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Citation for the original published paper (version of record):

Elvén, M., Hochwälder, J., Dean, E., Söderlund, A. (2015)

A clinical reasoning model focused on clients' behaviour change with reference to physiotherapists: Its multiphase development and validation

Physiotherapy Theory and Practice, 31(4): 231-243

<https://doi.org/10.3109/09593985.2014.994250>

Access to the published version may require subscription.

N.B. When citing this work, cite the original published paper.

Permanent link to this version:

<http://urn.kb.se/resolve?urn=urn:nbn:se:mdh:diva-42886>

A clinical reasoning model focused on clients' behaviour change with reference to physiotherapists: its multiphase development and validation

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Abstract

Background and purpose: A biopsychosocial approach and behaviour change strategies have long been proposed to serve as a basis for addressing current multifaceted health problems. This emphasis has implications for clinical reasoning of health professionals. This study's aim was to develop and validate a conceptual model to guide physiotherapists' clinical reasoning focused on clients' behaviour change. **Methods:** Phase 1 consisted of the exploration of existing research and the research team's experiences and knowledge. Phases 2a and 2b consisted of validation and refinement of the model based on input from physiotherapy students in two focus groups (n=5 per group) and from experts in behavioural medicine (n=9). **Results:** Phase 1 generated theoretical and evidence bases for the first version of a model. Phases 2a and 2b established the validity and value of the model. The final model described clinical reasoning focused on clients' behaviour change as a cognitive, reflective, collaborative, and iterative process with multiple interrelated levels that included input from the client and physiotherapist, a functional behavioural analysis of the activity-related target behaviour, and the selection of strategies for behaviour change. **Conclusions:** This unique model, theory- and evidence-informed, has been developed to help physiotherapists apply clinical reasoning systematically in the process of behaviour change with their clients.

Keywords: Behaviour change, biopsychosocial, clinical reasoning, physiotherapy

Background

Compared with biomedical models, a biopsychosocial approach in clinical reasoning helps to address multiple factors that contribute to an individual's health status. This approach may facilitate client participation in care and treatment and improve outcomes (Gatchel et al, 2007; Laisne, Lecomte, and Corbiere, 2012). In a vision of the physiotherapy profession in the 21st century, a biopsychosocial approach and competencies in health behaviour change have been advocated (Dean et al, 2011; Dean et al, 2014). Thus, the traditional focus on physical and pathological factors has been challenged. The evidence for applying cognitive and behavioural strategies to physiotherapy practice (Söderlund and Lindberg, 2001; Friedrich, Gittler, Arendasy, and Friedrich, 2005; Von Korff et al, 2005; Åsenlöf, Denison, and Lindberg, 2005; Åsenlöf, Denison, and Lindberg, 2009; Henschke et al, 2010; Linton and Shaw, 2011; Williams, Eccleston, and Morley, 2012; Brunner et al, 2013) strengthens the vision and supports the integration of these strategies into contemporary clinical reasoning. To date, models of clinical reasoning in physiotherapy exist (Jensen and Givens, 1999; Jones, Edwards, and Gifford, 2002; Edwards et al, 2004; Smart and Doody, 2007; Jones, Jensen, and Edwards, 2008; Smith, Higgs, and Ellis, 2008; Masley et al, 2011), with some models including a biopsychosocial approach (Jones, Edwards, and Gifford, 2002; Edwards et al, 2004; Jones, Jensen, and Edwards, 2008; Foster and Delitto, 2011). Models of behaviour change interventions also exist (Michie, van Stralen, and West, 2011), but no model has been found that integrates methods of behaviour change into clinical reasoning. To address the current multifaceted health challenges, a conceptual model is needed to systematically guide physiotherapists in their clinical reasoning with respect to behaviour change in clients.

Clinical reasoning refers to the capability that is needed by the physiotherapist to synthesise information from the assessment, analyse the findings, tailor the intervention, and evaluate its effectiveness (Edwards et al, 2004; Smith, Higgs, and Ellis, 2008; Holdar, Wallin, and Heiwe, 2013). Findings from qualitative studies suggest that clinical reasoning is influenced by the context, characterised by flexible decisions and actions, conducted in collaboration with the client and guided by the physiotherapists' cognitive and reflective processes (Doody and McAteer, 2002; Edwards et al, 2004; Smart and Doody, 2007; Smith, Higgs, and Ellis, 2008; Josephson, Bülow, and Hedberg, 2011; Masley et al, 2011; Wainwright, Shepard, Harman, and Stephens, 2011; Cruz, Moore, and Cross, 2012; Holdar, Wallin, and Heiwe, 2013). However, we found no studies that showed physiotherapists focus on client behaviour change in their clinical reasoning.

Behavioural medicine, which is based on a biopsychosocial model, is an interdisciplinary field that integrates knowledge of psychosocial, biomedical, and behavioural factors in diagnosis, treatment, health promotion, and rehabilitation (International Society of Behavioural Medicine, 2014). When behavioural medicine approaches have been incorporated into physiotherapy management, the outcomes have been reported to be superior to those of physiotherapy without a behavioural medicine component. Such approaches imply that the relationship between the client and physiotherapist is bi-directional and focuses on the client's behaviours and goals (Friedrich, Gittler, Arendasy, and Friedrich, 2005; Von Korff et al, 2005; Åsenlöf, Denison, and Lindberg, 2005; Åsenlöf, Denison, and Lindberg, 2009). Accordingly, to facilitate behaviour change and client satisfaction, the goals should be explicit, perceived by the client as meaningful (Locke and Latham, 2002), and linked to meaningful activities (task or action influenced by the context (World Health Organisation, 2013)) that the client needs to perform during everyday life (e.g., activities and participation related to the client's occupation, recreation, and self-care) (Randall and McEwen, 2000; Åsenlöf, Denison, and Lindberg, 2004). With respect to the present study we use the term activity-related behaviour to encompass a comprehensive set of behaviours, i.e., movements, thoughts, and emotions, that are needed to perform a specific task and that are affected by both physical and social contexts. A behavioural medicine approach also involves individually tailored interventions (Åsenlöf, Denison, and Lindberg, 2005) based on a functional behavioural analysis (Haynes and O'Brien, 1990) of the activity-related behaviour. Functional behavioural analysis refers to the analysis of the relationships among factors believed to affect a given activity-related behaviour (Haynes and O'Brien, 1990).

Learning and health psychology theories help explain the determinants of sub-optimal health behaviour and design behaviour change interventions (Abraham and Michie, 2008; Michie et al, 2008; Michie, van Stralen, and West, 2011). References to the trans-theoretical model/stages of change (Prochaska and Di Clemente, 1982), social cognitive theory (Bandura, 1997), and health belief model (Rosenstock, Strecher, and Becker, 1988) commonly appear in the health behaviour change literature (Painter et al, 2008). Operant and respondent learning theories also have been used to inform behaviour change strategies (Sarafino, 2001), e.g., reinforcement and graded activity (Brunner et al, 2013), and graded exposure *in vivo* (Leeuw et al, 2008; Woods and Asmundson, 2008). These theories (Prochaska and Di Clemente, 1982; Rosenstock, Strecher, and Becker, 1988; Bandura, 1997) and the evidence supporting the important role of contextual (Wilcox et al, 2009; Carpenter, 2010), psychological (Linton and Shaw, 2011; Williams, Eccleston, and Morley, 2012), physical, and behavioural (Söderlund and Lindberg, 2001; Friedrich, Gittler, Arendasy, and Friedrich, 2005; Dean, 2009; Åsenlöf, Denison, and Lindberg, 2009) factors in behaviour change and health improvement support their integration into the clinical reasoning process. The literature describes a range of strategies and methods that can be used to address behaviour change in clients (Michie et al, 2009; Linton and Shaw, 2011). To facilitate physiotherapists' translation of this knowledge to daily practice, user-friendly implementation formats have been advocated (Dannapfel, Peolsson, and Nilsen, 2013; Dean et al, 2014). Thus, a rational starting point for knowledge translation is a conceptual model related to clinical reasoning with a focus on clients' behaviour change in the physiotherapy context based on theory, evidence, and experience-based knowledge of experts in the field.

In this study, we aimed to develop and validate a conceptual model to guide clinical reasoning focused on clients' behaviour change specifically related to the physiotherapy context. The research questions were two-fold, namely, (1) what concepts and theories underpin the clinical reasoning and strategies that are needed by physiotherapists to support clients' behaviour change (Phase 1) and (2) how do physiotherapy students with knowledge of and experience in behavioural medicine and experts in behavioural medicine view the first version of the conceptual model that emerged from the first research question (Phases 2a and 2b, respectively)?

The methods were selected based on established procedures of model-building (Jaccard and Jacoby, 2010). Jaccard and Jacoby (2010) described three steps. Step 1 refers to creativity and the generation of ideas regarding the scope of the model and its concepts. This step could be addressed in various ways, including literature reviews, personal experience, and discussion with others interested in the topic. In Step 2, selected concepts are transformed from abstract to more concrete concepts, resulting in conceptual definitions. Step 3 consists of clarifying the relationships among concepts. In our study, Phase 1 involved an exploration of existing research and the research team's knowledge and experience and was aimed at addressing Steps 1 to 3 in the model building process. Phase 2 consisted of 2a, specifically, two focus groups of physiotherapy students, and 2b; a group discussion with physiotherapists with expertise in behavioural medicine, contributed to Steps 2 and 3, as well as Step 1, through refinements of the model. The study was approved by the Regional Ethical Review Board, Uppsala, Sweden, Dnr 2013/020.

Phase 1: First Version of a Clinical Reasoning Model Focused on Clients' Behaviour Change with Reference to Physiotherapists

The aim of this phase was to identify the specific concepts and theories that underpin the clinical reasoning and strategies needed by physiotherapists to support clients' behaviour change.

Methods

Design and procedure

An exploratory design was used. Exploration of existing research was performed by identifying scientific studies and theoretical works that are prominent in the topic and written in English (Cooper and Hedges, 2009). Searches were performed using the following databases: PubMed, PsycINFO, ERIC, and CINAHL; and the Cochrane Database of Systematic Reviews. The following topic areas were covered in the searches (examples of search terms are provided in brackets): clinical reasoning in physiotherapy (physiotherapy, physical therapy, and clinical reasoning); established learning and health psychology theories (trans-theoretical model, stages of change, social cognitive theory, health belief model, operant and respondent learning theory); determinants of health and health behaviour (determinant, predictor, and behaviour change); and interventions for behaviour change (intervention, evidence, psychosocial, physical activity, behaviour change, physiotherapy, and physical therapy). In addition, studies were identified using the citation lists of chosen studies and other publications (e.g., reports and books). The results from existing research were continuously discussed and evaluated by the research team to achieve the aim of Phase 1. In these discussions, the research team's experience in and knowledge of the topic helped identify and modify key concepts to the needs of a model.

Results

Phase 1 resulted in a first version of the model, which is presented in figure 1. The model that emerged depicts physiotherapists' clinical reasoning focused on clients' activity-related behaviours and behaviour change as a continuous, cyclical process and a shared responsibility between the client and physiotherapist. Prerequisites for the physiotherapist's capability in clinical reasoning are related to knowledge, cognition, and metacognition. Prerequisites for the client's activity-related behaviour reflect

biopsychosocial factors. A three-pronged clinical reasoning process derives input from both client and physiotherapist factors. Various assessments inform the analysis and problem formulation that serve as the basis for the selection of interventions to effect the client's behaviour change. Eventually, based on the physiotherapist's monitoring of the outcome of the clinical reasoning, the process is modified or restarted as indicated.

Figure 1. First version of a clinical reasoning model focused on clients' behaviour change with reference to physiotherapists.

Discussion

In clinical reasoning, the physiotherapists' knowledge underlies their thinking efforts and is used in conjunction with data collected from the client in the analysis. Metacognition is used to monitor and control the process, thereby enhancing the quality of clinical decisions and actions (Marcum, 2012). The physiotherapist's experience, education (Wainwright, Shepard, Harman, and Stephens, 2011; Holdar, Wallin, and Heiwe, 2013), and approach to the reasoning process (Edwards et al, 2004; Smith, Higgs, and Ellis, 2008; Holdar, Wallin, and Heiwe, 2013) are also important. In addition to the prerequisites of the physiotherapist, the clinical setting (Masley et al, 2011; Holdar, Wallin, and Heiwe, 2013) and the client's status (Josephson, Bülow, and Hedberg, 2011) contribute to the characteristics of the reasoning process. Previous studies however have demonstrated that the performance of clinical reasoning is mainly influenced by factors related to the individual physiotherapist (Doody and McAteer, 2002; Smith, Higgs, and Ellis, 2008; Wainwright, Shepard, Harman, and Stephens, 2011; Holdar, Wallin, and Heiwe, 2013). In contrast to emphasising the physiotherapist as the major contributor, an active client who participates in individualising interventions increases the probability of positive behaviour change (Turk and Salovey, 1995; Michie et al, 2009). Thus, when behaviour change is in focus, the client and physiotherapist are partners in clinical reasoning, which is reflected in the proposed model.

Self-efficacy, which is important in behaviour change (Bandura, 1997), is a strong predictor of disability in clients with acute (Söderlund and Åsenlöf, 2010) and chronic (Denison, Åsenlöf, and

Lindberg, 2004; Benyon, Hill, Zadurian, and Mallen, 2010) disorders. Interventions that include feedback lead to greater self-efficacy compared with interventions without feedback (Ashford, Edmunds, and French, 2010). The clients' expectations about the consequences (outcome expectations) of the specific behaviour and the value of these consequences (Bandura, 2004) also determine the actual behaviour, e.g., adherence to physical exercise (Rhodes and Fiala, 2009) and self-management strategies (Iannotti et al, 2006). Other factors that should be included in the model are catastrophizing beliefs, pain-related fear, and avoidance behaviour. The influence of these factors on developing and maintaining pain and disability, for example, has been confirmed by several investigators (Keefe et al, 2004; Leeuw et al, 2007; Pincus, Smeets, Simmonds, and Sullivan, 2010). Individual readiness to change behaviour is another factor that influences behaviour change outcome, as it corresponds to motivation and intention (Prochaska et al, 1994). Motivational interviewing, encompassing the individual's perceived readiness, goals, importance, and self-efficacy for behaviour change (Miller and Rollnick, 2012), has been reported to be a critical component to increase the likelihood of behaviour change (Burke, Arkowitz, and Menchola, 2003; Martins and McNeil, 2009). Additionally, a meta-analysis of behaviour change interventions confirmed self-regulation techniques, primarily self-monitoring, to be effective in improving health behaviours (Michie et al, 2009). Behaviours do not only depend on the individual. Facilitators of and barriers to health behaviours for example have been associated with the physical and social contexts (Wilcox et al, 2009; Carpenter, 2010; Morris, Oliver, Kroll, and MacGillivray, 2012). Therefore, contextual factors were included in the model.

Our literature search methodology was based on Cooper's and Hedges's (2009) recommendations regarding representative coverage, specifically the inclusion of prominent studies that best reflect the field. This was the case in our study. Our study did not attempt to provide a comprehensive description of the phenomenon of clinical reasoning. Rather, we identified variables that significantly contribute to an understanding of physiotherapists' clinical reasoning with a focus on effecting behaviour change in clients.

Jaccard and Jacoby (2010) argued that validation of a model depends on how individuals with expertise in the field perceive the model's value and usefulness. Thus, in Phase 2 of our study, we garnered input regarding the first version of the model from individuals with specific knowledge of the field.

Phase 2a: Views of Physiotherapy Students Regarding the First Version of the Clinical Reasoning Model

To refine and validate the first version of the conceptual model of clinical reasoning focused on clients' behaviour change, the aim of Phase 2a was to investigate the views of physiotherapy students with knowledge of and experience in behavioural medicine, about the model.

Methods

Design and sample

A descriptive and qualitative design was used. Participants were recruited based on a purposive sampling strategy. The inclusion criteria included knowledge of physiotherapy with a behavioural medicine perspective; and on-going engagement in learning about clinical reasoning and strategies for effecting behaviour change based on both theoretical and practical contexts. Therefore, the participants were recruited from the sixth and last semester of a physiotherapy programme in which behavioural medicine is thoroughly integrated. Twenty-five students were asked to participate: 12 students consented. Two students were unable to attend, which resulted in a sample of ten participants. Oral and written informed consent was obtained from participants. The sample included four men and six women who were assigned to one of two focus groups. The age ranged from 22 to 31 years, with a mean age of 26 years. Nine participants had previous work experience in health care, and seven participants had over one year

of health care experience. In addition to the physiotherapy programme, seven participants had achieved higher education ranging from 5 weeks to two years.

Procedure

Each focus group consisted of two men and three women. The primary investigator moderated both focus groups. The first version of the conceptual model in Swedish served as the basis for discussion. The conceptual model and information about the aim and procedure of the focus group were emailed to the participants one week before each group convened. Only the concept of clinical reasoning was defined, and the participants were asked to review the model and its concepts beforehand. The format for the focus groups was semi-structured and followed a tested interview guide with open-ended questions based on the guidelines of Kreuger and Casey (2000). The interview guide is presented in table 1.

The focus groups began with an overview by the moderator, including a brief introduction to the study and guidelines for discussion. The participants were reminded that their thoughts and reflections about the model were important and that the evaluation of their responses was not the purpose. In other words, they were assured that there were no right or wrong answers. The moderator led the focus groups based on the interview guide, asked supplementary questions as needed, and facilitated the discussion. The interview method allowed the participants to interact and comment on and share information, and provided the opportunity to ask for clarification. The focus group sessions, which were conducted in a designated room at the university, were audio-recorded. Each focus group session lasted two hours.

Table 1. Interview guide for the focus groups.

Type of question	Specific question
Opening question	Why did you decide to participate in this focus group?
Introductory question	Based on your theoretical and practical knowledge and experience, what do you think about this model?
Transition questions	In what ways do you think that this model is consistent with your theoretical and practical knowledge and experience?
	In what way do you think that this model is not consistent with your theoretical and practical knowledge and experience?
Key questions	What do you think about the model's content and concepts based on its aim?
	Do you think anything should be added or changed in the model?
	What do you think about the model's comprehensibility?
Summary questions	[The moderator summarises the discussion.] Is this summary consistent with your views of the discussion? Do you have any final thoughts and reflections that you would like to add?

Data analysis

A deductive content analysis (Elo and Kyngäs, 2008) was applied to the interview text, which was a complete verbatim transcription of the audio-recorded focus group discussions. A protocol for data analysis described by Wibeck (2010) was used. Analysis began during the focus groups. After each focus group session, the moderator summarised the discussion, which the participants were asked to comment upon to ensure its accuracy. Afterwards, the transcriptions were read by the moderator several times to obtain a sense of the discussion of each focus group overall. The text was divided into content areas, which were based on the interview questions. An unconstrained categorisation scheme with predefined categories relevant to the study aim was developed (Elo and Kyngäs, 2008). The categories included agreement with the content and concepts of the model and disagreement, content, or concepts that should be changed or added; if necessary, other categories could be added during the analysis process. The next step consisted of identifying meaning units (i.e., words or sentences that relate to the same central meaning) (Graneheim and Lundman, 2004). Both the primary investigator, who conducted

the focus groups, and the senior investigator reviewed the excerpts and identified meaning units independently. Dialogue between them regarding agreement in the interpretation of the data followed, and the meaning units were modified to achieve consensus. The meaning units were then coded. The codes were compared to determine similarities and differences, sorted into categories within the categorisation schema and divided into sub-categories (Elo and Kyngäs, 2008). Both of these investigators were involved in the later stages of the analysis. Codes and quotations were translated into English, edited by a native English speaker, and then back-translated into Swedish.

Results

The main findings are presented as two categories with sub-categories. No additional categories emerged during the analysis. The categories and sub-categories are illustrated and supported by quotations from the focus groups. The abbreviations FG 1 and FG 2 refer to Focus Group 1 and Focus Group 2, respectively. The categories and sub-categories are shown in table 2.

Table 2. Categories and sub-categories that emerged from the physiotherapy student focus groups.

Category	Sub-category
Agreement with the content and concepts of the model	Complete model with interacting components Collaboration Holistic view of the client Reflect theoretical knowledge and practical experience Reflection
Disagreement, content, or concepts that should be changed or added	Add conceptual definitions Possibly add additional assessments and interventions Clarify clients' priority of activity-related behaviour Clarify biomedical and physical factors Add a feedback loop Edit the layout

Agreement with the content and concepts of the model

Complete model with interacting components. There was overall agreement that clinical reasoning with a focus on clients' activity-related behaviours and behaviour change implies an interaction of the three components: the physiotherapist, the client, and the assessment and intervention. One participant expressed the following:

It [the model] is complete. I think, to be able to change a behaviour you [the physiotherapist] need all these tools and you do not do everything yourself... even the patient participates. (FG 2)

Collaboration. The participants emphasised that the physiotherapist and the client influence each other and that collaboration is the foundation of the clinical reasoning process. Some participants emphasised the importance of the client being engaged in his or her behaviour change, which implies collaboration.

There must be a collaboration where both parties give and take. The patient is the expert of himself; we do not know exactly how this individual patient will respond to the treatment that others have had a good response to. Therefore, we need to collaborate with the patient. (FG 1)

Holistic view of the client. The participants described ways in which they considered a biopsychosocial approach in their clinical reasoning. They believed this approach was reflected in the model. One participant noted that successful treatment should not rely solely on passive treatments directed toward physical impairments.

You can't do only manual treatments... you need to shape knowledge, set goals, etc. (FG 2)

Reflect theoretical knowledge and practical experience. In both focus groups, several participants mentioned that they recognised the concepts of the model based on their theoretical knowledge and practical experience. Some participants highlighted the importance of clinical reasoning as a process in which new information is considered in an iterative manner. Some participants expressed that the concepts of the model were straightforward.

It [the model] seems obvious in every way. It is this approach we have... this is the way you should do it, how else would you do it? (FG 2), Exactly. (FG 2)

Reflection. Several participants perceived the importance of metacognition in the clinical reasoning process. They believed that the physiotherapist's reflections increase awareness of his/her thoughts, which could improve decisions and actions. For example, one participant acknowledged:

It is important to be aware of your attitude and how you as a physiotherapist treat a patient. (FG 2)

Disagreement, content, or concepts that should be changed or added

Add conceptual definitions. There were various opinions about concepts that were perceived as difficult to comprehend. No single concept was considered apparent to the student participants. However, they emphasised the need for the inclusion of conceptual definitions.

It is important to know what is included in the concepts. We think differently about concepts. (FG 1)

Possibly add additional assessments and interventions. The participants recommended various assessments and interventions. The methods appeared to reflect individuals' perceptions, and that no method was viewed more important than another. One participant summarised the discussion as follows:

Maybe a general intervention should be included as well, because the physiotherapist works according to his individual knowledge base and focus. (FG 1)

Clarify clients' priority of activity-related behaviour. Some participants expressed the opinion that the model needed to clarify that the activity-related behaviour should be an activity of importance to the client; thus, it will serve as an essential motivator for behaviour change. One participant noted the importance of the client's involvement in decisions.

It requires that the activity is chosen by the patient. (FG 2)

Clarify biomedical and physical factors. In one focus group, some participants perceived that biomedical and physical factors appeared tangential to the model.

A patient with mainly biomedical problems does not really fit in here [in the model]. (FG 1)

Another participant expressed a similar view.

I think this model only can be used if you believe there is a psychological impact. (FG 1)

Add a feedback loop. Several participants described how a clinical reasoning process transitions back and forth. In clinical reasoning, the physiotherapist should be aware of the gaps that must be reassessed and that even the intervention generates new information that provides input to a new analysis. This feedback loop was not perceived as sufficiently clear within the model. For example, one participant expressed:

There is a need for arrows here also ... from analysis and problem-formulation back to input. Sometimes the problem changes and you need to assess further even after the analysis. It goes back and forth. (FG 1)

Edit the layout. The layout of a model was viewed as being important during the focus group discussions. The participants discussed this issue several times. Simplicity of the model was also considered an important feature. One participant expressed the following:

About the layout, move the text so it does not get messy in the middle. (FG 1)

Discussion

To a large extent, the participants perceived that the model reflected their views of clinical reasoning with a focus on behaviour change in clients. They emphasised the importance of the biopsychosocial approach and the clients' active roles. Furthermore, they confirmed the physiotherapists' cognitive and metacognitive prerequisites. In addition, they suggested content and concepts that could be clarified to improve the comprehensibility of the model and agreement with the participants' experiences and knowledge. Overall, the student focus groups helped validate the model. Physiotherapy students are a potential target group for using the model, and their views regarding ambiguous concepts were important to consider in further refinements of the model.

No consensus on the sample size of focus groups exists. Fewer groups are common when combining focus groups with other data collection methods (Carlsen and Glenton, 2011) and when the research question is limited (Kitzinger, 1995; Krueger and Casey, 2000), such as in our study. Several measures were taken to ensure credibility of the findings (Graneheim and Lundman, 2004). The interview guide was tested to ensure that the questions were understood. The moderator's summary of the participants' discussions at the end of each focus group session ensured that the viewpoints of the model were accurately reflected. In the analysis, the selection of the most suitable meaning units and condensation and development of categories to summarise the data, followed an established schema (Elo and Kyngäs, 2008). Finally, the two investigators involved in the data collection and analysis, achieved agreement in analysing the findings which further strengthened their credibility (Graneheim and Lundman, 2004).

Phase 2b: Views of Physiotherapists with Expertise in Behavioural Medicine Regarding the First Version of the Clinical Reasoning Model

To further refine and validate the first version of the conceptual model of clinical reasoning focused on clients' behaviour change, the aim of Phase 2b was to investigate the views of physiotherapists with expertise in behavioural medicine, about the model.

Methods

Design and sample

A descriptive and qualitative design was used. A convenience sample of experts in physiotherapy with a behavioural medicine specialisation was recruited from the participating university. To provide new insights about the model based on current knowledge, the participants needed to have experience in research and teaching in physiotherapy based on a behavioural medicine perspective. The sample (n=9) included seven senior researchers (one man and six women) and two junior researchers (women).

Procedure

A group discussion was conducted. It was an open discussion that revolved around one main question: based on the aim of the first version of the conceptual model, what are your views regarding the content and concepts of the model in relation to clinical reasoning in physiotherapy with a focus on clients' activity-related behaviours and behaviour change? The role of the moderator was to ensure that the discussion remained focused on its aim. The first version of the model and information about the aim of the discussion were e-mailed to the participants one week prior to the group discussion. The discussion was convened at the university and was led by the same moderator as the focus groups. The moderator recorded field notes to capture data for analysis (Krueger and Casey, 2000). The discussion lasted one hour and 45 minutes.

Data analysis

The analysis strategy was initiated by a discussion with the senior investigator, who also attended the expert group discussion. The aim of this discussion was to increase the possibility of capturing key reflections. Based on the field notes and the discussion with the senior investigator, a written summary of the group discussion was produced. The frequency, specificity, and extensiveness of the statements were examined (Krueger and Casey, 2000). The analysis was completed by the primary and senior investigators and resulted in the most salient views of the participants presented in condensed descriptions.

Results

Five condensed descriptions of the participants' most salient views emerged. The first two descriptions were related to agreement with the content and concepts of the model as follows: 1) a valuable model, which includes the following central components: a shared process, a biopsychosocial perspective, and the most prominent attributes of strategies for behaviour change; 2) activity-related behaviour is a preferable concept and emphasises the client's behaviour with respect to activity and participation. The following three descriptions were related to disagreement with aspects of the model or to content and concepts that should be changed or added: 3) highlight the uniqueness of the model, i.e., the focus being the client's behaviour and behaviour change, by clarifying or changing some concepts. For example, the participants expressed the importance of focusing on behavioural skills in assessment and treatment and replacing the analysis and problem formulation with functional behavioural analysis; 4) edit the layout by more distinctly highlighting each level of the clinical reasoning process; and 5) consider whether additional factors should be added to the physiotherapist dimension of the model, such as attitudes and beliefs about a behaviour change approach in clinical reasoning.

Discussion

Comparable to the student focus groups, the discussion with experts identified that they perceived the clinical reasoning model as valuable and useful, which further validated the model construction. Their views also led to minor refinements. Despite a less structured discussion compared with the focus groups, the participants' reflections were extensive because of enabling and reinforcing factors. Specifically, a "naturally occurring group" similar to this group has the advantage of being familiar with each other, which can contribute to an engaged discussion and the generation of ideas. An additional advantage is that the group's members may be able to relate effectively to each other's comments given their shared work environment (Kitzinger, 1995). A possible limitation regarding the method is that field notes do not capture all of the information in a discussion, unlike an audio-recording. In this study, the moderator mainly initiated the discussion, which allowed her to write detailed notes. Finally, the field notes were discussed with the senior investigator, thereby improving the validity of the results.

Synthesis of results

Final Version of the Clinical Reasoning Model Focused on Clients' Behaviour Change with Reference to Physiotherapists

Based on the findings of this two-phase study, the clinical reasoning model focused on clients' behaviour change was constructed with reference to the physiotherapy context. Trade-offs in the selection and refinement of concepts in the final version of the model were made according to the level of concreteness, coherence, and utility (Jaccard and Jacoby, 2010).

To facilitate the utility of the model across contexts, the concept of patient in the first version of the model was replaced with the concept of client in the final version. To increase the concreteness (Step 2) of the behaviour change approach in clinical reasoning, the concepts of analysis and problem formulation were replaced with functional behavioural analysis (Haynes and O'Brien, 1990). The clients' behavioural skills were added as central elements in the model. The addition of *prioritized* activity-related behaviour represents a target behaviour that the client perceives as important and that the client has self-efficacy to perform. The influencing factors related to the client were separated to increase concreteness and, in the final model, they consisted of biomedical and contextual factors. The latter of which included the social and physical environments. Factors related to the physiotherapist were extended with the inclusion of psychological and contextual influencing factors to better reflect a biopsychosocial perspective, thereby improving the coherence of the model. The sub-concepts linked to knowledge, cognition, and metacognition were simplified to improve comprehension and concreteness. For example, the sub-concepts of monitoring and control related to metacognition were subsumed within the concept termed regulative. To clarify the relationships among concepts (Step 3), the model layout was refined. For example, the circles visually appeared as the same size in the figure and depicted equality between the client and physiotherapist. To visualise the iterative process of clinical reasoning, double-headed arrows were added between the levels in the clinical reasoning process. The final version of the Clinical Reasoning model focused on clients' Behaviour Change with reference to Physiotherapists (CRBC-PT) is shown in figure 2. The conceptual descriptions are presented in table 3.

Figure 2. Final version of the clinical reasoning model focused on clients' behaviour change with reference to physiotherapists. *Input includes central elements in behavioural assessment. **Strategies for behaviour change includes central elements in behavioural interventions.

Table 3. Dimensions of the clinical reasoning model focused on clients' behaviour change with reference to physiotherapists: Concepts, descriptions, and sources.

Dimension and Concept	Description	Source
Client		
Prioritized activity-related behaviour	Movements, thoughts, and emotions associated with a specific task linked to activities in the client's everyday life and affected by the physical and social contexts. Prioritized refers to a behaviour perceived as important and that the client has self-efficacy in performing.	Randall and McEwen, 2000; Locke and Latham, 2002; Åsenlöf, Denison, and Lindberg, 2004; World Health Organisation, 2013.
<i>Capability and Skills</i>		
Physical	Physical capability and skills to engage in the activity-related behaviour, e.g., strength, mobility, and balance.	Edwards et al, 2004; Liu and Latham, 2009; Choi, Verbeek, Tam, and Jiang, 2010; Josephson, Bülow, and Hedberg, 2011; Michie, van Stralen, and West, 2011; Wainwright, Shepard, Harman, and Stephens, 2011.
Psychological	Psychological capability and skills to engage in the activity-related behaviour, e.g., cognitions, beliefs, expectations, fear, problem-solving, and coping.	Linton, 2000; Burton et al, 2004; Edwards et al, 2004; Josephson, Bülow, and Hedberg, 2011; Masley et al, 2011; Michie, van Stralen, and West, 2011; Wainwright, Shepard, Harman, and Stephens, 2011.
<i>Influencing Factors</i>		
Biomedical	Biomedical deficits, such as disease and tissue pathology, e.g., pain, ligament injury, and sensory deficits.	Doody and McAteer, 2002; Edwards et al, 2004; Masley et al, 2011; Wainwright, Shepard, Harman, and Stephens, 2011; Cruz, Moore, and Cross, 2012.
Contextual	Physical and social environmental factors and personal factors (e.g., socio-cultural background, knowledge and experiences).	Edwards et al, 2004; Wilcox et al, 2009; Josephson, Bülow, and Hedberg, 2011; Masley et al, 2011; Morris, Oliver, Kroll, and MacGillivray, 2012; World Health Organisation, 2013.
Physiotherapist		
<i>Capability and Skills</i>		
Knowledge		
Theoretical, empirical, and evidence-based	Theoretical, including e.g., theories of motor control, exercise physiology, learning, and health psychology theories. Empirical, generated through experiences. Evidence-based, generated from research.	Sarafino, 2001; Daykin and Richardson, 2004; Masley et al, 2011; Shumway-Cook and Woollacott, 2011; Wainwright, Shepard, Harman, and Stephens, 2011; Powers and Howley, 2012; Holdar, Wallin, and Heiwe, 2013.
Cognition		
Analytical	To analyse relationships among factors of importance for the activity-related behaviour in a functional behavioural analysis.	Doody and McAteer, 2002; Edwards et al, 2004; Kuiper and Pesut, 2004; Åsenlöf, Denison, and Lindberg, 2005; Wainwright, Shepard, Harman, and Stephens, 2011; Marcum, 2012.
Metacognition		
Regulative	To be aware and have knowledge of one's own thinking. Metacognition operates through reflections on cognitive processes and performances and regulates decisions and outcomes.	Zimmerman, 2002; Kuiper and Pesut, 2004; Smith, Higgs, and Ellis, 2008; Wainwright, Shepard, Harman, and Stephens, 2011; Marcum, 2012.

(continued)

Table 3. Continued

Dimension and Concept	Description	Source
<i>Influencing Factors</i>		
Psychological	Attitudes towards, and self-efficacy in, a behavioural approach in clinical reasoning.	Bandura, 1997; Bandura, 2004; Aizen, 2005; Smith, Higgs, and Ellis, 2007; Godin, Bélanger-Gravel, Eccles, and Grimshaw, 2008; Darlow et al, 2012.
Contextual	The physical and social environments in the physiotherapist's work location.	Smith, Higgs, and Ellis, 2008; Masley et al, 2011; Wainwright, Shepard, Harman, and Stephens, 2011; Holdar, Wallin, and Heiwe, 2013.
Input from Client	Identification of the problem and prioritised activity-related behaviour. Collection of data through interview, observation, physical assessment, and self-monitoring.	
Behavioural skills	Physical, psychological, and organisational skills for performing the activity-related behaviour in a specific situation.	Turk and Salovey, 1995; Sarafino, 2001; Sundel and Sundel, 2005.
Health-related lifestyle, modifiable risk factors	Assessment of modifiable risk factors for lifestyle conditions and counselling for healthy living.	Dean, 2009; Swedish National Board of Health and Welfare, 2011.
Readiness to change	The client's readiness to change his/her behaviour, which is dependent on the client's stage of change.	Prochaska and Di Clemente, 1982; Marshall and Biddle, 2001.
Self-efficacy	The client's belief in his/her capability to successfully perform a particular behaviour in a specific situation.	Bandura, 1997; Bandura, 2004; Denison, Åsenlöf, and Lindberg, 2004; Benyon, Hill, Zadurian, and Mallen, 2010; Söderlund and Åsenlöf, 2010; Amireault, Godin, and Vézina-Im, 2013.
Outcome expectations	The client's expectations regarding the consequences of a behaviour, i.e., the likelihood of the various outcomes and the perceived value of these outcomes.	Bandura, 1997; Iannotti et al, 2006; Rhodes and Fiala, 2009.
Fear-avoidance	The client's avoidance of movements or activities based on fear.	Vlaeyen and Linton, 2000; Keefe et al, 2004; Leeuw et al, 2007.
Catastrophizing	The client's thoughts comprise elements of rumination, magnification, and helplessness.	Sullivan, Bishop, and Pivik, 1995; Keefe et al, 2004; Leeuw et al, 2007.
Perceived barriers	The client's perceived negative aspects of performing a specific behaviour, e.g., physical and psychological impediments, lack of time, and barriers in the physical environment.	Rosenstock, Strecher, and Becker, 1988; Wilcox et al, 2009; Carpenter, 2010; Morris, Oliver, Kroll, and MacGillivray, 2012.
Biomedical factors	See 'Client'	
Contextual factors	See 'Client'	
Functional Behavioural Analysis	Identification of important, controllable, causal functional relationships among physical, psychological, biomedical and contextual factors, and behavioural responses believed to affect the activity-related behaviour. The outcome of the analysis is expressed as hypotheses.	Haynes and O'Brien, 1990; Sugai, Lewis-Palmer, and Hagan-Burke, 2000; Åsenlöf, Denison, and Lindberg, 2005.
Strategies for Behaviour Change	Individualised strategies for behaviour change, based on a functional behavioural analysis.	
Develop behavioural skills	Teaching and practicing of basic skills to improve performance of the activity-related behaviour (e.g., strength, balance, organisational skills, reduction of negative thoughts, and coping skills) and application of skills to perform the compound behaviour.	Turk and Salovey, 1995; Sarafino, 2001; Sundel and Sundel, 2005.

(continued)

Table 3. Continued

Dimension and Concept	Description	Source
Shape knowledge	Monitoring of the activity-related behaviour, discussion about antecedents and consequences of the behaviour, and developing strategies for how to perform the behaviour.	Sundel and Sundel, 2005; Michie et al, 2013.
Specific goal-setting and reviewing of goal	Agree on a goal defined in terms of a preferable activity-related behaviour. The goal should be specific, measurable, activity-related, realistic and time-specific (SMART). Modification of previous set goal if not appropriate.	Locke and Latham, 2002; Siegert and Taylor, 2004; Michie et al, 2013.
Promote feedback and reinforcement	Feedback is information regarding the quality of the performance and how it may be improved. Reinforcements are consequences that cause an increase in the performance of the behaviour.	Bandura, 1997; Sarafino, 2001; Sundel and Sundel, 2005; Ashford, Edmunds, and French, 2010; Brunner et al, 2013.
Enable self-regulation	The clients control themselves through goal-setting, self-monitoring, feedback, self-reward, enlistment of social support, and self-instruction.	Bandura, 1997; Michie et al, 2009.
Enable informed beliefs	Improve <i>self-efficacy</i> through mastery experiences, improving physical and emotional states, social modelling, and verbal persuasion.	Bandura, 1997; Ashford, Edmunds, and French, 2010; Prestwich et al, 2013.
	Improve <i>outcome expectations</i> by clarifying expectations, encouraging preferable behaviour, increasing awareness of the potential benefits, performing graded activity and creating an accessible environment.	Williams, Anderson, and Winett, 2005.
	Reduce <i>fear-avoidance</i> through graded activity or exposure <i>in vivo</i> .	Leeuw et al, 2008; Linton and Shaw, 2011.
	Reduce <i>catastrophizing</i> by encouraging less-exaggerated thoughts and active coping strategies.	Linton and Shaw, 2011; Thieme and Turk, 2012.
	Reduce <i>perceived barriers</i> through prompt reduction or restructuring of physical and psychosocial barriers.	Carpenter, 2010; Michie et al, 2013.
Motivational interviewing	Enhance the client's motivation for behaviour change by addressing and resolving ambivalence, including open questions, affirmations, reflections, and summaries.	Burke, Arkowitz, and Menchola, 2003; Martins and McNeil, 2009; Miller and Rollnick, 2012.
Modify contextual factors	Social support and restructuring of the physical environment enabling the activity-related behaviour.	Morris, Oliver, Kroll, and MacGillivray, 2012; Michie et al, 2013.

General discussion

Clinical reasoning in the context of interest emerged as a cognitive, reflective, collaborative, and iterative process with multiple levels, i.e., input from the client and physiotherapist, a functional behavioural analysis of the prioritised activity-related target behaviour, and the selection of strategies for behaviour change based on the analysis. Input from the client and strategies for behaviour change support that the physiotherapist needs to consider central elements in behavioural assessment and interventions, to effect a specific behaviour change. Throughout the process, the physiotherapist uses knowledge, cognition, and metacognition, which are influenced by psychological and contextual factors, and considers physical, psychological, biomedical, and contextual factors as well, relevant to the client's activity-related behaviour.

This newly proposed model addresses a gap in the literature and in physiotherapy practice. It integrates traditional clinical reasoning in physiotherapy with clinical reasoning focused on behavioural

considerations in relation to behavioural change. The strength of the model is that it elucidates how key factors from the areas of clinical reasoning and health behaviour and behaviour change are interrelated. Furthermore, the model specifies the selection of effective strategies that could support physiotherapists in their clinical reasoning to effect behaviour change in their clients. The CRBC-PT has the potential therefore to serve as a useful tool in practice as well as to support research. The model does not necessarily supersede other models; however, it was designed to integrate clinical reasoning theory, and the constructs of health behaviour and behaviour change from the perspective of the client and physiotherapist. Integrating concepts from related areas into one conceptual model helps to clarify the relationships among these concepts and their utility, which make them further accessible and applicable to practitioners (Jaccard and Jacoby, 2010). Existing models of physiotherapists' clinical reasoning based on observations or interviews (e.g., Edwards et al, 2004; Josephson, Bülow, and Hedberg, 2011; Holdar, Wallin, and Heiwe, 2013) seldom include preferred concepts and relationships in clinical reasoning based on theory and evidence. One exception is the biopsychosocial model of clinical reasoning, which was described by Jones, Jensen, and Edwards (2008). The model provides attributes for a recommended biopsychosocial approach in the physiotherapists' clinical reasoning. Nevertheless, strategies for a behaviour change approach are only briefly mentioned. The Behaviour Change Wheel described by Michie et al. (2011) is also a comprehensive model that describes health behaviour change interventions at various levels. The model was developed to serve as a tool for designing interventions and policies to change health behaviours. Thus, it uses a different context compared with the CRBC-PT. In the Behaviour Change Wheel, capability, motivation, and opportunity are identified as prerequisites for the generation of behaviour. These factors are in line with the factors related to the client in our model. One deviation is the highlighting of biomedical factors in the CRBC-PT given the potential of these factors to influence activity-related behaviour. Interventions designed to influence policies were not a focus of our model. However, this does not suggest that they were overlooked. Physiotherapists need to be aware that the client may perceive structure and systems in society as barriers to motivation and health behaviour change (Bandura, 2004). This notion implies that the physiotherapist needs to pay attention to and, when appropriate, help to influence the distal context of clients, e.g., social and cultural factors.

The International Classification of Functioning, Disability and Health (ICF) (World Health Organisation, 2001) has become an established framework in health and health service delivery across health professions and disciplines. Our proposed clinical reasoning model is consistent with the ICF. Both are based on a biopsychosocial model and factors related to the person, specifically, status of structure and function, activity, and participation: and overall context. However, in our model, the client's psychological capabilities and skills and behavioural skills are prominent factors. In the ICF, ambiguity exists regarding how these factors should be classified because of the lack of clarity regarding the scope of personal factors (World Health Organisation, 2013).

One criterion for a meaningful theory or model is its consistency with other theories and models that have been accepted by the scientific community (Jaccard and Jacoby, 2010). In the final modification of the CRBC-PT, we re-examined related learning and health psychology theories (Prochaska and Di Clemente, 1982; Rosenstock, Strecher, and Becker, 1988; Bandura, 1997; Sarafino, 2001) to ensure that the model had a solid foundation. One modification related to the theoretical basis was the inclusion of functional behavioural analysis (Haynes and O'Brien, 1990) at the centre of the clinical reasoning process. The starting point for functional behavioural analysis is the activity-related target behaviour which comprises activities that need to be modified to improve the client's health or those that are challenging for the client to perform because of pain, illness, or disability (Åsenlöf, Denison, and Lindberg, 2004). The functional behavioural analysis supports the process that the physiotherapist and client, in collaboration, need to identify important, controllable, causal functional relationships among factors that are associated with the target behaviour (Haynes and O'Brien, 1990). Essential factors encompass the behavioural performance and the setting in which the behaviour occurs, triggering antecedents and consequences of the behaviour. The term 'functional' highlights that the

analysis emphasises the specific impact (function) that the behaviour has on the individual. The major outcome of the analysis is summarised in the hypotheses that are generated about the relationships among the most important factors. In turn, the hypotheses provide the basis for selecting specific and individualised strategies for behaviour change (Sugai, Lewis-Palmer, and Hagan-Burke, 2000). The perceived importance (outcome expectations) of a behaviour change and the self-efficacy in performing a behaviour enhance goal commitment and serve as motivators for behaviour change (Locke and Latham, 2002; Åsenlöf, Denison, and Lindberg, 2004). This finding underscores the importance of identifying a *prioritized* activity-related behaviour early in the clinical reasoning process. Subsequent to the functional behavioural analysis, the activity-related target behaviour is specified as a measurable behavioural goal.

Several studies have reported that knowledge, cognition, and metacognition are major factors that contribute to physiotherapists' clinical reasoning (Masley et al, 2011; Wainwright, Shepard, Harman, and Stephens, 2011; Holdar, Wallin, and Heiwe, 2013). Thus, changes in these variables are expected to be followed by changes in the content of and approach to reasoning. Even if this relationship appears clear however, some degree of uncertainty exists. Why and how does this relationship exist? One explanation is that health-professionals' beliefs and attitudes appear to be associated with their clinical-related behaviour, e.g., clinical reasoning (Godin, Bélanger-Gravel, Eccles, and Grimshaw, 2008; Darlow et al, 2012). Therefore, it seems likely that in clinical reasoning, the physiotherapist's self-efficacy in and attitudes toward a behavioural change approach could mediate the causal relationship between variability in knowledge, cognitive, and metacognitive capabilities and variability in the focus on the clients' behaviour change. Further research is needed to clarify the importance of these variables with respect to the clinical reasoning process and its outcomes.

A particular strength of our study lies in the design of the model-building process, including the inclusion of two phases to not only develop the model but also validate it. The model has the advantages of reflecting the phenomenon based on theory, research, and experiences, which Lynham (2002) highlighted as prerequisites for model building. An exploratory approach was used to integrate the complexities of the field related to clinical reasoning and health behaviour change. Even if some studies were inadvertently overlooked, the model development process was strengthened by two data collections sources (students and experts). Together, the methods strengthened the utility and validity of the model.

This study has limitations beyond those discussed in relation to each phase of the study. Because the primary investigator moderated the focus groups and the group discussion with experts, there may have been a risk that the moderator influenced the discussion with experts based on the impressions from previous focus groups. The decision of using only one general opening question and permitting the group to lead the discussion based on their views, helped offset the risk of the moderator directing the group discussion. The moderator was known to the participants in the focus groups and the group discussion, and she was also largely responsible for developing the foundation of the model. Prior knowledge of the model's origin and the participants' contexts and knowledge may have been useful for gathering data in terms of facilitating participant discussions. However, this could also have been a limitation, for example, statements may have been taken for granted or relevant statements may not have been sufficiently explored. To control the influence of prior knowledge, the moderator's role as an investigator rather than a lecturer was emphasised to the focus groups. The influence of prior knowledge was also considered by the two investigators involved in the analysis (Graneheim and Lundman, 2004). A model must be used repeatedly to be confirmed or questioned and then refined to address its limitations (Lynham, 2002; Jaccard and Jacoby, 2010). The CRBC-PT now warrants additional investigation to further validate its theoretical underpinnings and clinical utility.

Conclusions

To our knowledge, this is the first conceptual model that describes the clinical reasoning process related to clients' behaviour change with special reference to the physiotherapists. Specifically, this model depicts multiple interrelated levels of the clinical reasoning process and the integration of factors that have been documented to be important in clinical reasoning and in relation to the strategies for effecting behaviour change in clients. The CRBC-PT highlights the concepts and corresponding relationships that may assist physiotherapists in understanding and implementing behaviour change strategies in their clinical reasoning.

The CRBC-PT supports the use of the client's perceptions of his/her health and life situation, supports a focus on behavioural goals of importance to the client, and involves the client in the analysis, decisions, and intervention. This collaboration between the physiotherapist and the client is consistent with a contemporary vision of physiotherapy and the commitment of the profession to clients' overall health through the adoption of the ICF; furthermore, the collaboration could improve quality of care. The integration of factors essential to clinical reasoning and evidence-based strategies for health behaviour change makes the model unique and consistent with current evidence. In addition, the concepts of the model are highly relevant to general physiotherapy practice. Accordingly, the model could serve as a suitable tool with which to develop learning activities for physiotherapy students and continuing education for registered physiotherapists. With some modifications, the model may have relevance to other health professionals. Professionals with such clinical reasoning competence could have an impact on lifestyle-related conditions by promoting lifestyle changes. These professionals could have a major role that impacts health equity and well-being by focusing on the intermediary determinants of health e.g., clients' biological, behavioural, and psychological factors and social circumstances. Finally, being the first model to be proposed in this much needed area of clinical reasoning in physiotherapy the CRBC-PT also provides a foundation for general research in clinical reasoning in the profession.

Declaration of interest

The authors report no declarations of interest.

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