical activity, and quality of life: A systematic review. *Kinesiol Rev.* 2013;2:113-29.
6. Rimmer JH, Riley B, Wang E, Rauworth A, Jurkowski J. Physical activity participation among persons with disabilities: barriers and facilitators. *Am J Prev Med.* 2004;26:419-25.
7. Arbour-Nicitopoulos KA, Tomasone JR, Latimer-Cheung AE, Martin Ginis KA. Get In Motion: An evaluation of the reach and effectiveness of a physical activity telephone counseling service for Canadians living with spinal cord injury. *Phys Med Rehabil.* 2014;6:1088-96. doi: 10.1016/j.pmrj.2014.05.018.
8. Martin Ginis KA, Latimer-Cheung AE, Corkum S, Ginis S, Anathaspoulos P, Arbour-Nicitopoulos KA, et al. A case study of a community-university multidisciplinary partnership approach to increasing physical activity participation among people with spinal cord injury. *Transl Behav Med.* 2012;2:516-22. doi: 10.1007/s13142-012-0157-0.
9. Cowan RE, Nash MS, Andersen KD. Exercise participation barrier prevalence and association with exercise participation status in individuals with spinal cord injury. *Spinal Cord.* 2013;51:27-32. doi: 10.1038/sc.2012.53.
10. Statistics Canada. A profile of persons with disabilities among Canadians aged 15 years or older, 2012. Online catalogue: 89-654-X 2015. Available from: <http://www.statcan.gc.ca/pub/89-654-x/89-654-x2015001-eng.htm - n3>.
11. Tomasone JR, Donald B, Arbour-Nicitopoulos KP, Latimer-Cheung AE, Martin Ginis KA. Get in Motion: Correlates of clients' adherence to a telephone-based physical activity counseling service. Society of Behavioural Medicine Conference; Philadelphia 2014.
12. Esterberg KG. *Qualitative Methods in Social Research.* Boston: McGraw Hill; 2002.
13. Michie S, Johnston M, Abraham C, Lawton R, Parker D, Walker A, et al. Making psychological theory useful for implementing evidence based practice: a consensus approach. *Qual Saf Health Care.* 2005;14:26-33. doi: 10.1136/qshc.2004.011155.
14. O'Reilly M, Parker N. 'Unsatisfactory Saturation': A critical exploration of the notion of saturated sample sizes in qualitative research. *Qual Res.* 2013;13:190-7. doi: 10.1177/1468794112446106.
15. Martin Ginis KA, Phang SH, Latimer AE, Arbour-Nicitopoulos KA. Reliability and validity tests of the leisure time physical activity questionnaire for people with spinal cord injury. *Arch Phys Med Rehabil.* 2012;93:677-82.
16. Martin Ginis KA, Hicks AL, Latimer AE, Warburton DER, Bourne C, Ditor DS, et al. The development of evidence-informed physical activity guidelines for adults with spinal cord injury. *Spinal Cord.* 2011;49:1088-96. doi: 10.1038/sc.2011.

17. Latimer-Cheung AE, Martin Ginis KA, Hicks AL, Motl RW, Pilutti LA, Duggan M, et al. Development of evidence-informed physical activity guidelines for adults with multiple sclerosis. *Arch Phys Med Rehabil*. 2013;94(9):1829-36.e7. doi: 10.1016/j.apmr.2013.05.015.
18. Verschuren O, Peterson MD, Balesman ACJ, Hurvitz EA. Exercise and physical activity recommendations for people with cerebral palsy. *Dev Med Child Neurol*. 2016. Epub Feb 7 2016. doi: 10.1111/dmcn.13053.
19. Boyatzis R. Transforming qualitative information: thematic analysis and code development. Thousand Oaks, California: SAGE Publishing, Inc.; 1998.
20. Curran J, Brehaut J, Patey A, M O, Stiell I, Grimshaw J. Understanding the Canadian adult CT head rule trial: use of the theoretical domains framework for process evaluation. *Implement Sci*. 2013;8:25. doi: 10.1186/1748-5908-8-25.
21. Patey A, Islam R, Francis JJ, Bryson GL, Grimshaw JM, Canada PRIME Plus Team. Anesthesiologists' and surgeons' perceptions about routine pre-operative testing in low-risk patients: application of the Theoretical Domains Framework (TDF) to identify factors that influence physicians' decisions to order pre-operative tests. *Implement Sci*. 2012;7:52. doi: 10.1186/1748-5908-7-52.
22. Guest G, Bunce A, Johnson L. How many interviews are enough? An experiment with data saturation and variability. *Field Methods*. 2006;18(1):59-82. doi: 10.1177/1525822X05279903.
23. Nicholls D. Qualitative research: Part one - Philosophies. *Int J Ther Rehabil*. 2009;16(10):526-33.
24. Martin Ginis KA, Nigg CR, Smith AL. Peer-delivered physical activity interventions: An overlooked opportunity for physical activity promotion. *Transl Behav Med*. 2013;3:434-43.
25. Brawley LR, Arbour-Nicitopoulos KP, Martin Ginis KA. Developing physical activity interventions for adults with spinal cord injury. Part 3: A pilot feasibility study of an intervention to increase self-managed physical activity. *Rehabil Psychol*. 2013;58:316-21. doi: 10.1037/a0032814.
26. Stapleton JN, Martin Ginis KA. Experimental investigation of the efficacy of a peer-facilitated, Skype-delivered physical activity intervention for persons with spinal cord injury. The International Spinal Cord Society & American Spinal Injury Association; Montreal 2015.
27. Schwarzer R. Modeling health behavior change: how to predict and modify the adoption and maintenance of health behaviors. *Appl Psychol*. 2008;57:1-29.
28. Scleza WH, Kalpakjian CZ, Zemper ED, Tate DG. Perceived barriers to exercise in people with spinal cord injury. *Am J Phys Med Rehabil*. 2005;84:576-83.
29. Brawley LR, Rejeski WJ, King AC. Promoting physical activity for older adults: The challenges for changing behavior. *Am J Prev Med*. 2003;25:172-83.
30. Stoutenberg M, Stanzilis K, Falcon A. Translation of lifestyle modification programs focused on physical activity and dietary habits delivered in community settings. *Int J Behav Med*. 2015;22:312-27.
31. Michie S, Johnston M, Francis J, Hardeman W, Eccles M. From theory to intervention: Mapping theoretically derived behavioral determinants to behavior change techniques. *Appl Psychol*. 2008;57(4):660-80. doi: 10.1111/j.1464-0597.2008.00341.x.

32. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implement Sci.* 2012;7:37. doi: 10.1186/1748-5908-7-37.

Table 1. Participant demographic characteristics.

<b>Variable</b>	<b>Adopters <i>n</i> = 26</b>	<b>Non-Users <i>n</i> = 13</b>
<b>Age (years), <i>M</i> ± <i>SD</i></b>	53.35 ± 12.06	49.91 ± 10.79
<b>Years post-injury, <i>M</i> ± <i>SD</i></b>	23.66 ± 19.01	20.67 ± 10.78
<b>Sex</b>		
Male	8 (30.8)	10 (76.9)
Female	18 (69.2)	3 (23.1)
<b>Disability</b>		
Spinal cord injury	10 (38.5)	8 (61.5)
Other physical disability	16 (61.5)	5 (38.5)
<b>Mode of mobility</b>		
Manual chair	8 (30.8)	8 (61.5)
Power chair	10 (38.5)	1 (7.7)
Gait aid/Walk independently	12 (46.2)	5 (38.5)
<b>Marital status</b>		
Single	7 (26.9)	5 (38.5)
Married/common law	13 (50.0)	4 (30.8)
Divorced/widowed/separated	6 (23.1)	4 (30.7)
<b>Highest level of education</b>		
Post-secondary	16 (61.5)	10 (76.9)
High school/other	10 (38.5)	3 (23.1)
<b>MVPA (mins/week), <i>M</i> ± <i>SD</i></b>	107.28 ± 143.93	385.20 ± 231.09

*Note.* MVPA, moderate-vigorous physical activity. All values are *n* (%) unless indicated as *M*±*SD*.

Table 2. Summary of themes and sample quotes from service non-users ( $n = 13$ ) assigned to theoretical domains in relation to enrollment and participation in the GIM or PAL services.

TDF Domain	Theme	Supporting Quotes
Knowledge	Participation interest dependent on current activity level	“[Participating in the service] is where I hesitate a little bit is just with how involved with sledge hockey I am. If I have a program like [service], and it gave me the venue to access different sports, I would be interested in it cause that’s the one thing I’ve been starting to look at – is try some different sports” –John
	Limited knowledge of service’s purpose	“Well I think that [the service] try to get it so a group of people get together and do a sort of activity so there is a sort of camaraderie and a sense of being like you’re one of a group and you’re all starting at the same fitness level and you can all workup to whatever level you can get to. So it doesn’t matter if you’re just beginning a sporting action or if you’ve been doing it for a little while. It brings you all together and it helps build up your confidence in yourself and I think its good to get out and participate with a group because if you do it on your own, you have a tendency to backslide and not do it.” –Mary
	Promotion through health services, disability organizations, and social networking	“If you can [promote PA] into the rehabilitation centres [...] At that point you have so many questions, we think our life is over, we have no idea of what we can do. I had no idea that I was going to be able to walk[...] So if you can work it out with the OTs and physiotherapists and maybe get them to promote or guide them to you I guess. Or you know, you could go in and do presentations for the (rehab centre) – that would help too.” –Mike
Environmental Context and Resources	Access to suitable facilities, equipment, and transportation facilitate participation in PA	“Equipment in general. [...] There’s only so many things that I can do and for certain things I need specific equipment... I have to plan it so I have equipment all the time.[...]I want to say that there’s more [PA] programs that I’m starting to find but its just been a very slow process just from my lack of knowledge. So just finding the knowledge to find resources out there is a big obstacle that I’ve had.” –John
Belief in Capability	Desire to participate dependent on perceived capability for PA	“I think that given the proper guidance and encouragement, I think I would be, I would say better than 50% that I would get out and complete a program like this. Without the encouragement or the mentorship, it might drop down to 20 or 30% or less.” –Mary
Belief about Consequences	Participation could lead to positive physical and psychosocial benefits	“Getting information about PA is always a good thing [...] it helps your mindset and everything – you stay active, you stay health, and become outgoing.” –Steve
Emotions	Psychological hurdles might impede participation	“As I say, sometimes your mind gets stuck in a rut because you spiral down and so once your mind gets like that, its really hard to get motivated again and if you don’t have that motivation then sometimes bad things happen. [...] I think when your mental state is really low, you don’t want to participate in anything. Its all mental” –Mary
Skills	Tailor to individual clients’ PA skills and characteristics	“The knowledge that a personal trainer has about fitness and imparting that to me and sort of creating an exercise program that would work best for me, based on his personal knowledge of who I am and what I need” –Matt
	Highly-skilled active individuals have less need for the service	“That type of a service wouldn’t be terribly useful I don’t think. I mean I’m really quite active – so like I said I play basketball a couple of times a week, hand cycling – I have a hand ergometer at home and exercise equipment that I use regularly and that kind of stuff. [...] Motivation is not an issue here” –Matt

Social Influences	High engagement of social support in all aspects of the service	<p>“The pain gets worse anyway, with time and wear and tear on your body. Sometimes you need somebody to push you. I think if you had somebody who could give you that little push every now and again, and say ‘this program is for you, and a program you can easily participate in’ and I think I could easily participate in.” –Mary</p> <p>“But most of these types of things do better with peer mentoring, peer testimonials, and word of mouth communication between the disabled people, either with similar disabilities or a disability in general and recommending it.” –Craig</p> <p>“Over the phone, I’m not sure you could [acquire successful trainers to train people to work with weights and cables], so the actual ability to use [equipment] has to be learned, so physical access and/or learning how to use [equipment] specifically for people with disabilities does work” –Matt</p>
Memory, Attention, and Decisional Processes	(Domain not applicable to non-users)	
Motivation and Goals	(Domain not applicable to non-users)	
Nature of behaviours	PA already a routine part of their life; limited need for service	<p>“I just sort of maintained a level of fitness over the years [...] Over the years, I guess we’re talking 35-36 years, I’ve sort of maintained the same level of activity, whether its going for long walks and biking and playing basketball – that has maintained over the years and even though I’m 61 I’m still working out kind of thing” –Matt</p>
Social roles and Identity	Greater match between client needs and service offerings would bolster enrolment	<p>“The big thing [for an appropriate SCI PA service] is just to be sensitive in terms of realizing the type of disability and maybe being sensitive to the challenges that each disabled person encounters because everyone is unique in what they’re facing, so being conscious and aware of that and being able to adapt and apply in terms of whatever it may be, programming or schedules or the activity itself” –Craig</p>
Behavioural regulation	Use of self-regulatory strategies facilitates ongoing participation in PA	<p>“There needs to be some kind of goals [...] there should be some sort of gains that can be measured” –Matt</p>

*Note.* Names have been changed to maintain participant anonymity. PA, physical activity; SCI, spinal cord injury; TDF, Theoretical Domains Framework [13].

Table 3. Summary of themes and sample quotes from service adopters ( $n = 26$ ) assigned to theoretical domains in relation to enrollment and participation in the GIM or PAL services.

TDF Domain	Theme	Supporting Quotes
Knowledge	Purpose is well-known	“It’s about [talking] with a kinesiologist, setting goals together, then establish a program according to my objectives and the results I want to achieve. It’s good and it’s more suitable than other program for people with disabilities.” –Stacey
	Clarify purpose at onset	“At the beginning, what I was afraid of when we spoke about it, what that I had to. I thought that you had to go on walks and run and things like that, even though it was with people with limitations. [Then the counselor] said no, no. She said you go at your rhythm, you have a follow-up etc. And when she explained that to me, I began to realize that there was maybe a possibility that the whole thing could work for me.” –Melanie
	Credible and knowledgeable counsellors in disability and PA	“The trainer was very knowledgeable and credible. [...] I thought it was excellent to be able to have that kind of training from someone who knew about (disability) and stuff” –Emma
Environmental Context and Resources	Resistance bands facilitate PA; however ongoing support is required for their use	“There were good intention; we got a pamphlet with information. And elastics. But for me it wasn’t sufficient to meet my needs.” – Catherine
	Activity plans not easily carried out in clients’ environment	“...I mean snow, well I mean weather can interfere if your workout goes beyond your living room and you’re going somewhere to work out or you’re going to wheel, of course the weather can interfere.” –Danielle
Belief in Capability	Provides a way to cope with the many barriers to PA	“There’s a holiday coming up in the fall that I’m going to be away for a while and at that time my regular routine is going to fall by the wayside big time and I may even gain a couple of pounds, however I’m not going to let that get in the way and stop me from when I get back from my holiday. I am going to be as physically active as I can during my holiday, there is going to be a gym available but if it will work for someone in a wheelchair it remains to be seen but I will still take my therabands [provided by service] with me and still be able to do a bit. But if I don’t I’m not going to beat myself up, I’m just going to start when I get back home again.” –Danielle
	High perceived capability for participating	“I started out quite confident [...] I like the material and I like the idea of having contact with a counselor and I certainly liked the CD and there was some equipment provided. I think I had those strength bands.” –Amanda
Belief about Consequences	Increased PA and improved activities of daily living	“Before [the service] I needed a sliding board to transfer into the car but now I don’t. So it makes you more independent and you can get along with other people more easily too. Without the transfer board, you can be stronger and more independent” –Lisa
	Benefits outweigh the efforts required	“It’s worth it [...] it allows me to maintain my weight and my waistline [...] because I’m diabetic, it also helps me to stay in shape [...] it’s a lot of work but it’s fun [...] it’s possible that they will stop my pills from diabetes” –Geoff
Emotions	Fluctuating mood/emotions a barrier to maintaining participation	“Of course [emotions influenced my participation in the service]. Plus the fact that I’m [...] a menopausal woman so I am subject to quite a varied amount of emotion. Well on days when I would not have done anything because I felt that I had a system of going and recording and keeping track of what I did, I went anyway no

		matter how I felt right? On the flip side, when you're encouraged and things are going great, it was easy to keep going." –Danielle
	Fostered sense of pride	"I was for sure proud of myself... well actually not just at the beginning but throughout. I saw little improvements so I was happy... and the fact that I was happy was a plus" –Susie
Skills	An adaptable and skill-matched service would promote skill development	"Some exercises that didn't take into consideration arm strength and arthritis. [...] I felt there wasn't anything sort of supplementing what we could do in terms of exercise. [...] Every condition is different and to have this pigeon holed SCI I think everybody should be especially in terms of what their physical condition and ability can be." –Amanda
Social Influences	Internal support facilitates clients' PA participation	"During one time, I think I had a pressure sore or something so I had to lay off for a bit, but the counselor was very supportive and understanding of that happening. Maybe other fitness trainers may not fully understand, but they seem to understand more the SCI side of it so that's good, it was helpful." –Lisa
	External support facilitates maintenance of participation	"[My social circle] facilitates [PA]. Well because they motivate me, if there're around there're like "go ahead, we know it's important to you" and that's part of the motivation. Encourage me in the sense that I didn't feel like going but I went anyway." –Stacey
Memory, Attention, and Decisional Processes	Ease of scheduling sessions impacted decision to continue participation	"I had a few problems with that because the [service] was in Ontario and I am here in Alberta so there's a 2 hour time difference [...] and I would have to ask him to call back" –Dan
	Telephone-delivery a barrier for learning and remembering exercises that were recommended	"I just wasn't so sure of so trying to explain things over the phone for how to do it wasn't 'like you need to work this muscle or that muscle or whatever' so trying to do the triceps muscles wrong and I didn't know that up until the third counseling session when I said 'tell me again how to do this because I still don't feel like I'm getting what I need from the exercise' so when he laid it out I was listening and I think I got it so. But its hard to do it over the phone and he would say 'look at the videos' and I would say 'well I can't do it that way' and that was the problem, he would go 'follow the video' and I would say 'well I can't get that, I can't do it that way'." –Stephanie
Motivation and Goals	Mastery experience fostered motivation to continue participation	"The more you do something and get a good result from it, the more you'll do it. So you know, training you get a good result you just keep doing it! And because I was getting good results from knowing [the counsellor] was going to call and seeing it on my calendar, it kept me doing the program and kept me doing my physical program" –Danielle
	Additional self-motivational strategies necessary to bolster commitment to planned activities between counselling sessions	"[The service] should have some sort of personal trainer come to you home because the we don't go out to regular exercise establishments, [...] doing it alone [...] was hard to stick to and do. I mean I did it a few times but it wasn't motivating enough." –Amanda
Nature of behaviours	Fostered integration of PA into daily life	"I didn't have any problems with maintaining it, and in fact it was good because when I first started doing exercises at home with the therabands and stuff, and whatever weights you could find to lift, then as I got stronger and stuff, I actually checked out a couple of local gyms and before I would never do that." –Lisa
	Redefined what it means to be physically active	"If I didn't have this program, I would have never thought to set up at home and do exercises" –Jessica

Social roles and Identity	Components of service meeting the PA needs of those with disabilities	“Having a person who can actually give recommendations on fitness activities with the knowledge of SCI is very helpful and not easy to come by in the gyms or anywhere else where people have any clue or can give any advice about how exercises can be adjusted by a person with an injury.” –Jason
	Heightened emphasis on providing social engagement opportunities would enhance clients’ experience	“My counselor did not have SCI so I found that difficult to relate. You know I thought ‘do you know what this is like?’ for us or that kind of thing, not in a bad way, just more in a .. when [the counselor] would tell me what kind of research he had done to back up his suggestions. [...] for instance, lets say you miss an entire week because your whole bowel routine is thrown off and you’re scared to even bend over, so you’re talking to someone who has nooo idea what you’re going through, so they have no way to encourage you though that. Versus just ‘keep trying’ and ‘maybe try this maybe try that’ but they may not know what you’re facing.” –Danielle
Behavioural Regulation	Promotion of development and realistic use of self-regulatory strategies	“I would plan it, like I would put it down in my calendar and it would be ‘okay I’m going to work out on this day, at this time’ just like [the service] said” –Stephanie

*Note.* Names have been changed to maintain participant anonymity. PA, physical activity; SCI, spinal cord injury; TDF, Theoretical Domains Framework [13].