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Research Article

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Objectives: This project used a systematic and integrated knowledge translation (IKT) approach to co-create theory- and evidence-based best practices for physical activity counseling for adults with spinal cord injury (SCI).

Methods: Guided by the IKT Guiding Principles, we meaningfully engaged research users throughout this project. A systematic approach was used. An international, multidisciplinary expert panel ($n = 15$), including SCI researchers, counselors, and people with SCI, was established. Panel members participated in two online meetings to discuss the best practices by drawing upon new knowledge regarding counselor-client interactions, current evidence, and members' own experiences. We used concepts from key literature on SCI-specific physical activity counseling and health behavior change theories. An external group of experts completed an online survey to test the clarity, usability and appropriateness of the best practices.

Results: The best practices document includes an introduction, the best practices, things to keep in mind, and a glossary. Best practices focused on how to deliver a conversation and what to discuss during a conversation. Examples include: build rapport, use a client-centred approach following the spirit of motivational interviewing, understand your client's physical activity barriers, and share the SCI physical activity guidelines. External

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experts ($n = 25$) rated the best practices on average as clear, useful, and appropriate.

Conclusion: We present the first systematically co-developed theory- and evidence-based best practices for SCI physical activity counseling. The implementation of the best practices will be supported by developing training modules. These new best practices can contribute to optimizing SCI physical activity counseling services across settings.

Keywords: Spinal cord injury, Physical activity, Behavioral support, Counseling services

Introduction

Physical activity (PA) counseling can be an effective way to promote and increase PA [1–3], and subsequently improve overall well-being in adults with spinal cord injury (SCI) [4–6]. PA counseling support services are provided in a variety of settings (e.g. rehabilitation centers or hospitals [7, 8], community organizations [9], fitness centers/gyms [9], SCI peer mentorship programs [10], research studies [11]) and delivered by counselors with different backgrounds and expertise (e.g. SCI peer mentors, physiotherapists, recreation therapists, coaches) [12]. As a result, there is tremendous variability in how PA counseling support is currently delivered to and received by adults with SCI.

This variability in PA counseling has been demonstrated in reviews of PA behavior change interventions among people with physical disabilities, including SCI [1, 2, 13]. To illustrate, Tomasone *et al.*'s review [2] identified 32 behavior change techniques (BCTs are *observable, replicable and irreducible components of an intervention that are designed to change a behavior* [14]) in SCI PA counseling interventions delivered in different settings and countries. These reviews showed large heterogeneity in clients' PA behavior outcomes, indicating that not everyone benefits from PA counseling support [1, 2]. Despite this heterogeneity, the findings of these reviews provided important directions for improving PA counseling interventions for people with SCI. In short, the findings [1, 2, 13] indicated that PA counseling interventions should:

- Be developed using a theoretical framework (*i.e.* interventions informed by theory are more effective than interventions that did not use theory);
- Implement BCTs that incorporate self-monitoring (*i.e.* interventions including self-monitoring techniques, such as action planning or goal setting, are more effective than those without);
- Be tailored to the client's characteristics, needs, preferences and context [15] (*i.e.* interventions should address the unique PA barriers of people with SCI).

While these findings provide valuable general directions for designing and delivering counseling interventions to adults with SCI, they do not provide specific evidence-based guidance for counselors working in a variety of settings on how to deliver and tailor PA behavioral support that will result in positive changes in clients' PA, health, and psychosocial well-being. Without more specific guidance, counselors may face barriers to providing PA counseling to adults with SCI [12]. For example, they may not know how to optimally provide PA counseling to their clients with SCI, indicating that their clients may not optimally benefit from the delivered PA counseling. Of further concern, a lack of standardized guidance on SCI PA counseling hinders efforts to advance our understanding of effective SCI PA counseling services.

A possible way to improve SCI PA counseling services and advance our knowledge on SCI PA counseling, is to co-create theory- and evidence-based best practices for SCI PA counseling. Best practices can be defined as *procedures that have been shown by research and experience to produce optimal results and that are established or proposed as a standard suitable for widespread adoption* [16]. Developing such best practices can help counselors to optimize and tailor the delivery of PA counseling to their clients with SCI. Furthermore, applying the same counseling best practices in different settings and different countries may result in the more consistent delivery of counseling support services. Greater consistency in delivery will provide better opportunities to learn from one another and advance our understanding on what type of behavioral support works best for whom.

To ensure such theory- and evidence-based best practices will be relevant and useful for the large and diverse group of potential end-users (e.g. counselors, SCI peer mentors, researchers, intervention developers), they should be developed following a systematic approach in which perspectives from end-users are considered [17]. An example of such an evidence-informed approach is the 10-step knowledge translation (KT) approach that was used to translate the scientific SCI exercise guidelines to community and clinical guidelines [18]. This KT approach, which is characterized by rigor, end-user engagement, and transparency, was developed by building upon previous literature and frameworks

on guideline development and KT, including the widely used Appraisal of Guidelines, Research and Evaluation (AGREE) II instrument [19]. Meaningful engagement of relevant end-users throughout the development process (*i.e.* integrated knowledge translation [IKT] [20]) can contribute to products that are more relevant and useful. To our knowledge, no research has focused on identifying best practices for SCI-specific PA counseling using a systematic and IKT approach. Theory- and evidence-based best practices for SCI-specific PA counseling may help counselors in various settings to optimize the delivery of counseling support to their clients with SCI. This project aimed to use a systematic and IKT approach to co-create theory- and evidence-based best practices for PA counseling for adults with SCI.

Methods
Project overview
This project is part of a larger 2-phase project on understanding and improving SCI exercise counseling (see Open Science Framework (OSF); https://osf.io/gx5n8). This paper reports on phase 1, which focuses on co-creating best practices for SCI-specific PA counseling. The development process was guided by four steps of Hoekstra *et al.* (2020) evidence-informed 10-step KT approach [18]. These four steps were modified to the scope of this project and include: (1) Establish the expert panel, (2) Prepare panel meetings, (3) Discuss and co-create best practices, and (4) Pilot test the best practices with an external group of experts. The remaining steps of the 10-step KT approach focus primarily on developing and evaluating a supporting evidence-based resource, which will be addressed in phase 2 of the project.

We approached this project from a pragmatic perspective, meaning that the primary aim of the research is *to use research findings to solve practical 'real-world'* *problems* [21]. Pragmatism focuses on the practical outcomes of the knowledge in a specific context. Aligning with our pragmatic perspective, we made decisions throughout the project with an emphasize on creating actionable and useful knowledge (*i.e.* best practices for SCI physical activity counseling). Furthermore, pragmatism aligns with an ontological relativist paradigm, which means that truth is uncertain, and based on what works in certain contexts. In other words, what is considered real for one person, may not be real for someone else.

Aligning with a pragmatic perspective, this project was conducted using an IKT approach. IKT is defined here as the *meaningful engagement of the right* *research users at the right time throughout the SCI* *research process* [22]. The IKT Guiding Principles for conducting and disseminating SCI research in partnership (www.iktprinciples.com) were used to guide our collaborative engagement activities [22]. Appendix 1 provides further details on the principles and strategies used to engage research users. Figure 1 summarizes the steps taken to co-create the best practices.

Step 1: establish the expert panel
We established an international, multidisciplinary panel of 15 experts in the field of PA counseling for adults with SCI. The expert panel included people with SCI, counselors, behavior change researchers, KT/implementation researchers, SCI researchers, SCI peer mentors, and representatives of organizations providing counseling services (age: 42.1 ± 11.3 years, 86% women, 21% with lived experience in SCI, 79% have ever spent 24 consecutive hours with a person with SCI). Appendix 2 outlines panel members' names, expertise, organizations and group-level demographics as well as additional information about the selection process and hierarchical relationships between members (e.g. trainee-supervisor). Seven members of
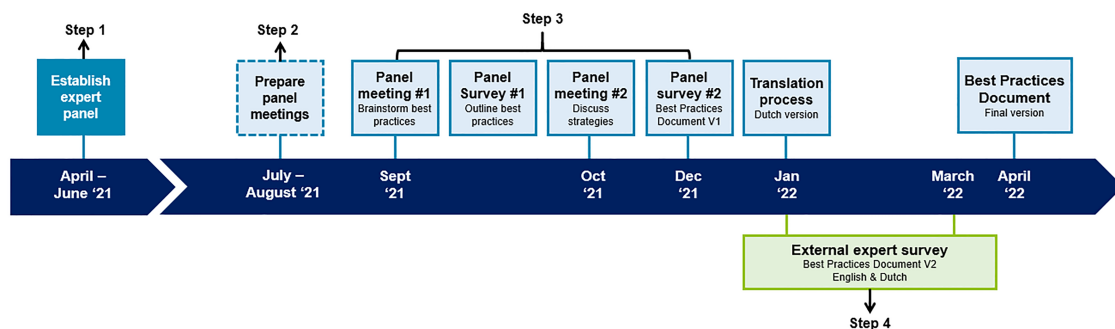
Figure 1 Project overview of the steps taken to co-create the theory- and evidence-based best. The 4 steps include: (1) Establish the expert panel, (2) Prepare panel meetings, (3) Discuss and co-create best practices, and (4) Pilot test the best practices with an external group of experts.

the panel (46%) have previous or current relationships with other members as trainee or supervisor.

Step 2: prepare discussion meetings

Two online panel meetings were organized to discuss and co-create the best practices. To prepare these meetings, the lead authors (FH, HG, KMG) outlined the scope and purpose of the project (see Appendix 3), identified the evidence base, drafted meeting agendas and shared preparation material with panel members. Panel members were asked to review the preparation material prior to the meetings. The evidence base was used to prepare the discussion meetings and inform the best practices and included (1) key literature on SCI PA counseling from three reviews [1, 2, 13], and (2) new knowledge on SCI PA counseling characteristics from an effective SCI-specific PA counseling intervention [23–27]. Appendix 4 provides further details on how we identified the reviews and the evidence base. Meeting agendas, preparation material, and further details on meeting procedures are available on OSF (https://osf.io/u7dsg/).

Step 3: discuss and co-create best practices

Two 2-hour online panel meetings took place in September and October 2021. After each meeting, an online survey was conducted to collect additional feedback and comments from panel members (Fig. 1).

During the first meeting, the panel discussed and brainstormed potential best practices for SCI PA counseling by drawing upon the identified evidence base, including new knowledge regarding SCI PA counseling characteristics, and panel members' own knowledge and experiences. Prior to the first meeting, panel members were asked to watch a 25-minute pre-recorded presentation by the first author (FH) on the new knowledge on SCI PA counseling characteristics and counselor-client interactions. The meeting included whole-group discussions and three break-out room discussions. The break-out room discussions focused on the following topics: communication & interaction, tailoring support to the individual, assessing PA behavior, barrier identification and problem solving, goals & planning, and education on PA. The meeting was recorded using Zoom-recording software. For each break-out room, a note-taker was present to take notes and facilitate the recording of the session. After the meeting, the first author (FH) drafted a summary of the meeting by listening to the Zoom-recordings and reading notes from all note-takers. The first author held two de-briefing meetings with the other two lead authors (HG, KMG) to reflect on the

meeting and discuss next steps of the project. Afterwards, FH drafted an outline of the best practices that reflected points discussed during the meeting.

Panel members were asked to review this outline and provide feedback via completing an online survey (Panel Survey #1 in Fig. 1). The survey was created by the first author (FH) in collaboration with other lead authors (HG, KMG) and included questions about the proposed outline of best practices, next steps of the development process, panel members' demographics, and the IKT approach. Survey results were used to inform the discussion and agenda of the second meeting.

The second meeting focused on discussing strategies/ techniques about each of the proposed best practices topics. In small group discussions, panel members shared example techniques/strategies of things that *should be* done, *could be* done, and *should not be* done by drawing from their own experiences and expertise. After the meeting, FH drafted a meeting summary by listening to the recordings and reading the notes. Afterwards, FH discussed with other lead authors how and which behavior change theories aligned with what was discussed and recommended by the panel, and what theories should be used to guide the best practices document. FH then drafted a first version (V1) of the best practices.

Panel members were asked to review this document and provide their feedback via a short online survey (Panel Survey #2 in Fig. 1). This survey included items to assess the clarity, usability and appropriateness of the best practices document V1. The survey was constructed by lead author (FH) using items from previous projects on the development of the SCI PA guidelines and IKT Guiding principles [18, 22]. Descriptive statistics (means, standard deviations [SD], medians, ranges) were calculated and presented. FH summarized panel members' feedback on the best practices document V1 and steps taken to address the feedback (Appendix 5). This document, together with the revised version of the best practices (Version 2; V2) was shared with the panel for their approval to start pilot testing with external experts (step 4). The best practices document V2 was translated into Dutch. Information on the translation process from English to Dutch is available on OSF.

Step 4: pilot test the best practices with an external group of experts

An online survey was conducted to pilot test the clarity, usability, and appropriateness of the English and Dutch version of the best practices documents with an external

group of experts. External experts (researchers, counselors, people with SCI, clinicians) in SCI PA counseling and/or health behavior change were invited to review the best practices document V2 and provide their feedback. Experts were recruited via panel members' own networks. The survey included the same items as the second panel survey (Panel Survey #2). Descriptive statistics for each survey item were calculated and presented. FH summarized experts' feedback in one document including the responses on how to address the feedback (Appendix 6). This document, the revised and final versions of the best practices documents, were shared with panel members for final approval.

Results

Step 3: discuss and co-create best practices

Table 1 summarizes panel recommendations, the evidence base, selected theories used to inform the best practices and the final best practices. The panel decided to create a main best practices document including a general introduction, the best practices, things to keep in mind, and a glossary. A separate supplementary file outlining example strategies/techniques for each of the best practices is also being created. The best practices focus on how to have a PA counseling conversation and what to discuss during a conversation about PA. The following three behavior change theories/approaches were selected to inform the best practices: Motivational Interviewing (MI) [28], COM-B (Capability, Opportunity, and Motivation model of Behavior) [29] and Health Action Process Approach (HAPA)-model [30].

First, the panel emphasized the importance of focusing on how counseling support should be delivered and recommended using a client-centered approach [28]. This recommendation aligned with a counseling approach called Motivational Interviewing (MI). MI is defined as *a collaborative conversation style to strengthen a person's own motivation and commitment to change*. The principles of MI informed the section on *How to have a conversation?*.

Second, the panel recommended that counselors should *understand* clients' contexts, and their unique barriers, needs, and preferences towards engaging in PA. This recommendation was operationalized by using the components of the COM-B model. The COM-B model provided guidance and structure on the section *What do you say during the conversation?*. The COM-B model was selected for its simplicity, strong theoretical foundation, and applicability for behavior change intervention development and evaluation. The COM-B model

[29] forms the center of the Behavior Change Wheel (BCW), an internationally accepted and widely used tool for developing behavioral interventions. The components of the COM-B can be linked to the BCT Taxonomy [31] facilitating the use of the best practices in intervention development and evaluation.

Third, the HAPA-model [30] was selected to align with panel members' recommendations that counseling support differs depending on clients' PA motivation. The theoretical and practical implications of the HAPA-model have been tested and applied in SCI-specific PA behavior interventions [32–34]. The elements of the HAPA-model were used to provide guidance on how to provide tailored support. According to the HAPA-model and in line with panel members' recommendations, people who are not yet active need different types of counseling support compared to those who are already active.

Step 4: pilot test the best practices with an external group of experts

Survey responses from panel members (*n* = 11) indicated that the English version of the best practices document V1 was rated as clear, useful and appropriate (Table 2). Minor changes were made to address panel members' feedback (Appendix 5). Survey responses from external experts (English: *n* = 13; Dutch: *n* = 12) indicated that the English and Dutch versions of the best practices document were perceived as clear, useful and appropriate (Tables 3 and 4). External experts' feedback mainly focused on clarification and simplification of the best practices document. Appendix 6 summarizes key points of the experts' feedback including a description how we addressed the feedback. The final English and Dutch versions of the best practices for SCI PA counseling are presented in Appendices 7 and 8. The best practices are summarized in Fig. 2.

Discussion

This paper presents the first systematically co-created theory- and evidence-based best practices for SCI-specific PA counseling. The best practices are developed for any individual or counselor providing formal or informal PA behavior support to adults with chronic SCI (>1 year after injury). Counselors include, but are not limited to occupational therapists, recreation therapists, physiotherapists, psychomotor therapists, social workers, kinesiologists, fitness trainers, coaches and SCI peer mentors. They are developed to be used in various settings, such as community organizations, rehabilitation centers, hospitals, fitness gyms, in clients' homes or in research settings.

Table 1 Overview of evidence base, panel's recommendations and co-created best practices.

Evidence base *	Meeting topics	Panel's recommendations from the meetings	Best practices (final)	Theory / approach *	Other SCI supporting literature**
	General	• Best practices should focus on how to have a conversation and what to say during a conversation.			
	General	• Best practices should focus on things that counselors should always do and best practices that counselors could consider.			
	General	• Provide information or tips on things to keep in mind when providing counseling to clients with SCI.			
Review: -Other: [18, 41]	*Communication & interaction*	• Counselors should build rapport and establish a relationship with their client	**How do you have the conversation?** • Build rapport and establish a relationship with your client.	MI [28]	
		• Counselors should use a client-centered approach, such as motivational interviewing.	• Use a client-centered approach following the spirit of Motivational Interviewing.	MI [28]	
Review: [2, 13] Other: [25, 27]	*Tailoring support to the individual*	• Counselors should tailor the support towards clients' PA motivation	• Tailor the support to your client's motivation for physical activity and their current needs, wishes and preferences.	MI [28] HAPA [30]	[33, 34]
Review: [1, 2] Other: [25, 27, 41]	*Assessing physical activity behavior*	• Counselors should always ask about their clients' physical activity	**What do you say during the conversation?** *You should always:* • Ask your client about their current physical activity behavior.	HAPA [30] COM-B [29]	
Review: [1, 2, 13] Other: [25, 40, 41]	*Barrier identification and problem solving*	• Counselors should understand clients' context and their physical activity needs and preferences.	• Understanding your client's physical activity capability, opportunity and motivation.	COM-B [29]	[36, 42, 44]
		• Counselors should identify and understand clients' physical activity barriers.	• Identify and understand your client's physical activity barriers and work together with your client to develop possible solutions to overcome these barriers.	HAPA [30] COM-B [29]	[36, 42, 44]
Review: [1, 2] Other: [25, 27]	*Goals & Planning*	• Counselors should provide support in goal setting and action planning to clients who have intention to engage in physical activity.	*You should consider:* • Working together with your client to set a physical activity goal and create an action plan.	HAPA [30] COM-B [29]	[47, 48]

Continued

Table 1 *Continued*

Evidence base *	Meeting topics	Panel's recommendations from the meetings	Best practices (final)	Theory / approach *	Other SCI supporting literature**
Review: [1, 2, 13] Other: [25, 27]	*Education on physical activity*	• Counselors should consider providing information on benefits that are meaningful to the client.	• Providing information to your client on benefits of physical activity.	COM-B [29]	[5, 6, 17, 42]
		• Counselors should share the SCI-specific physical activity guidelines to clients who have intention to engage in physical activity.	• Sharing the physical activity guidelines for adults with SCI.	COM-B [29]	[18, 45]
		• Counselors should consider share physical activity examples	• Sharing physical activity examples.	COM-B [29]	[18, 49, 50]

Notes: * Appendix 4 describes the procedures to identify the evidence base to inform the best practices. ** The other SCI supporting literature outlines key literature used to operationalize the best practices. This table provides only key SCI-specific supporting literature. A full reference list including other related literature will be available in the supplementary file on Open Science Framework (https://osf.io/u7dsg/).

Theory- and evidence-based best practices

The best practices are based on best available evidence on effective SCI PA behavioral support and are informed by behavior change theories. The unique barriers, needs and preferences of adults with SCI are factored into these best practices, as a result of engaging a diverse group of end-users throughout the development process. By incorporating SCI PA counseling literature and general health behavior change theories into the best practices, we increase the likelihood that applying the best practices will result in effective SCI PA counseling programs [1, 2, 17]. The three key behavior change theories/approaches that were selected to inform the best practices have been applied in previous SCI-specific interventions and studies on PA counseling and promotion (e.g. MI: [7, 35]; COM-B: [36] HAPA-model: [26, 27, 37]). While MI is a promising approach to support health behavior change in a variety of population groups and behaviors, including adults with SCI, its success is also highly dependent on counselors' MI knowledge and skills. As such, we recommend counselors who want to apply the best practices complete a MI course/training and/or a refresher, depending on their previous MI experience. Furthermore, the COM-B model has widely been used to promote behavior change and inform behavior change intervention development in SCI and other contexts (e.g. [36, 38, 39]). Lastly, the strong theoretical and practical implications of the HAPA-model within the SCI-specific PA literature [32–34] may increase the likelihood that the best practices will result in effective SCI PA counseling

programs. To illustrate, the HAPA-model has informed the development of the ProACTIVE SCI intervention, an 8-week SCI PA counseling intervention that resulted in the largest effect sizes to date for improving self-reported PA in adults with SCI [26, 27]. We used new knowledge from the ProACTIVE SCI counseling sessions to inform the best practices [25, 40, 41]. Drawing upon behavior change theories and approaches that have been tested and applied in previous SCI-specific PA counseling interventions may enhance the relevance and use of the best practices in SCI PA counseling interventions.

Scientific and practical implications

We present the first theory- and evidence-based best practices for SCI-specific PA counseling. The new best practices will have the potential to facilitate greater consistency in SCI PA counseling services offered within and outside research settings. Researchers and intervention developers of SCI PA counseling interventions are encouraged to use our best practices as the foundation for their PA counseling interventions and trials. More consistency in how counseling interventions are being delivered to and received by clients with SCI can help to advance our understanding of what type of support works best for whom. The best practices document also has the potential to facilitate and improve reporting in trials and interventions on how counseling has been delivered by counselors and received by clients. Improved reporting about how counseling is being

Table 2   Survey responses from panel members (*n* = 11) *.

Survey item	Mean ± SD (range)
Introduction	
The Introduction of the Best Practices is clearly expressed.	6.8 ± 0.4 (6–7)
The Introduction of the Best Practices is specific and unambiguous.	6.6 ± 0.5 (6–7)
The Best Practices	
The Best Practices in the section "How do you have the conversation?" are clearly expressed.	6.6 ± 0.5 (6–7)
The Best Practices in the section "How do you have the conversation?" are specific and unambiguous.	6.3 ± 0.8 (5–7)
The Best Practices in the section "What do you say during the conversation?" are clearly expressed.	6.6 ± 0.7 (5–7)
The Best Practices in the section "What do you say during the conversation?" are specific and unambiguous.	6.6 ± 0.7 (5–7)
Things to keep in mind	
The section on "Things to keep in mind" is clearly expressed.	6.4 ± 0.5 (6–7)
The section on "Things to keep in mind" is specific and unambiguous.	6.4 ± 0.5 (6–7)
Glossary of terms	
The glossary of terms is clearly expressed.	6.6 ± 0.5 (6–7)
The glossary of terms is specific and unambiguous.	6.6 ± 0.5 (6–7)
Main Document	
The Best Practices document is relevant for researchers who want to include a physical activity counseling intervention in their SCI research project.	6.0 ± 0.9 (5–7)
The Best Practices document is relevant for counselors with various backgrounds who want to provide physical activity counseling to adults with a SCI. Examples of counselor's backgrounds are occupational therapist, recreation therapist, physiotherapist, social worker, or kinesiologist.	6.7 ± 0.5 (6–7)
The Best Practices document is relevant for SCI peer mentors who want to provide physical activity counseling to adults with a SCI.	6.4 ± 0.9 (4–7)
The Best Practices document is relevant for community organizations who want to provide physical activity counseling to adults with a SCI.	6.2 ± 0.8 (5–7)
The Best Practices document is relevant for rehabilitation centers or hospitals who want to provide physical activity counseling to adults with a SCI.	6.4 ± 0.7 (5–7)
The Best Practices document is relevant for clinicians who want to provide physical activity counseling to adults with a SCI.	6.5 ± 0.7 (5–7)
The Best Practices document is useful to support counselors, research groups, intervention developers and organizations or centers offering counseling services to adults with a SCI.	6.6 ± 0.5 (6–7)
The Best Practices document is useful to support effective physical activity counseling to adults with a SCI.	6.4 ± 0.7 (5–7)

Continued

Table 2   *Continued*

Survey item	Mean ± SD (range)
I intend to use the Best Practices document.	6.5 ± 0.5 (6–7)
The Best Practices document uses language that is appropriate for researchers.	6.3 ± 0.6 (5–7)
The Best Practices document uses language that is appropriate for counselors.	6.5 ± 0.5 (6–7)
The Best Practices document uses language that is appropriate for SCI peer mentors.	5.9 ± 1.2 (3–7)
The Best Practices document uses language that is appropriate for community organizations.	5.9 ± 1.2 (3–7)

Notes: All items were rated on a 7-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither disagree nor agree, 5 = somewhat agree, 6 = agree, 7 = strongly agree. * The project leads (FH, KMG, HG) did not complete this survey. Appendix 5 summarizes panel members' feedback on the Best Practices document V1 and responses to the feedback explaining how the feedback was addressed. The different versions of the Best Practices Document are available on Open Science Framework.

delivered and received can enhance replicability of the interventions in other settings.

The best practices may help counselors with a variety of backgrounds improve upon the support delivered to their clients with SCI. The best practices provide information that are tailored to unique PA barriers and needs of clients with SCI [42–44]. By using an IKT approach in which we meaningfully engaged our research users in different steps of the development process, we ensured that the best practices are relevant and useful for end-users, which is also confirmed by the findings of our pilot test with external experts (see Table 4). The next step of this project focuses on the development of training modules that will teach counselors the best practices and may help to improve counselors' knowledge, skills and confidence on providing PA counseling to clients with SCI.

Limitations and future directions

Some limitations need to be acknowledged. First, we do not know if using the best practices in PA counseling will result in positive changes in clients' PA levels, on short and long term. While the best practices are built upon the best available literature on effective SCI PA counseling, we have not tested the use of the best practices in PA counseling sessions. Future research is required to test the effectiveness of the use of the best practices. The panel emphasized that the effectiveness of the best practices in terms of changing client's PA behavior highly depends on the counselor's skills, knowledge and expertise. To apply the best practices in an appropriate way, counselors may need additional training or practice.

Table 3 External experts' demographics and background/expertise.

| Demographics and expertise/background | Mean ± SD or n (%) | |
	English version (n = 13)	Dutch version (n = 12)
Age (years)	42.9 ± 11.2	46.2 ± 10.7
Gender identity:		
Man	5 (39%)	5 (42%)
Woman	8 (62%)	7 (58%)
Not listed/ prefer not to answer	-	-
Sexual orientation:		
Straight	12 (92%)	11 (92%)
Bisexual	1 (8%)	-
Prefer not to answer	-	1 (14%)
Identify as a person with a SCI	3 (23%)	1 (8%)
Identify as a person with a disability	4 (31%)	2 (16%)*
Have you ever spent 24 consecutive hours with an individual with a SCI?		
Yes	8 (62%)	3 (25%)
No	5 (39%)	8 (57%)
Ethnicity		
White / European	13 (100%)	12 (100%)
Background and expertise		
SCI Peer mentor	3 (23%)	1 (8%)
Physical activity or health counselor	4 (31%)	3 (25%)
Occupational therapist	1 (8%)	1 (8%)
Recreation therapist	-	-
Physiotherapist	1 (8%)	1 (8%)
Psychomotor therapist	-	-
Fitness training/ personal trainer	2 (15%)	2 (17%)
Social worker	-	-
Representative of a community organization	6 (46%)	3 (25%)
Researcher	8 (62%)	6 (50%)
Clinician/ rehabilitation physician	-	3 (25%)
Other	2 (15%)	1 (8%)
How many years of experiences have you provided professional guidance or counseling to adults with SCI on starting and/or maintaining a physically active lifestyle?		
None	6 (46%)	4 (33%)
Less than 1 year	-	-
Between 1–3 years	1 (8%)	2 (16%)
More than 3 years	6 (46%)	6 (50%)
How many clients with a SCI do you counsel in a year?		
0	-	1 (13%)
4-Jan	2 (15%)	1 (25%)
9-May	1 (8%)	1 (13%)
15-24	-	-
>25	4 (31%)	4 (33%)
Have you received a formal training or workshop in Motivational Interviewing?		
Yes	10 (77%)	11 (92%)
No	3 (23%)	1 (8%)

Second, the majority of the panel members and external experts who contributed to the development of the best practices were highly-educated and identified as

Table 4 Survey responses from external experts (*n* = 25).

| | Mean ± SD (ranges) | |
Survey item	English version (*n* = 13)	Dutch version (*n* = 12)
Introduction		
The Introduction of the Best Practices is clearly expressed.	6.1 ± 1.7 (1–7)	5.9 ± 1.4 (2–7)
The Introduction of the Best Practices is specific and unambiguous.	6.5 ± 0.7 (5–7)	5.9 ± 1.1 (3–7)
The Best Practices		
The Best Practices in the section "How do you have the conversation?" are clearly expressed.	6.5 ± 0.8 (5–7)	5.9 ± 0.8 (4–7)
The Best Practices in the section "How do you have the conversation?" are specific and unambiguous.	6.4 ± 0.8 (5–7)	5.9 ± 0.9 (4–7)
The Best Practices in the section "What do you say during the conversation?" are clearly expressed.	6.4 ± 0.7 (5–7)	6.3 ± 0.9 (4–7)
The Best Practices in the section "What do you say during the conversation?" are specific and unambiguous.	6.2 ± 0.8 (5–7)	5.9 ± 0.9 (4–7)
Things to keep in mind		
The section on "Things to keep in mind" is clearly expressed.	6.3 ± 0.8 (5–7)	6.3 ± 0.9 (4–7)
The section on "Things to keep in mind" is specific and unambiguous.	6.0 ± 1.1 (3–7)	6.2 ± 0.9 (4–7)
Glossary of terms		
The glossary of terms is clearly expressed.	6.2 ± 1.1 (3–7)	5.9 ± 0.9 (4–7)
The glossary of terms is specific and unambiguous.	6.2 ± 1.1 (3–7)	6.1 ± 0.9 (4–7)
Main Document		
The Best Practices document is relevant for researchers who want to include a physical activity counseling intervention in their SCI research project.	6.2 ± 0.9 (4–7)	5.7 ± 0.8 (4–7)
The Best Practices document is relevant for counselors with various backgrounds who want to provide physical activity counseling to adults with a SCI. *Examples of counselor's backgrounds are occupational therapist, recreation therapist, physiotherapist, social worker, or kinesiologist.*	6.2 ± 0.9 (4–7)	6.0 ± 1.9 (4–7)
The Best Practices document is relevant for SCI peer mentors who want to provide physical activity counseling to adults with a SCI.	6.1 ± 1.0 (4–7)	6.2 ± 0.9 (4–7)
The Best Practices document is relevant for community organizations who want to provide physical activity counseling to adults with a SCI.	5.9 ± 0.9 (4–7)	6.0 ± 1.0 (4–7)

Continued

Table 4 *Continued*

Survey item	English version (*n* = 13)	Dutch version (*n* = 12)
	Mean ± SD (ranges)	
The Best Practices document is relevant for <u>rehabilitation centers or hospitals</u> who want to provide physical activity counseling to adults with a SCI.	5.8 ± 1.1 (4–7)	6.0 ± 1.0 (4–7)
The Best Practices document is relevant for <u>clinicians</u> who want to provide physical activity counseling to adults with a SCI.	6.1 ± 1.1 (4–7)	5.8 ± 0.8 (4–7)
The Best Practices document is useful to support counselors, research groups, intervention developers and organizations or centers offering counseling services to adults with a SCI.	6.2 ± 1.1 (4–7)	5.9 ± 0.8 (4–7)
I intend to use the Best Practices document.	5.5 ± 1.7 (1–7)	5.3 ± 0.9 (4–7)
The Best Practices document uses language that is appropriate for <u>researchers</u>.	6.4 ± 0.9 (4–7)	5.8 ± 0.9 (4–7)
The Best Practices document uses language that is appropriate for <u>counselors</u>.	6.5 ± 0.9 (4–7)	5.8 ± 1.1 (4–7)
The Best Practices document uses language that is appropriate for <u>SCI peer mentors</u>.	5.9 ± 1.1 (4–7)	–
The Best Practices document uses language that is appropriate for <u>community organizations</u>.	6.1 ± 1.0 (4–7)	5.8 ± 0.8 (4–7)

Notes: All items were rated on a 7-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither disagree nor agree, 5 = somewhat agree, 6 = agree, 7 = strongly agree. Two experts were motivational interviewing experts without specific expertise/experience in spinal cord injury. They both rated all items on 'relevance' as 4 (= neither disagree nor agree). Appendix 6 summarizes experts' feedback on the Best Practices document V2 and responses to the feedback explaining how the feedback was addressed. The different versions of the Best Practices Document are available on Open Science Framework.

white, heterosexual women. We should acknowledge that we have not included perspectives of people from other ethnicities or sexual orientations. Future efforts are needed to understand if the best practices resonate with counselors and clients with different cultural backgrounds, gender identity, sexual orientations, socioeconomic status, education level, and/or ethnicity.

Third, the best practices are developed for counseling with adults with chronic SCI. The best practices do not include specific considerations for counseling to adults with acute SCI due to the limited scientific evidence on effects of PA in this population [5]. For example, the scientific SCI exercise guidelines are developed for adults with chronic SCI [45]. Previous studies have shown that providing PA counseling during and after rehabilitation can be an effective way to support people with SCI to develop and maintain an active lifestyle at home [7, 46]. Despite these promising findings, more research is needed to provide guidance on PA counseling services to adults with newly acquired SCI.

Lastly, while we took several strategies to reduce bias and navigator power, this project was not and could not have been conducted without bias. For example, there is a risk for selection bias in the literature used to inform the best practices as we conducted a purposive search instead of a systematic search. A purposive search made the most sense for this project, as there were already three reviews recently published on PA behavioral support for people with physical disabilities. While it is possible that we missed relevant literature, a purposive search allowed us more flexibility in the selection of literature relevant to our topic. The best practices were developed by drawing upon current evidence base and members' own knowledge and experiences on SCI physical activity counseling. As such, the best practices are our perspective of the current evidence base and our processes and decisions are driven by our own knowledge and experiences. Aligning with our ontological relativist paradigm, it is possible that another group of experts would develop different best practices by drawing upon the same literature. The external experts were selected via the panel's own network from only three countries. We only included experts from three different countries as there are only a handful groups around the world working on SCI-specific physical activity counseling. By recruiting from our own network, there is a chance that the external experts have similar views as the panel. Despite these potential biases, we used a systematic approach guided by the IKT Guiding Principles. Aligning with our pragmatic perspective, we made decisions throughout the project with the emphasis on creating actionable and useful knowledge. We provided detailed information on panel members' and external experts' demographics, expertise, experiences and background. To enhance transparency, we provided detailed information on our development and decision-making processes in this paper, the supplementary files and on OSF.

Conclusion

This paper outlines the first systematically co-developed theory- and evidence-based best practices for SCI-specific PA counseling. The implementation of the best practices will be supported by the development of training modules to teach counselors these best practices. These new best practices can contribute to optimizing SCI PA counseling services and, subsequently, improving PA behavior of adults living with a SCI.

The best practices

The best practices focus on *how* to have a conversation and *what* to discuss during a conversation about physical activity. Additional information including example strategies and techniques for each of the best practices is available in the online manual.

How do you have the conversation?

The tone you use during a conversation, the words you choose, the way you ask your questions, and the way you respond to your client are key elements to a positive and successful counseling experience for you and your client. The best practices are:

- Build rapport and establish a relationship with your client.
- Use a client-centered approach following the spirit of Motivational Interviewing.
- Tailor the support to your client's motivation for physical activity and their current needs, values, wishes and preferences.

What do you say during the conversation?

The content of each conversation can vary depending on your client's needs and their motivation. This section is divided into best practices that you **should always do** in every conversation and best practices that you **should consider** doing. The order to discuss the best practices can also vary from one conversation to the next. An example of a possible conversation flow is available in the online manual.

You should always:

- Ask your client about their current physical activity behaviour.
- Understanding your client's physical activity capability, opportunity and motivation.
- Identify and understand your client's physical activity barriers and work together with your client to develop possible solutions to overcome these barriers.

You should consider:

- Working together with your client to set a physical activity goal and create an action plan.
- Providing information to your client on benefits of physical activity.
- Sharing the physical activity guidelines for adults with SCI.
- Sharing physical activity examples.

Figure 2   A summary of the best practices for physical activity counseling for adults with a spinal cord injury. Appendix 7 and 8 outline the full documents in English and Dutch. Information on the online manual will be available on Open Science Framework.

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