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ORIGINAL ARTICLE

Measuring the determinants of implementation behavior in multiprofessional rehabilitation

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ABSTRACT

BACKGROUND: The Determinants of Implementation Behavior Questionnaire (DIBQ) measures facilitators or barriers of healthcare professionals' implementation behaviors based on the current implementation research on practice and policy. The DIBQ covers 18 domains of the Theoretical Domains Framework and consists of 93 items. A previously tailored version (DIBQ-t) covering 10 domains and 28 items focuses on implementing best-practice low back pain care.
AIM: To tailor a shortened version of DIBQ to multiprofessional rehabilitation context with cross-cultural adaptation to Finnish language.
DESIGN: A two-round Delphi study.
SETTING: National-level online survey.
POPULATION: Purposively recruited experts in multiprofessional rehabilitation (N.=25).
METHODS: Cross-cultural translation of DIBQ to Finnish was followed by a two-round Delphi survey involving diverse experts in rehabilitation (physicians, physiotherapists, occupational therapists, psychologists, nursing scientists, social scientists). In total, 25 experts in Round 1, and 21 in Round 2 evaluated the importance of DIBQ items in changing professionals' implementation behavior by rating on a 5-point Likert Scale (1=Strongly Disagree, 5=Strongly Agree) of including each item in the final scale. Consensus to include an item was defined as a mean score of ≥4 by ≥75% of Delphi participants. Open comments were analyzed using inductive content analysis. Items with agreement of ≤74% were either directly excluded or reconsidered and modified depending on qualitative judgements, amended with experts' suggestions. After completing an analogous second-round, a comparison with DIBQ-t was performed. Lastly, the relevance of each item was indexed using content validity index on item-level (I-CVI) and scale-level (S-CVI/Ave).
RESULTS: After Round 1, 17 items were included and 48 excluded by consensus whereas 28 items were reconsidered, and 20 items added for Round 2. The open comments were categorized as: 1) "modifying"; 2) "supportive"; and 3) "critical". After Round 2, consensus was reached regarding all items, to include 21 items. After comparison with DIBQ-t, the final multiprofessional DIBQ (DIBQ-mp) covers 11 TDF domains and 21 items with I-CVIs of ≥0.78 and S-CVI/Ave of 0.93.
CONCLUSIONS: A Delphi study condensed a DIBQ-mp with excellent content validity for multiprofessional rehabilitation context.
CLINICAL REHABILITATION IMPACT: A potential tool for evaluating determinants in implementing evidence-based multiprofessional rehabilitation interventions.

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KEY WORDS: Rehabilitation; Implementation science; Delphi Technique; Surveys and questionnaires.

In many fields of social and health care and rehabilitation, there is a gap between what has been proven to be effective and what is practiced.[1-4] Narrowing this gap through the successful implementation of evidence-based practices depends on changing the behavior of the professionals.[3, 5] Implementation research aims to generate knowledge of strategies helping to translate research evidence to clinical practice, and to understand key factors associated with changing professionals' implementation behavior.[3, 6-10] This can be complicated, especially in the multiprofessional rehabilitation context due to heterogeneous professional roles and complex interventions.[11, 12] Multiprofessional rehabilitation involves collaborative teams or work communities consisting of professionals from different social and health care disciplines working together to deliver services.[13]

The Theoretical Domains Framework (TDF) was initially developed for implementation research to identify factors influencing professionals' behavior regarding implementation of evidence-based practice recommendations. The TDF is an integrative framework synthetizing 33 theories of behavior and behavior change, originally sorted into 14 domains, with 4 additional domains later added.[14, 15] According to the TDF, barriers and facilitators of implementation may relate to the innovation itself (*e.g.* innovation characteristics), the social setting (*e.g.* norms, support), the individual professionals (*e.g.* skills, self-efficacy), health care organizations (*e.g.* resources and support), innovation strategies (*e.g.* training), the patients or participants in treatment and rehabilitation (*e.g.* attitudes) - or health care system and society per *se*.[3, 7, 16-21]

The Determinants of Implementation Behavior Questionnaire (DIBQ) has been developed based on TDF.[14, 15, 22] It quantifies the role of TDF domains in the implementation process, so that the factors influencing implementation behavior can be identified.[23] The DIBQ was initially developed for evaluating potential determinants of health care professionals' implementation behavior[24] and it was first tested with physiotherapists in physical activity interventions.[22] The original DIBQ is extensive, including 93 items assessing 18 domains,[22] but it was successfully shortened and tailored to different research questions, contexts and intervention types.[25]

The success of strategies for implementing evidence-based procedures into health care is often overlooked, and only patient-reported outcomes or economic impacts are often examined. Clinical guideline recommendations alone do not seem to be sufficient to change treatment practices.[26] Moreover, it has been shown that dissemination of guidelines is not enough to change behavior, and thus, more active implementation strategies are needed.[26] Therefore, it is important to have feasible and valid instruments for assessing facilitators and barriers of professionals' behavior regarding implementation of theory-based interventions. In science as well as in practice and policy, there is a growing need for robust, transparent and systematic as well as rapid and pragmatic methods for supporting implementation processes. In the multiprofessional rehabilitation context, a user-friendly and context adapted tool is required for monitoring and scaling the factors influencing implementation and for enhancing the use of evidence in daily routines that are often characterized by busyness and limited resources.

The current study aimed to tailor a shortened version of DIBQ to multiprofessional rehabilitation context and cross-culturally adapt a Finnish language version.

Materials and methods

The study design is described in Figure 1. Mixed methods were used. The original DIBQ in English language was first translated and cross-culturally adapted to Finnish (phase 1); and then tailored by means of a two-round Delphi process among a purposively recruited national-level group of experts, giving both quantitative ratings allowing content validity assessments as well as qualitative written judgements regarding DIBQ items to be included into a shortened multiprofessional rehabilitation context version of the DIBQ (DIBQ-mp) (phase 2). Support for adaptation and validation of the DIBQ to multiprofessional context was given by the original developer of the questionnaire through an e-mail communication.[22] This study did not include patients, but non-identifiable health care professionals who participated as volunteers.

Translation of the English version and cross-cultural adaptation to Finnish (phase 1)

The aims of the cross-cultural translation process were to translate all items of the English version and cross-culturally adapt them to Finnish language. A forward-backward translation was completed using the 4-stage process outlined by Beaton[27] based upon the English version of the questionnaire.[22, 28] Cross-cultural adaptation is defined as "a process which looks at both language (translation) and cultural adaptation issues in the process of preparing a questionnaire for use in another setting"[27].

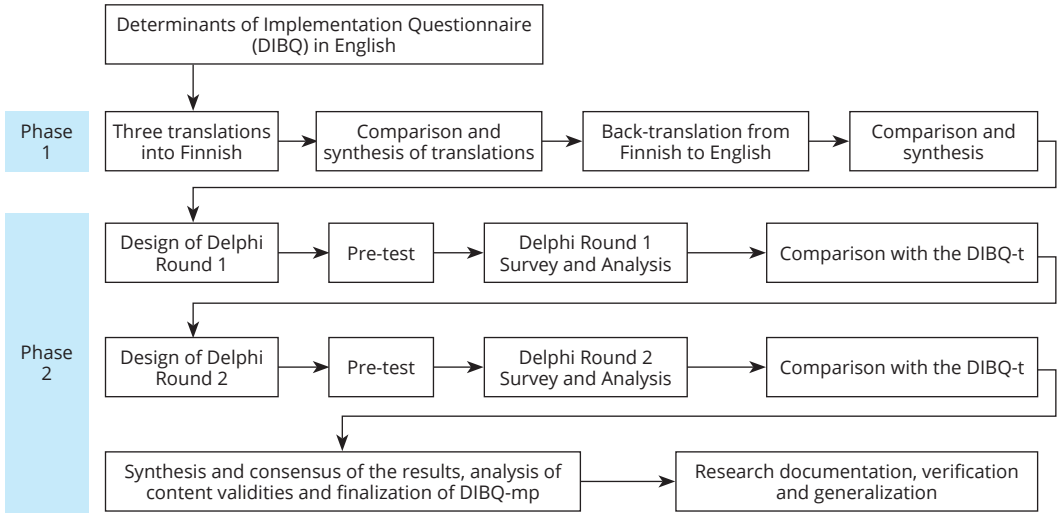

Figure 1.—Cross-cultural adaptation (phase 1) and Delphi procedure (phase 2).

Delphi procedure (phase 2)

The aim of phase 2 was to reduce the number of items and tailor DIBQ to multiprofessional rehabilitation context. The Delphi method was utilized to collect the judgments of experts in a group decision making setting to gain understanding of the items and for identification of critical factors to obtain a shorter version of the DIBQ. The research questions in the Delphi process were "which factors are the most critical in multiprofessional rehabilitation implementation, implying the question, which DIBQ domains and items thus cannot be left out of the shorter version of the questionnaire?". The study was conducted following the principles of classical Delphi.[29-31] Both qualitative and quantitative methods were used in the Delphi process. The Delphi process consisted of two iterative rounds of ratings using an online survey and pre-tests before and comparison to DIBQ-t after each round.

Prior to the Delphi rounds, pre-tests were conducted with the goal of testing and adjusting the Delphi questionnaire to improve comprehension, and to work out procedural problems. The survey was revised as the result of the pre-tests. To ensure sufficient contribution and take account of the typically high drop-out rate in Delphi-studies, the purpose of this study was to recruit 30 participants,[32] which would allow the diversity in views while accounting for expected attrition rate.[32]

A purposive sampling strategy was used to recruit a panel of experts from the authors' networks covering all health care districts, private and public sector and research and education networks in Finland. The following eligibility criteria and requirements for expertise for Delphi participants were used: 1) knowledge and experience with multiprofessional rehabilitation and/or evidence-based health care research implementation in the Finnish health care system; 2) capacity and willingness to participate; 3) sufficient time to participate in the Delphi-process.[33] Research team identified an initial group of experts with a good geographical coverage and multiprofessional diversity (including specialists in rehabilitation medicine, occupational health care, general medicine, psychology, physiotherapy, nursing sciences, occupational therapy and social sciences), and the "snowball" sampling technique was used to generate subsequent participants.[34] The Delphi study was conducted online, using Webropol, over a three-month period to provide sufficient time to gather data and aggregate group responses. Data collection took place in the period of April to June 2021.

Design of Delphi Round 1

The initial instruction of the Delphi questionnaire to Round 1 was: Please evaluate the importance of each item as a facilitator of or a barrier to changing professionals' implementation behavior. The survey was comprised of 5-point Likert scale questions with comments and free-text sections. The purpose of the first round was to: 1) rate the content and structure of each DIBQ item; 2) recommend items to be included or excluded from the multiprofessional DIBQ (DIBQ-mp); and 3) to comment on the comprehensibility, suitability and usability of the questionnaire. The descriptive comments were obtained within each domain:" Are the items understandable and clear? If no, please comment briefly". The DIBQ items as well as

new items suggested in the comments were then reconsidered and/or modified based on the ratings and remarks of the participants. Participants' age, gender, education, educational level, primary role, years of experience, and field of expertise were inquired to evaluate overall representativity/feasibility to be included in the Delphi process, but not further used in item-level considerations.

Design of Delphi Round 2

Delphi Round 2 was designed to 1) determine agreement on items revised based on results of Round 1; and 2) determine preliminary agreement of the new items generated in Round 1; 3) elicit further comments and feedback using a 5-point Likert scale and free text to state the reasoning for their rating or provide additional comments. Participants received the summary of Round 1 results and were free to review and reflect on these results as they submitted their responses and feedback in Round 2. Participants were also asked again to comment the comprehensibility of the items.

Data analysis

Descriptive statistics (ranges, means of ratings with standard deviations and percentages of agreements) for each item were calculated for Round 1 and Round 2 results. Participants rated and commented on the importance of each DIBQ item as a facilitator of or a barrier to changing professionals' implementation behavior. Consensus to include items was defined as a mean score of ≥4 on a Likert Scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree) by at least 75% of Delphi participants. Delphi questions with a group level of agreement of 75% or higher were included and 74% or lower were either excluded or reviewed depending on qualitative judgements. A second-round survey followed the same process as the first round.

Experts were asked to rate the relevance of each item on a 5-point scale (1 = not relevant, 2 = somewhat relevant, 3 = not relevant nor relevant, 4 = quite relevant, 5 = highly relevant). The relevance of each item scored by experts was indexed using content validity index (CVI). The rating of 3 on the scale was not included in the calculation of an item-level CVI. For each item, the I-CVI was computed as the number of experts giving a rating of either 4 or 5, divided by the number of experts. An item was considered 'relevant' when scoring an item-level CVI (I-CVI) of 0.78 or more.[35]

The qualitative data from survey comments within items, domains and the free-text sections were analyzed by using inductive content analysis to classify the comments in favor of exclusion, inclusion or modification before potential inclusion to the shortened version.[36, 37] Initially the participants' statements were read and re-read by the first author to gain familiarity. Subsequently, meaningful units of analysis (core sentences and words) were selected. Each meaningful unit was condensed and labelled with a code using qualitative data analysis program MAXQDA 2020 Analytics Pro. The codes were sorted and grouped into subcategories and categories in discussion among the authors. Analysis of the comments was also used to guide the modifications and considerations of the importance and suitability of the items for the multiprofessional rehabilitation context. An item could be included even it was quantitatively rated below threshold if qualitative assessment captured important issues in relation to the targeted context.[38]

Comparison with DIBQ-t

Finally, the results of the Delphi-procedure were compared with DIBQ-t tailored versions in Danish and Swedish before synthesis of the results.[25] A comparison to previously tailored versions was done for benchmarking and comparison of the items chosen, reflecting on differences between the two versions, identifying the items that overlap in content and reflecting experiences of the use of the DIBQ-t.

Data availability

The data associated with the paper are not publicly available but are available from the corresponding author on reasonable request.

Results

Translation of the DIBQ in English and cross-cultural adaptation to Finnish (phase 1)

The forward and backward translation (steps 1-4) were performed successfully. Since the multiprofessional rehabilitation context was considered, the 'profession' in the original DIBQ was modified to relate to 'social and health care professional'. 'Action' was modified to relate to 'intervention/procedure'. 'Context' was modified to relate to 'rehabilitation'. 'Target' was modified from 'patient' to 'patient, client, participant or rehabilitee' depending on the social and health care setting.

Taxonomy in Finnish language for implementation is in its early development and there are no scientific publications on translation of TDF to Finnish language. Another

challenge in the translation was that in Finnish language the variations of multiple meanings for words often differ from the corresponding variations in English. For example, the word 'worthwhile' can refer to health-economical perspective, financial profit for professional or workplace, or more abstract personal relevance or meaningfulness from client perspective, *i.e.* is it worthwhile to the client to participate on rehabilitation with regards to costs and outcomes. The results from the expert panel review and the inductive content analysis were used to answer the questions about content validity and cross-cultural adaptation to a Finnish social and healthcare setting. The Finnish translation of DIBQ and the TDF domain titles is presented in (Supplementary Digital Material 1: Supplementary Table I).

Delphi procedure to identify factors of importance in multiprofessional rehabilitation program implementation (phase 2)

Of the invited 111 persons, 25 experts (23%) participated in the Round 1 survey. Of the participants, half were women (52%), a third were aged from 51 to 60 years (32%), and two thirds had a doctoral level education (64%). Most often, the participants had 11 to 15 years of experience in clinical work (40%) and 16 to 20 years in academic work (32%, Figure 2). All experts used both spoken and written English regularly. Many reported having several professions or professional roles. Professions represented included physicians (specialized in rehabilitation medicine, occupational medicine and general practice), physiotherapists (specialized in orthopedic manual therapy, musculoskeletal physiotherapy and chronic pain), occupational therapists, psychologists, psychotherapists, social psychologists, educationists, health scientists, nursing scientists and social scientists (Table I). The experts represented of diverse settings and contexts in health, social welfare and education – and the perspectives of scientists, researchers, educators, organizational leaders, practitioners and policymakers. The participants were representative of the invited persons' professions and positions in the Finnish rehabilitation system. The pre-test of Delphi questionnaire resulted in revisions of improving clarity of the instructions for the Delphi panellists and spelling.

Round 1

In Round 1, participants reached agreement for 65 of the 92 content questions: 17 items reached consensus to be included, and 48 items were excluded because of low ratings or qualitative assessments favouring exclusion. The domains on which items reached agreement to be included concerned 'Knowledge', 'Skills', 'Beliefs about capabilities', 'Intentions', 'Innovation', 'Organization', 'Patient', 'Innovation strategy', 'Social influences' and 'Behavioral regulation'. The domains in which all items reached agreement to be excluded were 'Social/professional role and identity', 'Optimism', and 'Goals'. Mean scores ranged from 2.4 to 4.6, and the standard deviations from 0.51 to 1.22 (Supplementary Digital Material 2: Supplementary Table II).

In reconsiderations of items, which did not reach consensus in Round 1, 48 changes were made to the questionnaire. Changes included revisions to wordings (N.=27), adding one missing item (6.2) from original 93-item DIBQ

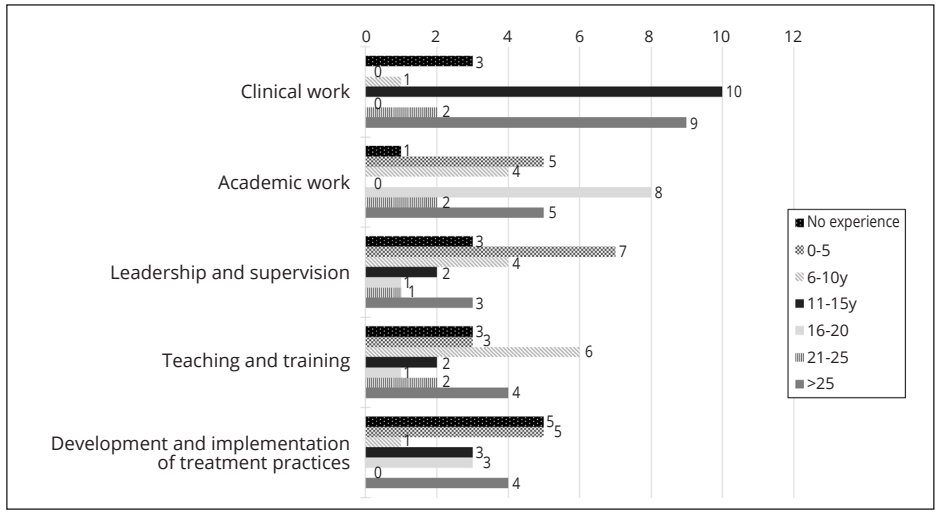

Figure 2.—Professional experience of participants.
X-axis describes the number of participants in each field and category.

TABLE I.—*Participants' field of education, primary role and field of expertise.*

Participant	Field of education	Primary role	Field of expertise
P1	Health Sciences Health Economics	Senior Planning Officer	Health economics Health technology assessment
P2	Health Sciences Occupational Therapy	Service Manager	Research and development of health care services Rehabilitation service system Management and supervision of social and health services Primary care
P3	Health Sciences Physiotherapy	Physiotherapist	Research and development of rehabilitation Research and development of health care services Education and training Biopsychosocial evaluation and treatment Direct access to physiotherapist Primary care
P4	Health Sciences Physiotherapy	Physiotherapist	Research and development of rehabilitation Education and training Biopsychosocial evaluation and treatment Direct access to physiotherapist Clinical expert: orthopedic manual therapy Rehabilitation entrepreneur
P5	Health Sciences Physiotherapy	Researcher	Education and training Clinical expert
P6	Health Sciences Physiotherapy	Educator	Research and development of rehabilitation Education and training: physiotherapy
P7	Medicine	Physician	Research and development of health care services Implementation research Management and supervision of social and health services Clinical expert Evidence-based medicine
P8	Medicine	Physician	Research and development of health care services Implementation research: clinical guidelines
P9	Medicine	PRM specialist	Research and development of health care services Research and development of occupational health care services Education and training: medical sciences Clinical expert
P10	Medicine	Specialist in neurology	Research and development of health care services Social insurance institution
P11	Medicine	Specialist in General Medicine	Research and development of health care services Implementation research Biopsychosocial evaluation and treatment Management and supervision of social and health services Primary care
P12	Music Therapy Psychotherapy	Researcher Trainer Facilitator Therapist	Research and development of rehabilitation: evaluation and effectiveness research Education and training Clinical expert
P13	Nursing Sciences	Doctoral Researcher Research Coordinator	Education and training
P14	Nursing Sciences	Educator	Education and training
P15	Psychology	Researcher, Psychotherapist	Research and development of rehabilitation Research and development of health care services Clinical expert
P16	Psychology and Educational Sciences	Senior Advisor	Multidisciplinary and customer-oriented development of social and health services Development of the cooperation structures in the social and welfare services
P17	Medicine	Researcher Physician	Research and development of rehabilitation Implementation research Rehabilitation service system Working life research Occupational health care
P18	Medicine	Chief Medical Officer PRM specialist	Research and development of rehabilitation Education and training Management and supervision of social and health services Clinical expert: secondary care
P19	Medicine	Chief Medical Officer PRM specialist	Research and development of health care services Primary care

(To be continued)

TABLE I.—*Participants' field of education, primary role and field of expertise (continues).*

Participant	Field of education	Primary role	Field of expertise
P20	Medicine	Chief Medical Officer PRM specialist	Research and development of rehabilitation Research and development of occupational health care services Rehabilitation service system
P21	Medicine	Chief Medical Officer PRM specialist	Research and development of rehabilitation Research and development of health care services Rehabilitation service system Management and supervision of social and health services Biopsychosocial evaluation and treatment Clinical expert: primary care
P22	Medicine	Researcher Chief Medical Officer PRM specialist	Research and development of rehabilitation Research and development of health care services Education and training
P23	Social, Health and Sports Sciences	Educator Project Manager Researcher	Research and development of rehabilitation: rehabilitation of the elderly Research and development of health care services Education and training
P24	Social Psychology	Executive Manager	Education and training: Social psychology, behavior change, motivational interview Associations and foundations
P25	Social Sciences	Senior Advisor	Research and development of rehabilitation Implementation research Implementation support Rehabilitation service system Management and supervision of social and health services: Self-assessment strategies Occupational health care

PRM: physical and rehabilitation medicine.

in Round 1 (N.=1) and addition of new items (N.=20). All new items were added as suggested by the experts for the Round 2.

Inductive content analysis of the feedback provided by the experts in Round 1 identified three key categories of statements that described the contents being: 1) 'modifying', 2) 'supportive' and 3) 'critical'. The total number of coded statements was 303. The statements were classified into three categories and five subcategories. 'Modifying' (N.=67) included subcategories of 'modifying the content of an existing item' (N.=47) and 'modifying the content of the domain with a new item' (N.=20). 'Supportive' included a subcategory of 'encouraging the use of an item or domain' (N.=36). 'Critical' (N.=200) included subcategories of 'critical constructive' statements reflecting of how the items are worded, presented and understood in Finnish language (N.=165) and 'exclude' statements suggesting excluding the item or domain (N.=35). Categories and subcategories were conceptualized based on the data of the research question, and iteratively developed from the coding. The results of content analysis are presented in the Table II.

In the end of Round 1, 68% (N.=17) expected the questionnaire as 'suitable' for Finnish context, 4% (N.=1) 'not suitable' and 28% (N.=7) 'could not yet say'. Half of the drop-outs (N.=4) rated the questionnaire as 'suitable' and half 'could not say'. The Delphi expert that rated the questionnaire not suitable criticized on the length, imbalance of the domains and lacking compatibility for all professional groups. On the other hand, the question categories were found to be useful in different situations, and the possibility to choose the most appropriate questions for different purposes was discussed.

Round 2

For Round 2, 84% of Round 1 participants completed the survey (N.=21). Three of the experts dropped out due to lack of time and one had volunteered to participate in Round 1 only. In total, 48 amendments to the questionnaire were proposed. In addition, four items reached consensus to be included while 44 items were excluded. Mean scores ranged from 2.9 to 4.6, with the standard deviation ranging from 0.49 to 1.22 (Supplementary Table II). Supplementary Digital Material 3 (Supplementary Table III) presents the ratings of items that are included in DIBQ-mp for Round 1 and Round 2.

In the end of Round 2, 76% (N.=16) expected the questionnaire to be 'suitable' for Finnish context and 24% (N.=5) could not yet say. Examples of responses included:

"If such a questionnaire were available, it could facilitate the implementation of the various guidelines and make it more targeted at the services." (P1)

"*The questionnaire can be used to design, adjust and provide the right kind of training for professionals, and*

TABLE II.—*Results of the content analysis of expert panel comments.*

Category (number of statements)	Subcategory (number of statements)	Example of comments	Examples of quotations	Adaptations
Modifying (67)	Modifying the content of an existing item (47)	• Context related feedback. • Improve clarity and legibility by shortening the sentences. • Content related feedback on the wording of the items.	• *"The system is shifting towards common social and health care organizations. The forms of the questions are targeted only to health care professionals."* (P17) • *"A 'participant' is not a suitable term for all interventions."* (P8) • *"Shorten "following the guidelines" out of the questions."* (P9) • *"6.9 Strange emphasis on physical activity. Rehabilitation is a learning process.* (P25) • *"18.1 The word 'automatically' does not seem appropriate here. Could it be 'naturally', which suggests that it does not require effort. Automatic rehabilitation intervention is more like robotics."* (P12) • *"14.7 The word "helpful" is challenging. It may or may not mean concrete help."* (P2)	• Modifying the items to have a multidisciplinary 'social and health care professional' perspective. • Modifying the items to refer to patient, client, participant or rehabilitee depending on the social and health care setting. • Modifying a few items by shortening out "following the guidelines". • Modifying the item 6.9 by replacing "physical activity" with "activity in the daily living". • Modifying the item 18.1 by replacing the word "automatically" with "naturally". • Modifying the items 14.7 and 11.4 with replacing "are helpful" with "are supportive and willing to provide solutions".
	Modifying the content of the domain with a new item (20)	• New questions suggested by Delphi experts.	• *"I believe that […] is achieving results"* • *"I experience positive emotions (e.g., calmness, optimism, comfort) when working in an […].* • *"I believe that I am doing relevant work in delivering […]"*	• The importance of all the proposed 20 new items were evaluated in Delphi round 2.
Critical (200)	Critical constructive (165)	• Choice of wording and phrasing in Finnish. • Imprecise sentences that should be clarified. • Understanding. • General critical statements of the questionnaire.	• *"The term intervention is not clear to everyone."* (P14) • *"The questions are formulated as if assuming that the intervention is a one-time operation that is performed and can then be considered performed (such as surgery on a single patient). I guess the intention should be for a professional to take intervention in a tool that is used constantly and over and over again with several different clients."* (P16) • *"The issue of motivation of participants is problematic because professionals should not drift into a situation where "they" accomplish something for "those" who are not motivated."* (P12) • *"It is essential to specify what is meant by an evaluation (4.9)."* (P25) • *"The question of the focus of primary health care on prevention is surprising in this context and, if it is held, it must somehow be explained (10.3). In order to have sufficient resources, primary health care should focus more on prevention ...?"* (P16) • *"13.7. I do not understand the question."* (P2) • *"This domain [Organization] is limited to thinking about a paid work model, as is the case in the original survey. But while this work is done in many other different "labour market positions" such as self-employed, it should be possible to answer similar questions from those positions as well".* (P17)	• Modifying the Finnish wording of "guideline-based intervention/procedure" to support the continuous use. • Comments were used to guide the considerations of the importance and suitability of the items 4.4 and 17.4 and changing the wording of the item 12.1 from "motivation" to "meaningfulness". • Specifying and clarifying items 4.9, 4.11, 10.3 and 13.7 for increased understanding. • The general critical comments were saved for research group for future studies.
	Exclude (35)	• Statements suggesting excluding the item or domain.	• *"14.1 is definitely useless."* (P8) • *"Slightly unclear how this relates to a particular intervention, in particular 10.3."* (P3)	• No adaptations made to items. • Comments were used to guide the considerations of the importance and suitability of the items.
Supportive (36)	Encouraging the use of the item or the domain (36)	• Confirmatory feedback on the importance of the items or the domains.	• *"Really important questions."* (P25) • *"Really important that implementation intentions are involved!"* (P24)	• No adaptations made to items. • Comments were used to guide the considerations of the importance.

supervisors will also be informed about their own role in the success of the implementation." (P13).

"The questionnaire would reveal the views of the professional delivering the intervention as well as it can explain the results of the intervention or whether it is not taking place actually in practice." (P2)

"This is a good universal questionnaire for evaluation of the implementation. If particularly interested in some aspect in addition to the core-set, such as emotions or organizational support, you may add questions related to this topic to the questionnaire." (P25)

Synthesis and consensus of the results with validity ratings

After Round 2, comparison with DIBQ-t resulted in further exclusion of four and inclusion of four items. Items were included in the synthesis based on importance for research purposes (2.1), multiprofessional work (6.7), the need of further support for professionals (4.6) and emphasis on client perspective (12.1). Items (1.3, 11.4, 14.5) were excluded due to overlapping with content. Suggested new item "I believe that I am doing relevant work in delivering [guideline-based intervention/procedure]" was excluded due to not having TDF classification. After the synthesis, the Delphi process was concluded. Figure 3 illustrates the Delphi Process Summary.

The final DIBQ-mp covers 21 items representing 11 out of 18 TDF domains: 'Knowledge', 'Skills', 'Beliefs about Capabilities', 'Beliefs about Consequences', 'Intentions', 'Innovation', 'Organisation', 'Client/Participant/Patient', 'Innovation strategy', 'Social influences' and 'Behavioral regulation'. Table III demonstrates the final multiprofes-

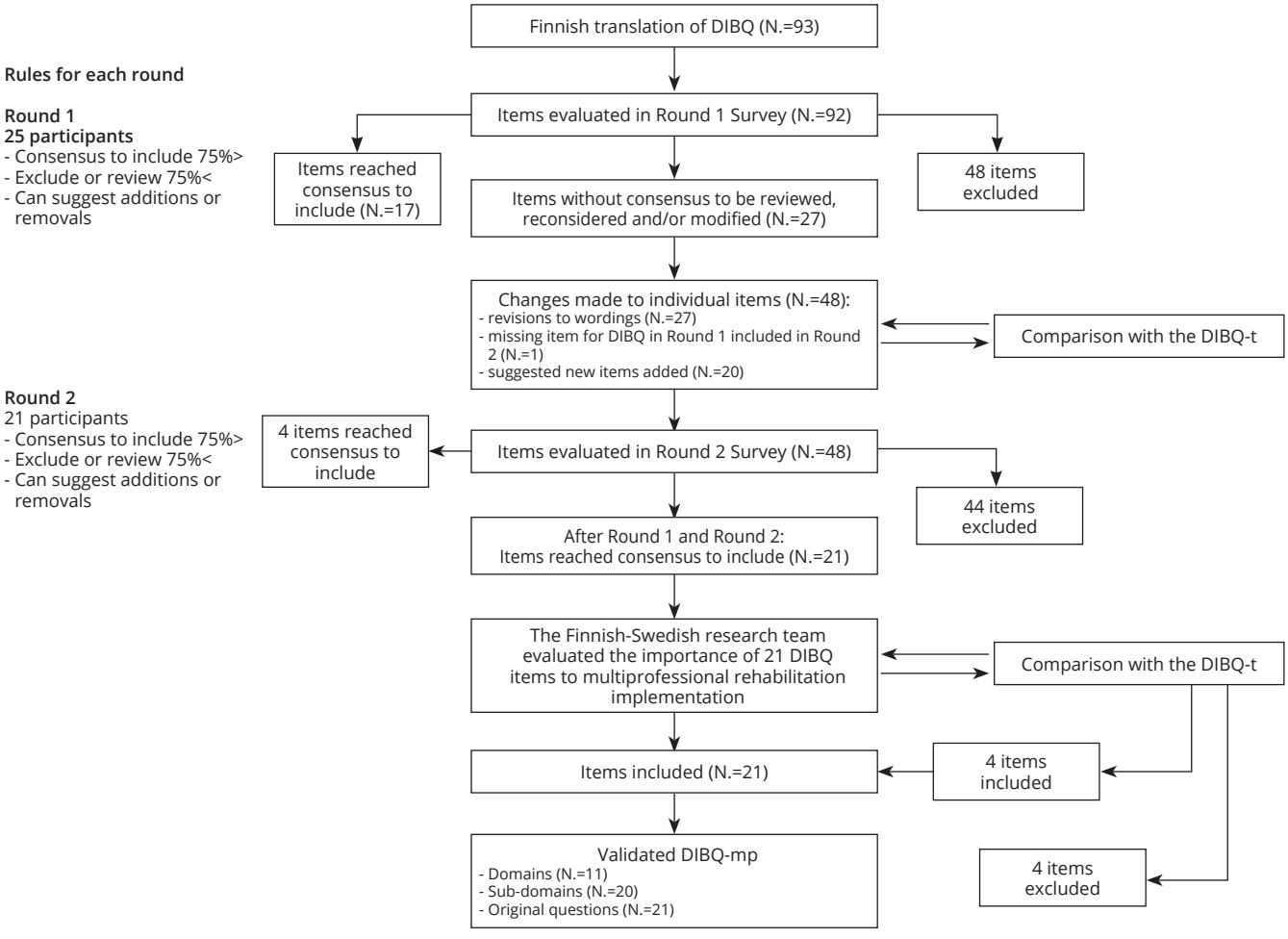

Figure 3.—The Delphi Process Summary.

TABLE III.—*The Final DIBQ-mp.*

Domain and construct	Item	Experts in agreement (N.)	Number of experts (N,)	I-CVI
Knowledge				
Knowledge	I know how to deliver [guideline-based intervention/procedure].	25	25	1.00
Role clarity	Objectives of [guideline-based intervention/procedure] and my role in this are clearly defined for me.	22	22	1.00
Skills				
Skills	I have been trained in delivering [guideline-based intervention/procedure].	18	23	0.78
	I have the skills to deliver [guideline-based intervention/procedure].	22	23	0.96
Beliefs about capabilities				
Self-efficacy	I am confident that I can deliver [guideline-based intervention/procedure]	20	21	0.95
Perceived behavioral control	For me, delivering [guideline-based intervention/procedure] is (very difficult – very easy).	18	20	0.90
Beliefs about consequences				
Attitude	For me, delivering [guideline-based intervention/procedure] is (not useful at all – very useful).	21	21	1.00
Outcome expectancies	If I deliver [guideline-based intervention/procedure] following the guidelines, this will strengthen the collaboration with professionals with whom I deliver [guideline-based intervention/procedure].	17	19	0.88
Intentions				
Intentions	How strong is your intention to deliver [guideline-based intervention/procedure] in the next three months? (not strong – very strong)	19	22	0.86
Innovation				
Innovation characteristics	It is possible to tailor [guideline-based intervention/procedure] to patients'/clients'/rehabilitees'/participants' needs?	20	22	0.91
	[Guideline-based intervention/procedure] is compatible with daily practice.	21	23	0.91
Organization				
Organizational resources and support	In the organization I work, all necessary resources are available to deliver [guideline-based intervention/procedure].	20	21	0.95
	I can count on support from the management of the organization I work in, when things get tough around delivering [guideline-based intervention/procedure].	25	25	1.00
Patient/client				
Patient/client characteristics	Patients/Clients/Rehabilitees/Participants consider participation in [guideline-based intervention/procedure] meaningful.	14	16	0.88
	Patients/Clients/Rehabilitees/Participants of [guideline-based intervention/procedure] are positive about [guideline-based intervention/procedure].	22	24	0.92
Innovation strategy				
Innovation strategies	[Implementing organization] provides professionals with a training to deliver [guideline-based intervention/procedure].	21	22	0.95
	[Implementing organization] provides sufficient intervention instructions and materials.	19	21	0.90
	[Implementing organization] provides assistance to professionals with delivering [guideline-based intervention/procedure].	22	24	0.92
Social influences				
Descriptive norm	Professionals with whom I deliver [guideline-based intervention/procedure] deliver [guideline-based intervention/procedure] following the guidelines.	20	21	0.95
Social support	I can count on support from professionals with whom I deliver [guideline-based intervention/procedure] when things get tough around delivering [guideline-based intervention/procedure].	22	23	0.96
Behavioral regulation				
Action planning	I have a clear plan of how I will deliver [guideline-based intervention/procedure].	23	23	1.00

S-CVI/Ave 0.93
I-CVI: Item-level content validity index; S-CVI/Ave: scale-level content validity index, averaging method.

sional DIBQ (DIBQ-mp), re-translated back to English language. Supplementary Digital Material 4 (Supplementary Table IV provides the Finnish version of the final DIBQ-mp.

In the content validity assessment, all 21 of the DIBQ-mp items were indexed with CVI≥0.78 (Table III). Most items were rated CVI≥0.90 by majority of the content experts (N.=16-25) except for four items ranging from 0.78 to

0.88 (Table III). The final DIBQ-mp is composed of items that have I-CVIs of ≥0.78 and overall scale-level content validity index S-CVI/Ave 0.93 (excellent content validity: I-CVIs of ≥0.78 and an S-CVI/Ave of 0.90 or higher).[39]

Discussion

The final validated multiprofessional DIBQ, DIBQ-mp, was reduced from 93 items on 18 domains to 21 items on 11 TDF domains of most important to multiprofessional rehabilitation context: 'Knowledge', 'Skills', 'Beliefs about Capabilities', 'Beliefs about Consequences', 'Intentions', 'Innovation', 'Organisation', 'Client/Participant/Patient', 'Innovation strategy', 'Social influences' and 'Behavioral regulation'. Moreover, based on high CVI-ratings, the DIBQ-mp is suitable for different settings in Finnish social and health care in context of multiprofessional rehabilitation.

To our knowledge, other tools intended to be used for the research on implementation of multiprofessional rehabilitation interventions and procedures are not available. The previous studies have applied the DIBQ-t in evaluating the expectations of the implementation process in profession-specific interventions.[40, 41] In the Swedish study, facilitating role of most domains of DIBQ-t was reported.[41] The Danish study investigated clinician-level factors related to implementing evidence-based care for LBP patients in primary care using DIBQ-t and qualitative assessments. Personal gain, practicalities, buying-in on the program, and clinicians' attitudes toward the program were found important for implementation. Qualitative data was valuable in understanding that the participants had high competence in knowledge and skills after evidence-based training irrespective whether they implemented the intervention or not. The study indicated that training alone is insufficient for implementation.[40] DIBQ-mp version was developed for the multiprofessional rehabilitation context whereas DIBQ-t had focus on low back pain management. When DIBQ-mp was benchmarked to DIBQ-t, the determinants of implementation behaviour were same in both versions on the domain level but differed on an item-level.

The domains that were excluded from the original DIBQ related, firstly, to the individual level (micro level such as emotions and optimism), and secondly, to the system-related domains (macro-level such as professional role, and social and political context). It might reflect that the system level in Finland and in other Scandinavian countries is considered stable and allows professionals to choose interventions based on rather autonomous understandings on evidence-based guidelines instead of being strictly regulated by the authorities. Organizational level (meso-level such as organizational support) was considered more important in the local clinical context. On the individual level, the domains that were ruled out related to the psychological profiles, whereas included domains such as knowledge and skills were considered of more importance. System and individual level were potentially less influential considering barriers or facilitators of implementation behavior in multiprofessional rehabilitation context.

The purpose of the Round one Delphi was to detect the DIBQ questions that experts valued as potentially important determinants of professionals' implementation behavior and the purpose of the Round two was to condense the list. However, instead of just removing unnecessary questions, Delphi panellists suggested multiple new items to be included. Delphi participants raised up relevant themes that they felt were missing from the original DIBQ questionnaire: 1) support for multiprofessional work in rehabilitation; 2) beliefs about outcome-expectancies and meaningfulness of the work; 3) patient perspectives: expectations, values, satisfaction, recovery; 4) compatibility (is the intervention perceived as being consistent with the professional's existing values, past experiences, and needs); 5) perspectives of continuous learning, learning organization and special features of adult learning; 6) advantages from the patient's point of view; and 7) estimation of the professional's own willingness to embrace and apply, and ability to monitor the implementation (Supplementary Table II). Notably, in Round 2, none of the added items reached consensus to be included in the final DIBQ-mp.

One aspect that was not raised by Delphi panellists was which DIBQ items would capture barriers and facilitators from a health care/societal economic point of view. For example, items regarding beliefs about consequences (6.1, 6.2, 6.5), innovation (9.3), social-political context (10.2), innovation strategy (13.6) capture certain economical aspects. However, the experts prioritized the item 6.1 asking if delivering the intervention following the guidelines is "useful". This could be interpreted as capturing aspects of cost utility from the professional perspective, but for more robust coverage of cost utility, researchers would probably need to include additional items to the DIBQ-mp for their specific research purpose.

The original version of the questionnaire was developed to be applicable to any context but was first tested in a specific context. A recent Cochrane review suggests that mixed-methods studies with longer acclimatization period before evaluation of newly implemented teamwork interventions, and longer follow-up, are needed when

implementing interventions that require multiprofessional collaboration.[11] For this purpose, valid and reliable tools are necessary. A scale has been developed to measure multiprofessional (nurse-physician) collaboration[42] but there are limitations with the validity, reliability, and the extent the scale can be used with different professional groups.

Engaging clinicians in multiprofessional collaboration belongs to managers' role, starting with an evaluation of the quality of services and establishing reimbursements that support teamwork, local quality improvement and the interdisciplinary sharing of knowledge.[43] Therefore, managers need information about the relationship of professionals with other disciplines, and professionals' attitudes, beliefs and motivational factors for multiprofessional collaboration.[44, 45] We propose the use of implementation research -based questionnaire to collect data on the use of evidence in daily routines, to advance problem solving when putting evidence into practice, and to facilitate the implementation of guideline-based interventions and procedures.

The DIBQ-mp would seem most suitable for multiprofessional training of evidence-based interventions and in improving future implementation strategies. Essentially, DIBQ-mp can identify factors of importance at individual, system and organization levels. The 'Socio-political context' domain was excluded from the DIBQ-mp. The society context was seen critical to success by Delphi experts, but the important actors are context- and system-related. When aspects of information at society level is needed, items considering larger operational environment can be added to the questionnaire.

We used well-established methods in the cross-cultural adaptation and Delphi process. The strength of the Delphi method was that we were able to gather participants with different professions in rehabilitation from all parts of Finland. Good geographical coverage also provided diversity in Delphi experts' accents and wordings in different parts of the country. Finland has approximately 5.5 million inhabitants. The Finnish rehabilitation system includes practicing rehabilitation experts from the primary care, secondary care, rehabilitation entrepreneurs, associations and foundations, occupational health care, scholars of the field in universities and research institutions as well as experts acting in the funding organizations such as the national social insurance institution, earnings-related pension providers, insurance companies and State Treasury.[1] The group of experts included was representative in terms of practicing experts and educators of the Finnish rehabilitation system. A minimum panel of 15-20 experts is recommended to ensure sufficient contributions in a Delphi study,[32] and we had over 20 experts in both rounds. Also, the use of both quantifiable and qualitative measures, and especially, inclusion of a qualitative assessment can be regarded as a strength of the study. However, the use of Finnish multiprofessional experts for the Delphi process can be regarded as a limitation too as the generalizability of DIBQ-mp to other European countries and worldwide needs to be evaluated. However, the authors of the study comprise a multiprofessional group of researchers from Sweden and Finland, intensively networking internationally.

The process of translation of DIBQ involved cross-cultural translation process followed by Delphi procedure, which provided expert opinions on the comprehensiveness of the questionnaire. The cross-cultural translation included a backward translation by one professional translator, while a minimum of two professional translators is recommended to assure consistent translation.[27] However, there is controversy of the need and value of backward translation.[46, 47] It has been proposed that the inclusion of an expert panel improves the quality of the instrument, especially the face validity and content validity.[48] In addition, the qualitative assessment can maximize the attainment of semantic, idiomatic, experiential and conceptual equivalence.[49]

There are no validated quality indicators for Delphi studies. A set of four criteria has been proposed as quality indicators:[31] 1) Were criteria for participants reproducible? 2) Was the number of rounds to be performed stated? 3) Were criteria for dropping items clear? 4) Stopping criteria other than rounds specified? In this study, the recruiting strategy and criteria for participants produced the desired number of professionals with diversity of professions and convincing experience in implementation or rehabilitation system. Four Delphi participants did not attend Round 2 with a drop-out rate of 16%, which is quite low. The planned number of rounds was performed as noted in instructions to Delphi participants. The criteria for dropping items were based on consensus. In Delphi studies the definition of consensus based on percentage can range from 50-97%.[31] In this study, consensus was defined as a proportion within a range (unrestricted), *i.e.* items rated at group level of agreement of 75% or higher were included and 74% or lower were either excluded or reviewed and revised depending on qualitative judgements. The termination of the Delphi was based on *a priori* definition to run two rounds.

Limitations of the study

One of the limitations of *a priori* specification of criteria for dropping items, is that items believed to be important may

fall just below the threshold. If sufficient justification is provided, the authors may consider including these items *a posteriori*.[31] In our study, three original items with ≤74% agreement (2.1; 4.6; 12.1) were included in the final DIBQ-mp.

Implementing and changing behavior in a multiprofessional context can be even more challenging than in a profession-specific setting. The research on multiprofessional collaborative practices is still developing.[50, 51] The factors that facilitate multiprofessional collaboration are often specifically related to the operating environment (organizational and processual aspects) and relational and contextual factors of multiprofessionalism.[12]

The study presents a tool, a tailored questionnaire for multiprofessional rehabilitation implementation use, the DIBQ-mp, consisting of 21 items. DIBQ-mp can be used in evaluating determinants, either facilitators or barriers, of implementing evidence-based multiprofessional rehabilitation in clinical practice. The questionnaire can address the issues professionals encounter when implementing new evidence-based models for the benefit of patients. The specific name of the training, intervention, model, innovation or procedure is replaced for [guideline-based intervention /procedure] within each item. The DIBQ-mp with 21 items is a shorter, and more pragmatic version of the original DIBQ. Expert statements denoted that a questionnaire aimed for professionals should be kept short as a long questionnaire is more difficult to use for multiprofessional rehabilitation.

In all, the focus of the research was directed by the opinions of the Delphi participants. Therefore, the results of the study reflect the consensus opinion. The Delphi study objective was to present the results as a core set of items important in multiprofessional rehabilitation implementation. As all the DIBQ items are tailored to multiprofessional rehabilitation context (Supplementary Table II), certain domains or individual items can be added to the DIBQ-mp according to singular research purpose. The TDF is generally used to build a semi-structured interview guide. In future studies, it would be interesting to use the determinant questionnaire as a low-cost strategy to survey a large sample of professionals in different fields of multiprofessional rehabilitation.

Conclusions

We present a national-level development process of cross-culturally adapted and condensed DIBQ-mp tool. It consists of 21 items to assess determinants of professionals' implementation behavior in multiprofessional rehabilitation context, representing 11 of the initial 18 DIBQ domains.

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Conflicts of interest
The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

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