

RESEARCH ARTICLE

Adapting the determinants of implementation behavior questionnaire to evaluate implementation of a structured low back pain programme using mixed-methods

Inge Ris^{1,2}  | Karin Schröder² | Alice Kongsted^{1,3} | Allan Abbott² | Per Nilsen² | Jan Hartvigsen^{1,3} | Birgitta Öberg²

¹Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense M, Denmark

²Department of Health, Medicine and Caring Sciences, Division of Prevention, Rehabilitation and Community Medicine, Unit of Physiotherapy, Linköping University, Linköping, Sweden

³Chiropractic Knowledge Hub, Odense M, Denmark

Correspondence

Inge Ris, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Campusvej 55, 5230 Odense M, Denmark.
Email: iris@health.sdu.dk

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Abstract

Background and Aims: Best-practice low back pain (LBP) primary care programmes have been developed based on evidence-based clinical guidelines and implemented in Sweden and Denmark. The theoretical domains framework (TDF) was utilized in the design of the implementation strategy. Based on the TDF domains, the Determinants of Implementation Behavior Questionnaire (DIBQ) has been developed to evaluate implementation determinants, but its feasibility and validity need to be tested and adapted to study specific contexts. This study aimed to tailor the DIBQ for evaluation of implementation for LBP primary care programmes. The objectives were to (a) translate the DIBQ into Swedish and Danish, (b) adapt the DIBQ into DIBQ-tailored (DIBQ-t) to study content validity, (c) test the DIBQ-t for feasibility, and (d) perform validity testing of DIBQ-t.

Methods: We used a mixed-methods design. First, forward translation of the DIBQ, then adaptation into DIBQ-t using qualitative face validity and quantitative content validity was done. Finally, to determine feasibility and construct validity using confirmatory factor analyses, we used data from DIBQ-t collected after the programmes' 2-day course.

Results: The final DIBQ-t included 28 items describing 10 of the original 18 DIBQ domains and was considered feasible. A total of 598 clinicians out of 609 responded to the DIBQ-t, with only 2% of the items missing. The confirmatory factor analyses showed a good fit after removing two items with the lowest domain loading. The DIBQ-t maintained linkage to all domains within the Behavioral Change Wheel. The clinicians' expectations, according to the DIBQ-t, indicate facilitating determinants outweighing barriers at the initiation of implementation processes.

Conclusions: The study resulted in a feasible and valid version of a questionnaire for evaluating clinicians' expectations regarding implementation determinants of best-practice LBP primary care programmes.

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KEYWORDS

health services research, implementation, low Back pain, primary care, theoretical domains framework

1 | BACKGROUND AND AIMS

Several countries have developed evidence-based guidelines with recommendations for clinical practice in the management of patients with low back pain (LBP).^{1,2} However, there is a mismatch between recommendations and clinical practice³ as patients, clinicians, and healthcare systems can hinder the implementation of guidelines.⁴ Although clinicians consider evidence-based guidelines important, they may not adopt and adhere to them in routine practice.⁵ Some clinicians consider guideline recommendations a threat to their autonomy, inconsistent with their clinical reasoning, or beliefs and traditions.⁶ Consequently, many rely on experiences and well-established habits using an intuitive approach.⁶ To assist in and strengthen guideline implementation, best-practice LBP primary care programmes have been developed in Sweden and Denmark, aiming to facilitate the adoption of guideline-consistent care in the management of LBP.^{7,8}

The theoretical domains framework (TDF)⁹ and the behavioral change wheel (BCW)¹⁰ have been used as frameworks to develop implementation strategies. The TDF is a behavior change framework consisting of 12 determinants that may influence behaviors involved in evidence-based practice implementation. It was revised into a 14-domain version and linked to the BCW, help interpret how potential determinants influence behavioral change and affect implementation strategies on, for example, best-practice LBP primary care programmes.^{10,11} Recently, a user guide for the application of the TDF was developed.¹²

The BCW incorporates the Capability-Opportunity-Motivation-Behavior (COM-B) model to describe the central source of behavior and behavioral change. Linking BCW to TDF can assist in defining interventions for behavior change.¹³

The Determinants of Implementation Behavior Questionnaire (DIBQ) was developed to assess the TDF-domains in an implementation process.¹² Using an oblique multiple group method to perform a confirmatory factor analysis, DIBQ ended up containing 93 items assessing 18 determinant domains.¹⁴ When using the DIBQ, researchers should be able to identify the most relevant domains related to implementation processes based upon the aims and population of the specific research project and implementation context. Consequently, after tailoring the DIBQ to specific research, feasibility and validity need to be tested while maintaining its linkage to the BCW.

This study aimed to tailor the DIBQ for evaluation of the clinician expectations regarding the implementation of best-practice LBP primary care programmes in Sweden and Denmark. The results of this study can be used to assess implementation processes using a Danish or Swedish version of the DIBQ but also as method guidance for

research to address validity questions within studies that explore implementation problems.

Specific objectives were to (a) translate the DIBQ into Swedish and Danish; (b) adapt the version into DIBQ-tailored (DIBQ-t) to study expectations of implementation of LBP programmes; (c) test the DIBQ-t for feasibility; (d) perform initial validity testing of DIBQ-t; and (e) map the DIBQ-t according to the COM-B.

2 | METHODS AND MATERIAL

2.1 | Setting

The Swedish BetterBack[®] model of care⁷ and Danish GLA:D Back programme⁸ are best practice programmes for LBP in primary care. They were developed in collaboration between researchers in the two countries to support the implementation of guideline-consistent care. Compatible multifaceted implementation strategies, including a 2-day course with lectures, workshops, and access to supporting material, were used in both countries to enable clinicians to deliver the programmes to patients with LBP.

2.2 | Design

This study applies a mixed-method design in five phases: (a) translation of the DIBQ; (b) qualitative and quantitative content validity assessment by the project team and experts; (c) adaptation into DIBQ-t and determining feasibility; (d) construct validity testing of DIBQ-t; and (e) discussion of the interpretation of the results.

2.2.1 | Phase 1: Translation of Swedish and Danish version of DIBQ

The original English version of the DIBQ has good construct validity, and most domains show high internal consistency, reliability, and discriminant validity.^{15,14} The translation was performed according to the guidelines by Beaton.¹⁶ Two persons knowledgeable in English/Danish and two persons knowledgeable in English/Swedish, one with a clinical background and one with a native or academic knowledge for each language translated from English into Danish or Swedish. The translated versions were discussed among the authors to obtain consensus on the wordings. Subsequently, these versions were commented upon by linguistic experts to improve the readability. Finally, instead of backward translation, a panel of experts in musculoskeletal

health and implementation research commented on the translation, wording, phrasing, and understandability.¹⁷

2.2.2 | Phase 2: Adaptation of the DIBQ into the DIBQ-tailored, content validity assessment

Tailoring the translated DIBQ into DIBQ-t involved the selection of the most relevant items and domains based on their suitability for evaluation of the implementation of BetterBack[®] and GLA:D Back. First, qualitative content validity was tested by members of the project team (IR, AA, BÖ, and PN) representing both countries by selecting domains of the original DIBQ for the DIBQ-t. The project team, two males and two females, represented musculoskeletal and implementation research and clinical background, aimed to include a realistic number of items,¹⁸ while simultaneously covering evaluation of the implementation at an individual, social, organizational, and contextual level. Second, quantitative content validity was tested by 16 experts with a clinical or methodological research background in the musculoskeletal and implementation fields. The experts were asked to rate each item of the DIBQ on a 1-4 Likert scale from “not relevant” to “very relevant” to evaluate implementation in Sweden and Denmark. The ratings of the experts were indexed using the Content Validity Index (CVI).¹⁹ An item was considered “relevant” when 80% or more of the experts rated the questions “relevant” or “very relevant” (CVI ≥ 0.80). Items were included in the DIBQ-t when: (a) selected by project leaders and experts rated CVI ≥ 0.80 , (b) experts rated CVI 1.00, irrespective of the selection by the project leaders, or (c) project leaders selected items which were rated CVI ≥ 0.80 country-wise to allow for differences in contexts between the countries. For example, Danish clinicians worked in private clinics and self-funded their course participation as Swedish clinicians worked in public clinics and had no costs.

2.2.3 | Phases 3 and 4: Feasibility and construct validity

Clinicians from public physiotherapy clinics in the Östergötland healthcare region in Sweden ($n = 110$) involved in Better Back[®] and clinicians from private primary care clinics (physiotherapists and chiropractors) in Denmark ($n = 488$) involved in GLA:D Back²⁰ were asked to complete the DIBQ-t after the 2-day educational course. During the course, they were trained in delivering the programme to patients through lectures and workshops. Course participants filled in DIBQ-t directly after the course, having detailed theoretical knowledge about the programmes but not delivered it in practice. Therefore, the items were statements about the clinicians' expectations (defined: a belief that something will happen because it is likely) for implementation. The items were scored “strongly agree,” “agree,” “neither agree nor disagree,” “disagree,” and “strongly disagree” on a 5-point Likert scale. Response options for items five to nine were changed to “very easy,” “easy,” “neither easy nor difficult,” “difficult,” and “very

difficult.” The scale was reduced from originally seven response alternatives to five to make it easier to respond.²¹ Data were collected in Denmark by emailing the participants within 24 hours after the course in 2018 using a digital platform (OPEN REDCap, Vanderbilt University), and in Sweden using paper-based send questionnaires completed immediately upon finishing a course in the period from March 27, 2017 to January 30, 2018. All participating clinicians provided their consent for the data to be used for research purposes.

2.2.4 | Phase 5

The project group discussed the interpretation of the results using the COM-B model and possible future uses of the DIBQ-t in the evaluation of implementation processes.

2.3 | Data analyses

Results for content validity by the project group, CVI scores of the experts as well as the feasibility and construct validity testing were analyzed and reported descriptively. The proportion of missing data for specific items was used to judge feasibility. Domain and item-level data were analyzed as categorical data with the reporting of the proportion of clinicians responding to each response category. Ratings of “agree” or “strongly agree” were classified as positive expectations to implementation, whereas items and domains rated as “neither nor,” “disagree,” or “strongly disagree” were classified as neutral/negative expectations to implementation.

The internal construct validity for the DIBQ-t domains was assessed with confirmatory factor analysis,²² using the Laavan package in the R version 3.5.1. Cut-off values according to current recommendations reported by Perry were applied.²³ Root mean square of approximation (RMSEA), root mean square residual (SRMR; both with cut-off < 0.05), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI; both with cut-off score > 0.9) were used to evaluate the model fit. Adequate estimates of loading of the items on the domains were defined at 0.4 or higher.²⁴

Finally, the results of the DIBQ-t were mapped onto the COM-B categories using the dichotomized results, that is, “positive implementation expectations” or “neutral/negative implementation expectations,” through discussions in the project group.

2.4 | Ethics approval and consent to participate

Ethical clearance in Sweden for the study (Dnr: 2017-35/31) has been attained through the Regional Ethics Committee in Linköping. After obtaining a written and verbal explanatory statement regarding participation in the study, participants provided consent by returning a completed questionnaire for the study. The Regional Committees on Health Research Ethics for Southern Denmark decided that the study did not need ethical approval (file number S-20172000-93). The

TABLE 1 Selection of DIBQ domains/items to DIBQ-t by the project team, and Swedish and Danish experts

Domains	Items	Selected by project team	Danish experts (CVI 80%)	Swedish experts (CVI 80%)	Danish experts (CVI 100%)	Swedish experts (CVI 100%)	Selected in SWE/DK, only SWE or DK
1. Knowledge	1. I know how to deliver Better Back/GLA:D Back following the programme.	x	x	x		x	SWE/DK
	2. Objectives of Better Back/GLA:D Back and my role in this are clearly defined for me.	x	x	x			SWE/DK
	3. With regard to Better Back/GLA:D Back, I know what my responsibilities are.	x		x			SWE
	4. In my work with Better Back/GLA:D Back, I know exactly what is expected from me.	x		x			SWE
2. Skills	5. I have been trained in delivering Better Back/GLA:D Back following the programme.			x			SWE
	6. I have the skills to deliver Better Back/GLA:D Back following the programme.	x	x	x	x		SWE/DK
3. Social/professional role	7. I am practiced, to deliver Better Back/GLA:D Back following the programme.			x			SWE
	8. Delivering Better Back/GLA:D Back following the programme is part of my work as a PT.			x			
4. Beliefs about capability	9. As a PT, it is my job to deliver Better Back/GLA:D Back following the programme.						
	10. It is my responsibility as a PT to deliver Better Back/GLA:D Back following the programme.						
	11. I am confident that I can deliver Better Back/GLA:D Back following the programme.	x	x	x	x		SWE/DK
4. Beliefs about capability	12. I am confident that I can deliver Better Back/GLA:D Back following the programme even when other professionals with whom I deliver Better Back/GLA:D Back do not do this.	x		x			SWE
	13. I am confident that I can deliver Better Back/GLA:D Back following the programme even when there is little time.	x					
	14. I am confident that I can deliver Better Back/GLA:D Back following the programme even when participants are not motivated.	x					
	15. I have control over delivering Better Back/GLA:D Back following the programme.	x					
	16. For me, delivering Better Back/GLA:D Back following the programme is (very difficult—very easy).	x	x	x		x	SWE/DK
	17. For me, performing the intake is (very difficult—very easy).	x	x	x			SWE/DK
	18. For me, delivering the training programme is (very difficult—very easy).	x	x	x			SWE/DK
	19. For me, performing the evaluation is (very difficult—very easy).	x					
	20. For me, giving attention to participant's maintenance of physical activity behavior outside Better Back/GLA:D Back is (very difficult—very easy).	x	x	x			SWE/DK
	21. For me, reporting about the Better Back/GLA:D Back to the referring professional is (very difficult—very easy).	x	x	x			SWE/DK

TABLE 1 (Continued)

Domains	Items	Selected by project team	Danish experts (CVI 80%)	Swedish experts (CVI 80%)	Danish experts (CVI 100%)	Swedish experts (CVI 100%)	Selected in SWE/DK, only SWE or DK
5. Optimism	22. In my work as a PT, in uncertain times, I usually expect the best. 23. In my work as a PT, I'm always optimistic about the future. 24. In my work as a PT, overall, I expect more good things to happen than bad.	x	x	x	x	x	SWE/DK
6. Beliefs about consequences	25. For me, delivering Better Back/GLA:D Back following the programme is (not useful at all—very useful). 26. For me, delivering Better Back/GLA:D Back following the programme is (not worthwhile at all—very worthwhile). 27. For me, delivering Better Back/GLA:D Back following the programme is (not pleasurable at all—very pleasurable). 28. For me, delivering Better Back/GLA:D Back following the programme is (not interesting at all—very interesting). 29. If I deliver Better Back/GLA:D Back following the programme, Better Back/GLA:D Back will be most effective. 30. If I deliver Better Back/GLA:D Back following the programme, participants will appreciate this. 31. If I deliver Better Back/GLA:D Back following the programme, this will strengthen the collaboration with professionals with whom I deliver Better Back/GLA:D Back. 32. If I deliver Better Back/GLA:D Back following the Programme, I will feel satisfied. 33. If I deliver Better Back/GLA:D Back following the Programme, it will help participants to be able to coop better with their back problems. 34. When I deliver Better Back/GLA:D Back following the programme, I get financial reimbursement. 35. When I deliver Better Back/GLA:D Back following the programme, I get recognition from the work context. 36. When I deliver Better Back/GLA:D Back following the programme, I get recognition from participants.	x	x	x	x	x	SWE/DK
7. Intentions	37. I intend to deliver Better Back/GLA:D Back following the programme in the next 3 months. 38. I will definitely deliver Better Back/GLA:D Back following the programme in the next 3 months. 39. How strong is your intention to deliver Better Back/GLA:D Back following the programme in the next 3 months?	x	x	x	x	x	SWE/DK

(Continues)

TABLE 1 (Continued)

Domains	Items	Selected by project team	Danish experts (CVI 80%)	Swedish experts (CVI 80%)	Danish experts (CVI 100%)	Swedish experts (CVI 100%)	Selected in SWE/DK, only SWE or DK
8. Goals	40. How often is working on something else on your agenda a higher priority than delivering Better Back/GLA:D Back following the programme? 41. How often is working on something else on your agenda more urgent than delivering Better Back/GLA:D Back following the programme?			x		x	SWE a
9. Innovation	42. It is possible to tailor Better Back/GLA:D Back to participants' needs. 43. It is possible to tailor Better Back/GLA:D Back to professionals' needs. 44. Better Back/GLA:D Back costs little time to deliver. 45. Better Back/GLA:D Back is compatible with daily practice. 46. Better Back/GLA:D Back is simple to deliver.	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	SWE/DK SWE/DK SWE/DK SWE/DK SWE/DK
10. Socio-political context	47. Government and local authorities provide sufficient support to interventions such as Better Back/GLA:D Back. 48. Insurance companies provide sufficient support to interventions such as Better Back/GLA:D Back. 49. Primary Health Care is sufficiently oriented toward the delivery of Better Back/GLA:D Back.		x x x				DK
11. Organization	50. In the organization I work, all necessary resources are available to deliver Better Back/GLA:D Back. 51. I can count on support from the management of the organization I work in when things get tough programme. 52. The management of the organization I work in is willing to listen to my problems with delivering Better Back/GLA:D Back following the programme. 53. The management of the organization I work in is helpful with delivering Better Back/GLA:D Back following the programme.	x x x x	x x x x	x x x x	x x x x	x x x x	SWE/DK SWE/DK SWE SWE
12. Patients	54. Participants of Better Back/GLA:D Back are motivated. 55. Participants of Better Back/GLA:D Back are positive about Better Back/GLA:D Back.	x x	x x	x x	x x	x x	SWE/DK SWE/DK
13. Innovation strategy	56. [Implementing organization] provides professionals with training to deliver Better Back/GLA:D Back. 57. [Implementing organization] provides the possibility to experience delivering Better Back/GLA:D Back before professionals need to commit to it. 58. [Implementing organization] provides sufficient intervention materials. 59. [Implementing organization] provides assistance to professionals with delivering Better Back/GLA:D Back. 60. [Implementing organization] organizes peer support meetings for professionals.		x x x x x	x x x x x			DKa DKa

TABLE 1 (Continued)

Domains	Items	Selected by project team	Danish experts (CVI 80%)	Swedish experts (CVI 80%)	Danish experts (CVI 100%)	Swedish experts (CVI 100%)	Selected in SWE/DK, only SWE or DK
	61. [Implementing organization] provides sufficient financial reimbursement to professionals for Better Back/GLA:D Back delivery.		x	x			DKa
	62. [Implementing organization] provides insights into results of Better Back/GLA:D Back.					x	DKa
14. Social influences	63. Most people who are important to me think that I should deliver Better Back/GLA:D Back following the programme.	x			x		SWE/DK
	64. Professionals with whom I deliver Better Back/GLA:D Back think I should deliver Better Back/GLA:D Back following the programme.	x			x		SWE/DK
	65. Professionals with whom I deliver Better Back/GLA:D Back deliver Better Back/GLA:D Back following the programme.	x					DKa
	66. Other professionals who work with Better Back/GLA:D Back deliver Better Back/GLA:D Back following the programme.	x	x				DK/SWE
	67. I can count on support from professionals with whom I deliver Better Back/GLA:D Back when things get tough around delivering Better Back/GLA:D Back following the programme.	x	x	x		x	DK/SWE
	68. Professionals with whom I deliver Better Back/GLA:D Back are willing to listen to my problems with delivering Better Back/GLA:D Back following the programme.	x					
	69. Professionals with whom I deliver Better Back/GLA:D Back are helpful with delivering Better Back/GLA:D Back following the guideline.	x					
15. Positive emotions	70. When I work with Better Back/GLA:D Back I feel optimistic.						
	71. When I work with Better Back/GLA:D Back I feel comfortable.		x	x			a
	72. When I work with Better Back/GLA:D Back I feel calm.						
	73. When I work with Better Back/GLA:D Back I feel relaxed.						
	74. When I work with Better Back/GLA:D Back I feel cheerful.						
	75. When I work with Better Back/GLA:D Back I feel elated.						
16. Negative emotions	76. When I work with Better Back/GLA:D Back I feel nervous.			x			
	77. When I work with Better Back/GLA:D Back I feel pessimistic.						
	78. When I work with Better Back/GLA:D Back I feel depressed.						
	79. When I work with Better Back/GLA:D Back I feel agitated.						
	80. When I work with Better Back/GLA:D Back I feel sad.						
	81. When I work with Better Back/GLA:D Back I feel uncomfortable						

(Continues)

TABLE 1 (Continued)

Domains	Items	Selected by project team	Danish experts (CVI 80%)	Swedish experts (CVI 80%)	Danish experts (CVI 100%)	Swedish experts (CVI 100%)	Selected in SWE/DK, only SWE or DK
17. Behavioral regulation	82. I have a clear plan of how I will deliver Better Back/GLA:D Back following the programme.	x	x	x	x	x	SWE/DK
	83. I have a clear plan under what circumstances I will deliver Better Back/GLA:D Back following the programme.	x		x			SWE
	84. I have a clear plan when I will deliver Better Back/GLA:D Back following the programme.	x		x		x	SWE/DK
	85. I have a clear plan with regard to delivering Better Back/GLA:D Back following the programme when participants are not motivated.	x	x				SWE/DK
	86. I have a clear plan with regard to delivering Better Back/GLA:D Back following the programme when there is little time.	x		x			SWE
	87. I have a clear plan with regard to delivering Better Back/GLA:D Back following the programme when other professionals with whom I deliver Better Back/GLA:D Back do not do this.	x					
	88. Delivering Better Back/GLA:D Back following the programme is something I do automatically.						
18. Nature of behavior	89. Delivering Better Back/GLA:D Back following the programme is something I do without having to consciously remember.		x				
	90. Delivering Better Back/GLA:D Back following the programme is something I do without thinking.						
	91. Delivering Better Back/GLA:D Back following the programme is something I start doing before I realize I am doing it.						
	92. Delivering Better Back/GLA:D Back following the programme is something I seldom forget.		x	x			
	93. Delivering Better Back/GLA:D Back following the programme is something I often forget.			x		x	SWEa

Abbreviations: CVI, Validity Index; DK, Denmark; SWE, Sweden.

^a40, 49, 59, 60, 62, 66, 71, 93: questions used only at follow-up—results are not reported in this study.

TABLE 2 DIBQ-t: Expectations for implementation: domains and items

DIBQ-t item—TDF domain	Items
DIBQ-t 1—knowledge	I know how to deliver Better Back/GLA:D Back following the programme.
DIBQ-t 2—knowledge	Objectives of Better Back/GLA:D Back and my role in this are clearly defined for me.
DIBQ-t 3—skills	I have the skills to deliver Better Back/GLA:D Back.
DIBQ-t 4—beliefs about capability	I am confident that I can deliver Better Back/GLA:D Back.
DIBQ-t 5—beliefs about capability	I expect that delivering Better Back/GLA:D Back is (very easy—very difficult).
DIBQ-t 6—beliefs about capability	I expect that performing the intake is (very easy—very difficult).
DIBQ-t 7—beliefs about capability	I expect that delivering the training programme is (very easy—very difficult).
DIBQ-t 8—beliefs about capability	I expect that giving attention to participant's maintenance of physical activity behavior outside Better Back/GLA:D Back is (very easy—very difficult).
DIBQ-t 9—beliefs about capability	I expect that reporting about the Better Back/GLA:D Back to the referring professional is (very easy—very difficult).
DIBQ-t 10—beliefs about consequences	I expect that delivering Better Back/GLA:D Back is (not worthwhile at all—very worthwhile).
DIBQ-t 11—beliefs about consequences	If I deliver Better Back/GLA:D Back, Better Back/GLA:D Back will be most effective.
DIBQ-t 12—beliefs about consequences	If I deliver Better Back/GLA:D Back, it will help participants to be able to cope better with their back problems.
DIBQ-t 13—beliefs about consequences	I expect that, when I deliver Better Back/GLA:D Back, I get recognition from the work context.
DIBQ-t 14—intentions	I intend to deliver Better Back/GLA:D Back in the next 3 months.
DIBQ-t 15—innovation	It will be possible to tailor Better Back/GLA:D Back to participants' needs.
DIBQ-t 16—innovation	It will be possible to tailor Better Back/GLA:D Back to professionals' needs.
DIBQ-t 17—innovation	Better Back/GLA:D Back will be compatible with daily practice.
DIBQ-t 18—innovation	Better Back/GLA:D Back will be simple to deliver.
DIBQ-t 19—organization	I expect that, in the organization I work, all necessary resources are available to deliver Better Back/GLA:D Back.
DIBQ-t 20—organization	I expect that I can count on support from the management of the organization I work in when things get tough with the programme.
DIBQ-t 21—patient	I expect that participants of Better Back/GLA:D Back are motivated.
DIBQ-t 22—patient	I expect that participants of Better Back/GLA:D Back are positive about Better Back/GLA:D Back.
DIBQ-t 23—social influences	Most people who are important to me think that I should deliver Better Back/GLA:D Back.
DIBQ-t 24—social influences	Professionals with whom I deliver Better Back/GLA:D Back think I should deliver Better Back/GLA:D Back.
DIBQ-t 25—social influences	I can count on support from professionals with whom I deliver Better Back/GLA:D Back when things get tough around delivering Better Back/GLA:D Back.
DIBQ-t 26—behavioral regulation	I have a clear plan of how I will deliver Better Back/GLA:D Back.
DIBQ-t 27—behavioral regulation	I have a clear plan when I will deliver Better Back/GLA:D Back.
DIBQ-t 28—behavioral regulation	I have a clear plan about delivering Better Back/GLA:D Back when participants are not motivated.

Danish data collection has obtained authorization from the Danish Data Protection Agency (DPA) as part of the University of Southern Denmark's institutional authorization (DPA no. 2015-57-0008 SDU no. 17/30591). Digital informed consent was obtained from the Danish participants when they signed up online for the course, following normal procedures of the Danish Data Protection Agency for the collection of non-sensitive personal data.

3 | RESULTS

3.1 | Phase 1: Translation of DIBQ in Swedish and Danish

The Swedish and Danish versions of the DIBQ are presented in Appendix S1 and S2. There were no important disagreements

between the translators. Two items (18,23) in the Danish version and none in the Swedish version were rephrased based upon experts' comments. The 93 Swedish and Danish translated items entered into phase two, where DIBQ was tailored into DIBQ-t.

3.2 | Phase 2: Adaptation into the DIBQ-tailored version, selection of items, and content-validity assessment

Eighteen items were included in the DIBQ-t based upon selection by the project leaders, plus having $\geq 80\%$ CVI from Danish and Swedish experts. Project leaders selected an additional 10 items, which had $\geq 80\%$ by either the Danish (DIBQ-t question 8, 9, 21, 23, 24) or Swedish (DIBQ-t question 13, 14, 20, 27, 28) experts, anticipating the differences in context for the countries. Consequently, DIBQ-t, the Swedish/Danish version of the DIBQ, contained 28 items that were intended to assess expectations of the implementation process (Table 1).

DIBQ-t covers 10 out of 18 DIBQ domains: Knowledge, Skills, Beliefs about Capabilities, Beliefs about Consequences, Intentions, Innovation, Organization, Patients, Social influences, Behavioral regulation. The numbers of items in the domains vary from one to six. The DIBQ-t still represents all categories of the COM-B model within the BCW (Table 2).

3.3 | Phase 3: Feasibility of the DIBQ-t Sweden, Denmark combined

From 609 invited clinicians, 598 (110 from Sweden, 488 from Denmark) answered the DIBQ-t. There were 60% men ($n = 368$), mean age was 39 years (SD 11; range 22 to 70), almost 33% had less than 6 years' experience and 20% more than 20 years (Table 3).

Overall, 39 answers (2%) were missing.

Domain-level responses indicated positive expectations for implementation of the programme (Figure 1) as at least 55% of the clinicians agreed or strongly agreed with the items in all domains. The domains with the largest number of clinicians stating positive expectations related to implementation were "Knowledge" (95% stated agree/strongly agree), "Skills" and "Beliefs about consequences" (94% stated agree/strongly agree). The domain with the largest number of clinicians stating neutral/negative expectations to implementations was "Behavioral regulation" (36% stated neither nor, 7% disagree, 1% strongly disagree). Overall, the rating of clinicians stating disagree/strongly disagree was low (0-8%). There was no consistent pattern that exposed one specific COM-B category to be either positive or negative (Figure 1).

Item-level responses indicated that $>75\%$ (range 77-97%) of the clinicians had positive expectations to implementation for 20 items. For the remaining eight items, $\geq 25\%$ (ranging 25-63%) of the clinicians had neutral or negative expectations to implementation (Figure 2).

TABLE 3 Demographics of Clinicians

	Swedish clinicians (n = 110)	Danish clinicians (n = 488)
Sex female % (n)	66 (73)	31 (153)
Age years (SD)	37.4 (11.8)	39.9 (10.7)
Profession physiotherapist/chiropractor (n)	110/0	440/48
Clinical experience		
1-5 years %	46.7	30.0
6-10 years %	19.1	17.0
11-15 years %	9.6	16.2
16-20 years %	7.6	15.0
>20 years %	17.1	21.5

3.4 | Phase 4: Construct validity, confirmatory factor analysis

The initial assessment of construct validity included 28 items; however, this model did not reach the pre-defined cut-off values for model fit. Based on domains with most items and their items with the lowest domain loadings and lowest content validity, items were sequentially removed to attain adequate model fit. As a result, items 4 ("I am confident that I can deliver Better Back/GLA:D Back") and 13 ("I expect that, when I deliver Better Back/GLA:D Back, I get recognition from the work context") were removed to obtain an adequate fit of the model. Further removal of two additional items (items 2 and 28) did not strengthen the model. The final analyses are, therefore, based on 26 items (Table 4). The reliability analyses showed Cronbach Alpha values above 0.70, indicating acceptable internal consistency.²⁵ (Tables 4 and 5).

The estimated factor loadings of the items related to the TDF domains are between 0.365 and 0.819, where three items (items 12, 15, and 16) were below 0.4, but all items had P -values $< .001$.

The correlations between the domains were between 0.12 ("Patients" and "Intention") and 0.74 ("Innovation" and "Beliefs about consequences"), suggesting the domains were independent.²⁶

3.5 | Phase 5: Mapping the result of DIBQ-t to COM-B

In the category Capability, the domain Behavioral regulation had the highest percentage of clinicians answering with neutral or negative (45%) expectations for implementation, compared to the other domains. In three domains of the category Opportunity, 26% to 28% of the clinicians responded with neutral or negative expectations to implementation. At item-level, the eight items rated by $>25\%$ clinicians with neutral or negative expectations toward implementation were linked to COM-B as follows: three items linked to Capability, three to Opportunity, and two to Motivation (Figure 2).

FIGURE 1 Distribution of responses of the DIBQ-t at domain-level in percentage on a 5-point Likert-scale, sorted by COM-B

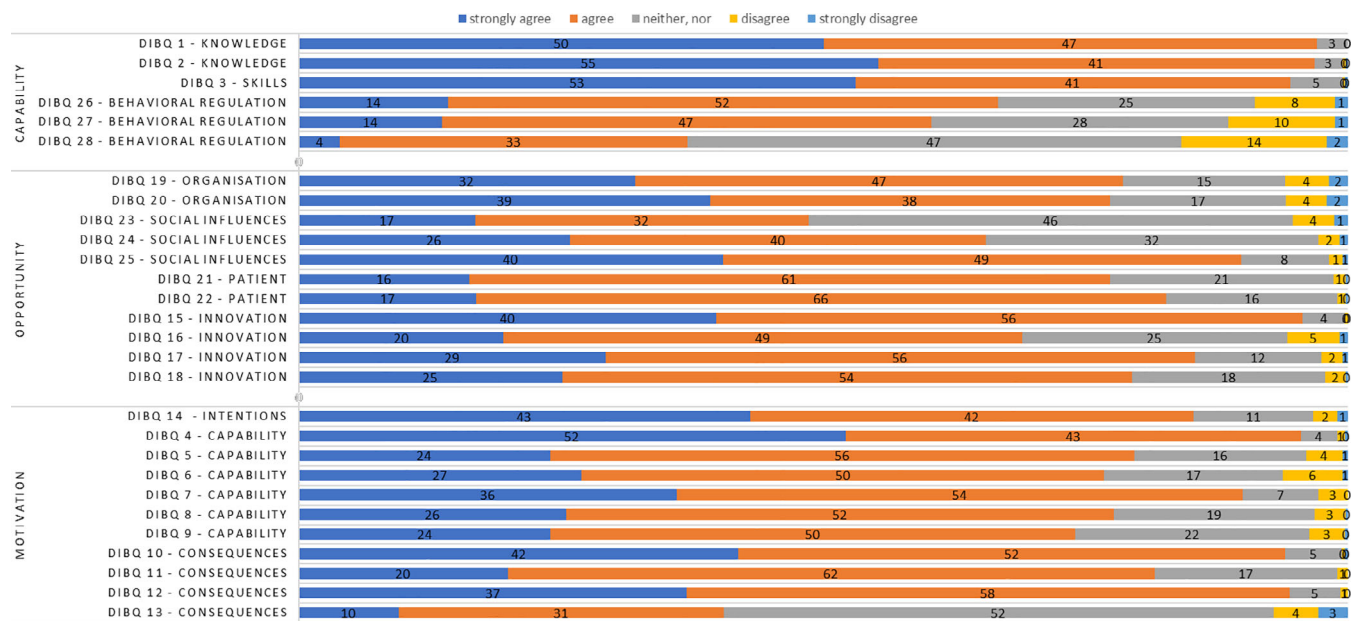
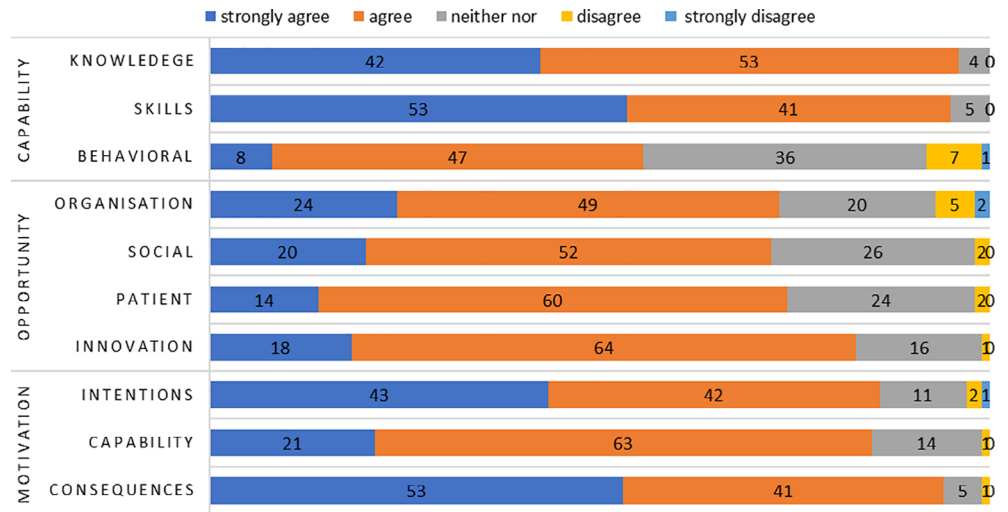


FIGURE 2 Distribution of responses of the DIBQ-t at item-level in percentages on a 5-point Likert-scale, sorted by COM-B

TABLE 4 Results from the construct validity testing after removal of two items

	χ^2	Df	p-Value	CFI	TLI	RMSEA (90% CI)	SRMR
Total model fit	635.844	256	0.00	0.933	0.916	0.050 (0.045-0.055)	0.047

Abbreviations: CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual; TLI, Tucker-Lewis Index.

4 | DISCUSSION

4.1 | Principal findings

The tailoring of the DIBQ resulted in a shorter version of the questionnaire with 28 items to assess clinicians' expectations to implementation, representing 10 of the initially 18 DIBQ domains. The DIBQ-t covers the categories of the COM-B model for Capability ("Skills," "Knowledge," and "Behavioral Regulation"), for Opportunity ("Social Influences," "Patients," "Organization," and "Innovation"), and

Motivation ("Beliefs about Capabilities," "Beliefs about Consequences," and "Intentions"). The DIBQ-t demonstrated good feasibility with only 2% missing data. The construct validity revealed an adequate fit of the model after removing two items. After removing these, the different domains in the questionnaire did not overlap. At the domain-level, at least 72% of the clinicians rated positive expectations to implementation except for the domain "Behavioral regulation" (55%).

Translation of DIBQ involved expert opinions on the questionnaire but did not include a backward translation, as robust evidence is

TABLE 5 Estimated factor loading ranges and internal consistency for the domains

DIBQ Domain	Items (n)	Estimated factor loading range for items	Reliability analysis-Internal consistency (Cronbach's alpha)
Knowledge	2	0.455-0.490	0.788
Skills	1	0.632	1.000
Beliefs about capabilities	5	0.406-0.589	0.779
Beliefs about consequences	3	0.399-0.443	0.730
Intentions	1	0.819	1.000
Innovation	4	0.365-0.536	0.717
Organization	2	0.689-0.696	0.721
Patient	2	0.521-0.582	0.855
Social influences	3	0.435-0.652	0.736
Behavioral regulation	3	0.435-0.739	0.774
			Overall = 0.896

lacking for the need for backward translation.²⁷ The inclusion of experts substantiated the face validity. Backward translation was not needed as the experts were skilled in the original language and English language¹⁷ since all experts use English regularly, both spoken and written.

Tailoring of the DIBQ into DIBQ-t was two-leveled as both the project team and experts selected relevant questions from the original DIBQ, reducing the risk of overlooking relevant or adding superfluous items. We used CVI based on expert opinion as recommended²⁸ and selected items with experts' ratings on CVI equalling 1.00. To allow for differences in contexts and cultures between Denmark and Sweden, project leaders added to these questions with CVI ≥ 0.80 country-wise.

The domains social/professional role, optimism, goals, socio-political context, innovation strategy, positive and negative emotions, and nature of behavior are not addressed in the DIBQ-t, as they did not meet the criteria for selection of the items. This does not mean that these domains may not be relevant in other implementation strategies.

Validity testing with confirmatory factor analyses resulted in the exclusion of two items: "I am confident that I can deliver Better Back/GLA:D Back" (item 4) and "I expect that, when I deliver Better Back/GLA:D Back, I get recognition from the work context" (item 13). Item 4 is one of six items in the domain "Beliefs about capability," with the other items covering elements of beliefs about the capability to deliver the programme. Therefore, this topic is expected to be covered sufficiently. Item 13 was highest rated as neutral (53%) or disagree/strongly disagree (4%, 3%), indicating that the item did not represent strong views toward expectations of implementation.

Linkage of the TDF domains to COM-B was conducted to provide an understanding of the results related to COM-B and to inform on future adjustments of the implementation strategies.^{10,11} The results showed that within the *Capability* category, the TDF domain "Behavioral Regulation" had the lowest frequency of "agree"/"strongly agree" responses, whereas the TDF domains "Knowledge" and "Skills" had $\geq 90\%$ clinicians strongly agreed/agreed with the items. This

finding is consistent with a study where "Knowledge" and "Skills" were associated with positive attitudes toward the promotion of physical activity.²⁹ The item "planning management of unmotivated patients" in "Behavioral regulation" had 63% of clinicians rating neutral/negative expectations to implementation. This is supported by a review concluding that physiotherapists' perception of low-motivated patients influenced the promotion of physical activity negatively.³⁰ This current study results may indicate that clinicians felt skilled and knowledgeable but uncertain about the delivery of the programme to less motivated patients.

In the COM-B category of *Opportunity*, domain "Social influences" three items were rated neither/nor by 25% to 46%. Interpretation of results with a large number of neutral responders should be made with caution as reasons for this response may be to avoid taking a stand or not having an opinion apart from genuinely having a mid-point position.³¹

Patients' perspectives were rated by 74% of the clinicians to influence the implementation. The focus of the programme is away from biomechanical explanations toward a more behavioral approach. It is earlier reported that patients' difficulties to accept non-biomechanical explanations can impact implementation.⁶

For the COM-B category *Motivation*, the domains had an average of over 80% clinicians rating "agree"/"strongly agree," suggesting positive motivation concerning the expected implementation behavior.

4.2 | Strengths, limitations, and further studies

The high response rate from both countries strengthens the results of the study. Also, the item-bank covers a wide spectrum relevant to both private and public LBP primary care internationally, as the study was conducted in two countries with different health care contexts. This study has some shortcomings that must be considered when interpreting the results.

This current study focused on clinicians' expectations for implementation and confirmed a stable construct of the DIBQ-t for

monitoring the strength of expectations toward implementation. To assess possible moderators of the implementation process, the clinicians' views on implementation based upon DIBQ-t can be related to other outcomes at clinician, patient, and service levels, as suggested by Proctor.³² Further analyses are planned after a longitudinal period of volition to investigate whether and the extent to which expectations measured by DIBQ-t predict implementation. Also, as the programme is expanded regionally and internationally, the DIBQ-t can be used to compare evaluations of implementation processes in different settings, organizations, and countries.

5 | CONCLUSIONS

DIBQ was tailored for evaluation of expectations toward the implementation of two best-practice LBP primary care programmes resulting in an English, Swedish and Danish version: the DIBQ-t. The DIBQ-t was feasible to use and had adequate content and construct validity. Most determinant domains indicated positive expectations of implementation. The DIBQ-t covers the categories of COM-B. The Behavioral regulation domain (having a clear plan when and how to deliver the programme) within the category "Capability" was rated lowest in DIBQ-t, being a potential topic for discussing challenges related to behavioral change in the current context.

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CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

AUTHOR CONTRIBUTIONS

Conceptualization: Inge Ris, Birgitta Öberg, Allan Abbott, Per Nilsen, Karin Schröder, Alice Kongsted, Jan Hartvigsen

Data curation: Inge Ris, Birgitta Öberg, Allan Abbott, Karin Schröder

Formal analysis: Inge Ris, Birgitta Öberg, Allan Abbott, Karin Schröder

Funding acquisition: Allan Abbott, Birgitta Öberg, Karin Schröder

Project administration: Inge Ris, Karin Schröder

Writing—Original Draft Preparation: Inge Ris

Writing—Review & Editing: all authors

All authors have read and approved the final version of the manuscript.

Inge Ris had full access to all of the data in this study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis.

TRANSPARENCY STATEMENT

The manuscript is an honest, accurate, and transparent account of the study being reported, and no important aspects of the study have been omitted.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available on reasonable request from the corresponding author.

ORCID

Inge Ris  <https://orcid.org/0000-0001-6623-4799>

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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