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Physiotherapists' Clinical Reasoning in Examination of clients with Low Back Pain in Direct Access Practice: a theory-driven Qualitative Content Analysis

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ABSTRACT

Aim: The aim of this study was to gain deeper understanding of physiotherapists' clinical reasoning in examination of clients with low back pain (LBP) in direct access (DA) practice.

Method: Data were collected through individual semi-structured thematic interviews of ten physiotherapists who described their clinical reasoning in one of their LBP clients in direct access practice. The interviews were recorded and transcribed verbatim and then examined using a theory-driven qualitative content analysis. Four clinical reasoning models, hypothetico-deductive, pattern recognition, narrative and systematic, were used as theoretical frameworks to analyse the descriptions of physiotherapists' clinical reasoning in examination.

Results: In this study clinical reasoning in examination manifested as process where physiotherapist proceeds from interview to clinical assessment and decision-making, simultaneously taking into consideration the DA setting and the specific role of the physiotherapist. As described by the physiotherapists working in DA practice clinical reasoning in examination presented by extracting facts from the interview in relation to symptoms or certain diagnosis, identifying and excluding red flags and identifying the factors that were important to consider in acute musculoskeletal pain in relation to individual client's problem. Physiotherapists described having improved differential diagnostic skills, wider range of physical assessment techniques and more precise assessment. Based on the data, the physiotherapists presented to use either the hypothetico–deductive or the systematic clinical reasoning model when examining an LBP client in DA practice.

Conclusions: Clinical reasoning in examination with LBP clients in direct access practice started with anamnesis and proceeded by using either the hypothetico–deductive or the systematic clinical reasoning model.

INTRODUCTION

Direct access (DA), client self-referral or a physiotherapist working as the first contact is a common procedure in health care systems around the world especially in the case of musculoskeletal (MSK) conditions (World Confederation for Physical Therapy, 2019). In direct access, the physiotherapist is an independent autonomous practitioner who is responsible for decision-making. (European Region World Physiotherapy, 2020; Finnish Association of Physiotherapists, 2016; Finnish Society of Physical and Rehabilitation Medicine and Finnish Association of Physiotherapists 2017.) There is evidence of physiotherapists assessing and managing MSK conditions independently and effectively (Downie et al. 2019), and it is known that skilled clinical reasoning could lead to efficiency and quality client outcomes (Higgs et al. 2019, pp.248). However, little is known about the clinical reasoning in examination of physiotherapists working in direct access although clinical reasoning creates the basis for expert practice. Karvonen et al. (2017) examined the critical reflection and clinical reasoning of physiotherapists encountering clients in the early phase of low back pain (LBP) and found that the physiotherapists critically justified their use of the hypothetico–deductive clinical reasoning model. Yet, most research on clinical reasoning is focused on physiotherapy students or compared novice and expert clinical reasoning processes (Wainwright et al. 2010; Furze et al. 2015; Gilliland & Wainwright 2017). More knowledge on clinical reasoning of physiotherapists working in different settings is still needed (Holdar et al. 2013; Langrigde et al. 2015; Widerström et al. 2019).

Globally, professional entry-level education usually permits physiotherapists to work in direct access (Bury & Stokes, 2013). However, physiotherapists operating in direct access in Finland have usually completed continuing education in addition to professional entry-level education and have minimum of two years of work experience with musculoskeletal clients. Continuing education is typically 15 European Credit Transfer System (ECTS) points including training in physical examination and clinical reasoning concerning MSK clients in theory and in practice and guidance on medication and authorising sick leaves (Finnish Society of Physical and Rehabilitation Medicine and Finnish Association of Physiotherapists 2017). After completing the continuing education, the physiotherapists start to treat clients in direct access, usually in primary or occupational health care, where their clinical reasoning in examination further develop**s** through practice. Evidence of how the added clinical reasoning know-how gained in continuing direct access education are put into practice is scarce (Karvonen et al. 2017).

Clinical Reasoning (CR) is a thinking process during which the physiotherapist, through interaction with the client, collects information and generates and tests possible hypotheses of the ailment, and finally concludes the physiotherapy diagnosis and performs and guides the treatment individually, based on the information obtained. (Higgs et al. 2019; Jones & Rivett, 2019; Edwards et al. 2004.) There is evidence of physiotherapists assessing and managing MSK conditions independently and effectively (Downie et al. 2019), and it is known that skilled clinical reasoning could lead to efficiency and quality client outcomes (Higgs et al. 2019, pp.248). Thus, if clinical reasoning in examination is successful better treatment outcomes could be achieved (Karvonen, 2020). Through DA practice it is possible to reduce health care costs and increase client satisfaction and possibly achieve less recurrence and prolongation of pain and disability (Hon et al. 2021; Ojha et al. 2014; Piscitelli et al. 2018.) On the other hand, clinical reasoning is not well understood as a process and further understanding of physiotherapists´ decision-making processes is still needed (Widerström et al. 2019).

Clinical reasoning in examination

Clinical reasoning is the path to expert physiotherapy diagnosis making and is therefore a crucial competence for the physiotherapist working in direct access in terms of expert practice and client care (Health Education England&NHS, 2018; World Confederation for Physical Therapy, 2019; Finnish Association of Physiotherapists, 2016; Finnish Society of Physical and Rehabilitation Medicine and Finnish Association of Physiotherapists, 2017).

Clinical reasoning is needed to make decisions about the examination of the client; examination creates the ground for the clinical reasoning process and for physiotherapy diagnosis making. Clinical examination is conducted to define the client's problem and to develop differential diagnoses that will lead to a management plan. Clinical examination includes anamnesis and interview of the client and then identifying the need for and selecting appropriate investigations and tests that further lead to a physiotherapy diagnosis, a conclusion and management plan for the client. (Finnish Association of Physiotherapists, 2016; Health Education England&NHS 2018; Higgs et al. 2019, pp.253.) Clinical examination is therefore needed to make an appropriate physiotherapy diagnosis through the clinical reasoning process in examination.

Clinical reasoning models

Multiple types of clinical reasoning models are used by physiotherapists in various physiotherapy settings. The choice of the clinical reasoning model depends on the physiotherapist's expertise but also on the client. (Jones et al. 2019.) In MSK physiotherapy practice the four typically used clinical reasoning models are the hypothetico–deductive model, the pattern recognition model, the narrative model (Edwards et al. 2004; Higgs and Jones 2008) and the systematic model (Baker et al. 2017).

The hypothetico–deductive model is the most common model in physiotherapy decision-making. It is known as the progressive line of reasoning, in which the initial clues from the initial hypothesis lead to further assessment and continual hypothesis-making. Hypothetico-deductive reasoning model is an ongoing process, forward reasoning, where the physiotherapists tests hypothesis based on provided clues, and the conclusion of the client's problem evolves during examination. (Jones& Rivett, 2019.) Another model is pattern recognition, in which the physiotherapist instantly recognises certain patterns or symptoms that present in certain conditions (illness scripts) and performs clinical tests that rapidly either negate or confirm the hypothesis. Pattern recognition is more typical for experienced physiotherapists, and the use of pattern recognition is more limited in novice physiotherapists. (Jones& Rivett 2019.) Then there is the narrative model that is based on the dialogue between the client and the physiotherapist. In narrative reasoning the physiotherapist aims to construct meanings in the client's story and allows that narrative to guide the examination and management in consensus with the client. The narrative clinical reasoning model can be more functional with chronic pain clients, whereas the hypothetico–deductive and pattern recognition models are used more with acute pain clients even though the biopsychosocial approach and interaction with the client are always a constant. (Edwards et al. 2004; Jones&Rivett, 2019.) A systematic model is also used, especially by more novice physiotherapists, in which the examination of client is carried out pragmatically by following a checklist or an examination form for a specific condition. With the systematic model more time is spent on the physical examination that is carried out in organised manner and decisions are not made until the end of the examination. (Baker et al. 2017; Edwards et al. 2004). In theory, these four clinical reasoning models (hypothetico-deductive, pattern recognition, narrative and systematic model) could be used by physiotherapists working in DA practice with MSK clients.

AIM OF THE STUDY

The aim of the study was to gain deeper understanding of physiotherapists' clinical reasoning by exploring how the physiotherapists describe their examination of clients with LBP in direct access practice.

The research question was:

How do physiotherapists describe their clinical reasoning in examination of an LBP client in DA practice?

METHODS

Participants

This study was a part of a wider research project within three organisations in different geographical parts of Finland that examines the long-term effects of physiotherapy on LBP clients who have received direct access physiotherapy. The physiotherapists participating in this qualitative research were also recruited from these organisations. The participant recruitment was performed through a manager preselection: the Principal Investigator (MR) contacted the managers of the physiotherapists in each participating outlet in primary health care centres in Southern or Eastern Finland to obtain the contact information of the physiotherapists working regularly in direct access. One of the researchers (M.R) then emailed the physiotherapists to ask for their consent to be interviewed. Of twelve physiotherapists, ten gave their consent.

Out of the ten participants, six were from Southern Finland primary health care centres and four were from Eastern Finland primary health care centres, nine were female and one was male, work experience as a physiotherapist varied between 6.5 and 33 years (mean =20), years working in direct access practice varied between 9 months and 11 years (mean=4 years), time passed since continuing direct access education varied between 1 and 20 years (mean= 6) and the number of clients treated in direct access varied from 1 to 25 per week (mean=10) (table 1).

[insert table 1 near here]

Ethical permission (MR; TS) was received from Helsinki University Hospital´s ethical committee (HUS/2710/2020). Research permits were retrieved from all the organisations participating in the study. Participants signed written informed consent forms when they participated in this study. Participation was voluntary and could be discontinued at any point during the research.

Data collection

The interviews of the ten participating physiotherapists were conducted as individual interviews by two members (EK; MR) of the research team either face-to-face (3/10, EK) or via secured Microsoft Teams meetings (7/10, MR). The language of the interviews was Finnish. The research team (MR; EK; HK; TS) created question themes and developed a semi-structured thematic interview frame (Table 2) that was used by both interviewers. Clarifying or additional questions were asked when needed. Prior to the interview the physiotherapists were asked to bring a client case example of their selected LBP client as a printout to the interview event. The printout was only used by the physiotherapist and its purpose was to act as a memory aid for the questions regarding their clinical reasoning in examination of an LBP client they selected as an example to describe their clinical reasoning in that situation. The interviews were recorded, and the recordings were converted into MP3-form and transcribed verbatim. The interviews were then pseudonymised by assigning the interviewees numbers instead of names and removing other identifying information such as names of health centres or other people. Altogether, we had ten interviews of average duration of 50 minutes (40–60 minutes) and 134 pages of pseudonymised transcript (A4; Times New Roman 12; spacing 1.5; marginals 2.54 cm). Only the pseudonymised transcript was used in the data analysis.

[insert table 2 near here]

DATA ANALYSIS

We used qualitative methods to answer our research question. Our method of analysis was qualitative content analysis (QCA) using a theory-driven approach following the steps introduced by Margrit Schreier (2012) (figure 1). QCA is a method that aims to understand meanings and features of the phenomenon by using a coding frame to conceptualise the data in a systematic way (Schreier, 2012, pp.3). This study explored physiotherapists' clinical reasoning in examination in DA practice through their selected LBP client case example that they were asked to describe in the interview event. We chose QCA as our selected method for data analysis as it is well applied with the rich and in-depth data set, and as existing theoretical knowledge about clinical reasoning models used with MSK clients by physiotherapists in different settings are well suited to use as the theoretical lens through which to explore the physiotherapists' clinical reasoning in examination. The four different models of clinical reasoning (hypothetico-deductive, pattern recognition, narrative and systematic model) were used in this theory-driven analysis as a theoretical framework to compare the physiotherapists' descriptions of their clinical reasoning in examination of their LBP client to the models.

The steps in QCA are forming the research question, defining the data, building the coding frame, dividing the data to coding units, testing and shaping the coding frame, performing the analysis and presenting the results (Schreier, 2012, pp.6). Following these steps adapted from Schreier (2012, figure 1), two members of the research team (MR; EK) worked independently and became familiarised with the data set. Then they each underlined and separated the relevant items the descriptions of clinical reasoning in examination from the data set. Next, they met in person to compare the items identified as relevant and found that they had the same items separated. In this theory-driven QCA the four clinical reasoning models (hypothetico-deductive, pattern recognition, narrative and systematic model) were used as coding frames to explore how the physiotherapists described performing their clinical reasoning in examination. This was carried out by comparing the descriptions of the physiotherapists' clinical reasoning in examination to all of the four clinical reasoning models to discover how they performed clinical reasoning and further to find out which of the clinical reasoning model each physiotherapist used. This analysis was performed by the same two separate members of the research team (MR; EK) by making notes on when and how the physiotherapists started to make decisions about the client´s symptoms and possible reasons for them, and on making physiotherapy diagnosis, and on how physiotherapists justified their choices and conclusions concerning their examination of the client. Then the two research team members (MR;EK) met in person to crosscheck their findings through mutual discussion. Both had same ideas about how the physiotherapists performed and proceed in their examination and about the used clinical reasoning models. Finally, all the authors reviewed, discussed and critiqued each case to verify the similarities identified by two members of the research team.

[insert figure 1 near here]

RESULTS

Clinical reasoning in examination

Based on the data as perceived by the physiotherapists, clinical reasoning in examination manifested as a process that took place during the interaction with the client in direct access practice. Clinical reasoning performed in examination was described by proceeding from interview to clinical assessment and decision-making, but also simultaneously taking into consideration the DA setting and the role of the physiotherapist in that particular setting. Knowledge of benefits of early encounters and being able to ease the client's situation in a single visit, gained from the continuing direct access education, were seen as added validation to practical work in DA practice.

Clinical reasoning in examination included interviewing their clients and taking the preliminary data into consideration in their examination as stated by the physiotherapists. Specific to DA practice, the physiotherapists described performing clinical reasoning in examination by extracting facts that came up in the interview concerning the client's symptoms or certain diagnoses.

> "First the interview part and the client tells me a bit about their symptoms, problems and then we start doing our physiotherapeutic examination based on that and looking at the findings" PT 8 (page 100, line 3332)

> "I always use [time] for the anamnesis as I think it is so important that I interview them first and hear how they have been encountered in health care before" PT 1 (page 5, line 129)

> "Typically with a low back pain client it is always about the preliminary data…a mother of four, twins born through a C-section, two months ago she had lifted a sofa and had back pain that healed on its own but now six days ago she had lifted her child's moped and the pain had come back and she called [the health center]…and as the client worried during the call, if there was something completely broken [in the spine], I thought it was best to examine the situation [in DA practice]" PT 3 (page 34, line 1095)

After taking part to continuing direct access education and working in direct access practice, physiotherapists experienced having improved differential diagnostic skills, a wider range of physical assessment techniques and more precise assessment.

> "Well we can certainly examine things in a lot more detail now, let's say if the pain radiates to the hand, then we can separate it better, what causes it and examine the neck more closely, to see whether there's something in the neck…..then it's not just tension-neck for example and you find something else there, when you know how to examine further" PT 5 (page 69, line 2266 and page 68, line 2238)

> "Certain kind of precision, like things what we look at and also when we discover what [the problem] is, then what we do next. So, precision to what you can think that [the findings] could be or not" PT 2 (page 19, line 599) [when asked what was taken to practice from the contents of continuing education]

Physiotherapists also perceived that after taking part to continuing direct access education and working in direct access practice, they were more able to identify and exclude red flags [serious pathology] and the factors that were important to consider in acute MSK pain in relation to individual client's problem.

> " We rule out the alarming things and other things and the client gets a like, impression that everything's ok, there's nothing to worry about" PT 9 (page 122, line 4064)

When the physiotherapists were asked if they would do anything differently in retrospect, all the physiotherapists stated to be satisfied with their decision-making process but considered formulating the physiotherapy diagnosis challenging. They described leaving the conclusions as indefinite in the written client report even though they were described orally in the interview event.

> *"Well, it [conclusion] was difficult to say…Or I have written here that pain is found in SI-joint and lower back. The L4 felt really sliding easily forward and I saw that there was some instability, but SI-joint was also sore." PT 5 (p. 61, line 2005)*

> *"I have written here that difficult decrease in function comes up in examination and that pain is located in presacral and L4-5 gap and radiates to both lower extremities, no strength weaknesses and some difference in lower extremity length" PT 6 (p.75, line 2489)*

Clinical reasoning models

The data explored through the theoretical lens of four clinical reasoning models shows that the physiotherapists in this study used evidently either the hypothetico-deductive or the systematic clinical reasoning model to proceed in their clinical reasoning in examination (figure 2). In this study we use the terms type 1 (hypothetico-deductive model) and type 2 (systematic model) to present our findings in more detail.

[insert figure 2 near here]

Type 1: Hypothetico–deductive reasoning model

Based on the data, the descriptions of actions of six physiotherapists (1, 2, 4, 5, 9, 10) presented the use of hypothetico–deductive model in their clinical reasoning. According to the data, the hypothetico–deductive reasoning proceeded from presumptions derived from the interview and anamnesis of the client and to testing these presumptions in their examination. The symptoms led them to consider the possible physiotherapy diagnosis and perform specific clinical tests that matched the symptoms which then either validated or negated the initial diagnosis. Anamnesis was considered to be an important part of the decision-making process and led them to perform the clinical tests that they saw relevant in the presenting condition based on the anamnesis. The type 1 physiotherapists stated to rationalise the clinical tests that they chose to perform.

> *"And radiation pain, of course I immediately started thinking about that surely it has to be from the spine...then I thought, it must be something in the intervertebral disc, and I got to doing those tests…with changing the position of the spine [forward bend], the client's symptom worsened and even that one spot [L2-L3] was tender, so that led my conclusions there." PT 4 (page 49, line 1604, line 1621)*

> *"I did an initial interview and so identified what sort of symptoms they had…and they had numbness in their foot and pain in their back, so that guided me...the symptomology and then the test results supported each other in a way" PT 10 (page 127, line 4251, page 128, line 4273 and page 129, line 4302)*

The physiotherapists that presented to use the hypothetico–deductive model also described trusting their own skills in their decision-making and being confident in their clinical reasoning process.

> "My own actions have become more confident….learnt that if the patient's records say that they have come because of back pain…maybe they're not completely…the problem may be somewhere else…so they can very easily change their own way of thinking" PT 5 (page 67, line 2203)

> " The longer you've been doing this, the less your try out different tests, so I've tried to train my clinical reasoning skills…when I became more confident about my clinical reasoning skills, then to stop, like, this doesn't affect, for instance, SLR testing so I don't do it to everyone, especially if they have no lower limb symptoms, then I won't test everyone with back symptoms even in the acute pain stage…it's what's relevant in terms of their present situation.. PT 9 (page 115, line 3836)

Type 2: Systematic reasoning model

Based on the data as described, the descriptions of actions of four physiotherapists (3, 6, 7, 8) physiotherapists presented the use of the systematic model in their clinical reasoning. According to the data the use of the systematic model manifested as testing and examining all angles without presumption and making conclusions when all examinations were completed. The type 2 physiotherapists stated to use a clinical test frame with all clients, and all clients were assessed using the same pattern, starting with basic clinical tests and then progressing to more specific clinical tests.

> "..We have this certain framework based on which we start examining the issue.. we of course test normal mobility range and forward bending, sideways bending, banding backwards, heel-to-toe walk, the Trendelenburg test and then….well Lasègue´s Test and the slump test and straight leg lifts and hip mobility usually too, and of course surface sensation and….in palpation, is there any tenderness to palpation and then reflexes." PT 6 (page 73, line 2429 and page 74, line 2457)

> " I have a clear…template…checklist…walking, moving, sitting-to-standing test and how the client sits…then we start basic tests, simply squats, the Trendelenburg, and standing on one leg.. the slump test, SLR. Then sensation, muscle strength and hip mobility, we always examine spine mobility.. reflexes, Babinsky response, feeling the spine and examining the muscles through palpation.." PT 8 (page 101, line 3355)

The physiotherapists who presented to use the systematic model questioned their clinical reasoning competence and worried about their differential diagnostic skills and their ability to recognise serious pathology.

> "When the pain is acute then, well, based on that can I separate the issues and determine what the reason behind it could be and the reason for the pain…it feels like there's a need for deeper expertise and skill and understanding" PT 7 (page 85 line 2817 and page 85 line 2821)

DISCUSSION

The findings of this study are in line with those of earlier research but also expand our knowledge of the clinical reasoning in examination of the physiotherapists working in direct access practice. The four different clinical reasoning models were used as a theoretical lens to explore our research data to gain a deeper understanding of physiotherapists clinical reasoning in examination of an LPB client in DA practice. The physiotherapists´ descriptions of their clinical reasoning in examination of their selected LBP case provided knowledge that sheds more light to expertise of physiotherapists working in direct access practice. By exploring the clinical reasoning process from the point of view of examination of the client enabled understanding more about the complex process of clinical reasoning with acute MSK clients in DA setting. Physiotherapists performed clinical reasoning in examination by proceeding from interview to clinical assessment and decision-making by extracting facts from the interview in relation to symptoms or certain diagnosis, identifying and excluding red flags, identifying the facts that were important to consider in acute MSK pain. They also described having improved differential diagnostic skills, wider range of physical assessment techniques as well as more precise assessment after undergoing the continuing direct access education and working in DA practice. However, the way in which clinical reasoning in examination is ~~are~~ put into practice in our study seemed to depend on the individual physiotherapists, as the clinical reasoning models they used varied.

The results of this study differ partly from those of the qualitative study by Karvonen et al. (2017) in which the physiotherapists working in direct access systematically and justifiably used the hypothetico–deductive clinical reasoning model. However, in that study the physiotherapists had just completed their continuing education on the use of hypothetico–deductive reasoning and were at the front line to begin the direct access in their health centres. May et al. (2010) in turn found that although novice physiotherapists also used hypothetico–deductive model to assess shoulder problems, they did not utilise specific signs or symptoms, to guide their decision making. In our study the type 1 physiotherapists followed the cues alongside with the ongoing interactive process of hypothesis-making, and type 2 performed clinical reasoning using a clinical test frame. As the client might visit the physiotherapist in direct access only once, use of the hypothetico–deductive model – following the cues provided by the client and performing the relevant tests –could be a more economical way to make the physiotherapy diagnosis. However, for some physiotherapists, the systematic model seemed to provide safety and a more pragmatic approach to make final decisions. The difficulty in distinguishing the specific signs, relevant cues from irrelevant ones, could be one reason for the use of the systematic model instead of the hypothetico–deductive model.

Holdar et al. (2013) found that physiotherapist´ decision-making was influenced by their individual characteristics and knowledge of as well as by client perceptions and contextual factors. The personality of the physiotherapist and the personality of the client were both found to influence the clinical reasoning process (Holdar et al. 2013). Furthermore, a qualitative systematic review and meta-synthesis revealed that the clinical reasoning process was influenced by physiotherapist, client, elements of the reasoning process and context, but that the factors with the most influence were related to the individual physiotherapist (Elvén&Dean, 2017). In addition, according to Widerström et al. (2019), clinical reasoning is influenced by trust in oneself, treatments and personal and work environment-related constraints. Moreover, physiotherapists´ self-reflection seemed to play a substantial role in clinical reasoning and its development as a competence (Karvonen et al. 2017; Widerström et al. 2019). Ongoing self-assessment and self-reflection are essential for the development of the clinical reasoning competencies (Higgs et al. 2019). Although this study did not investigate the individual characteristics of the physiotherapists, it is important to note that these factors might influence the decision-making processes of individual physiotherapists.

Jensen et al. (2019, pp.74) state that clinical reasoning is a dynamic process that requires critical reflection and a continuum of development and that expertise in clinical reasoning is not something that comes with work experience. On the other hand, Budtz et al. (2021) point out the importance of work experience as "the ability to recognize diagnostic patterns evolves over time". The physiotherapists in this study had long careers as physiotherapists and up to eleven years of work experience in direct access. Nonetheless, the preliminary analysis of work experience as a whole or in direct access practice does not seem to be connected to the clinical reasoning model used by the individual physiotherapists in this study.

As the nature of the clinical reasoning process is interactive with the client, it is difficult to analyse the specific factors that influence the physiotherapist´ decision-making. In this study only one LBP client case was used as an example to explore the clinical reasoning process of the physiotherapists working in direct access. Thus, it is difficult to verify whether the clinical reasoning model used in this study is always used by that physiotherapist or whether specific client had some effect on the choice of the used model. Keller et al. (2022) also discovered heterogeneity in correct diagnosis and management decisions among Swiss physiotherapists in a simulated direct access setting. Also, the reasons behind the choices that the physiotherapists made were unclear, as they were not investigated in this study. For example, in terms of the systematic model, the issue of whether neurogenic tests are needed when the client has no neurogenic symptoms, is raised. Nonetheless, according to previous research this may have been related to insecurity in the decision-making process or a learnt habit, as the physiotherapists that used the systematic model described to "always proceed in this manner" (Holdar et al. 2013; Widerström et al. 2019). It could also be questioned how open or ready physiotherapists are to implementing a clinical reasoning model that deviates from their previous or usual practice. This study did not investigate the backgrounds of the participants in terms of the details of the continuing education they underwent or other possible further education they might have completed or how they would usually proceed in their clinical reasoning. More knowledge on the reasons behind the physiotherapists´ clinical reasoning processes is needed to fully understand the justification for using the clinical reasoning models used.

Direct access in Finland is targeted towards acute and subacute MSK problems, but clients might have other symptoms or other issues in the background that need a more extensive investigation of the situation than that required by the current problem (Finnish Association of Physiotherapists, 2016). The usual approach in physiotherapy is to use The International Classification of Functioning, Disability and Health (IFC) model (World Health Organization, 2022) and take into consideration contextual and environmental aspects in relation to health and function. Because clinical reasoning as a process is multifaceted and interactive with the client, it needs to be adaptable and applicable to the biopsychosocial perspective (Elvén&Dean, 2017). Elvén and Dean (2017) suggest that more research should be targeted at how physiotherapists weigh biomedical and psychosocial elements in their clinical reasoning process. This study did not examine how the physiotherapists assessed any possible biopsychosocial issues or how these issues affect client´s perceived pain or disability. In addition, the length and contents of the continuing education provided varies across the country. This study did not explore the differences between the continuing education courses that the physiotherapists had attended. Comparing the clinical reasoning processes of the physiotherapists in relation to the IFC model could be a fruitful research topic for the future.

Most of the research related to clinical reasoning consists of qualitative studies that have not used benchmarks to measure the quality of clinical reasoning as Oostendorp et al. (2020) note in their point of view article. This is also the case in our study. Oosterdorp et al. (2020) suggest quantitative measures to improve the quality of clinical reasoning. In many other countries entry-level education provides a foundation to work in direct access (Bury&Stokes, 2013). In comparison the contents of the continuing education courses are guided by recommendations which also aims to harmonise the expertise of the physiotherapists and the service that clients

receive across the country (Finnish Society of Physical and Rehabilitation Medicine and Finnish Association of Physiotherapists 2017). However, there are currently no nationally co-ordinated means to monitor quality of service in direct access or other physiotherapy settings. It could be argued that skilful clinical reasoning in direct access leads to quality in service through expert direct access practice. Coordinated quantitative means to monitor clinical reasoning could help provide equal services for the clients. For example, Budtz et al. (2021) recommend a quality audit as it associates with correct management decisions and could systematise clinical reasoning processes and workflow. The use of quality control could also help justify the clinical reasoning models used, as discussed before.

The findings of this study could be beneficial in developing the contents of entry-level and continuing education courses to target the educational goals accordingly. Oostendorp et al. (2020) believe that increased knowledge on physiotherapists´ clinical reasoning can positively impact on physiotherapy through the development in education and practice, by making it more transparent and more consistent, and that progressive increase in research on physiotherapists´ clinical reasoning and a deeper understanding of the clinical reasoning processes could increase the quality of not only direct access but the whole field of physiotherapy. In clinical settings knowledge on different ways to work in practice provides tools for management decisions and for implementing new processes accordingly. The results may also be beneficial in the development of physiotherapists' expertise. From the point of view of education and clinical practice, the findings of our study show that clinical reasoning skills can be improved by working but not only work experience improves clinical reasoning. For example, individual guidance and mentoring, practicing and reflecting competencies with peers and regular update of knowledge based on scientific evidence could be suggested to support the clinical reasoning process.

STRENGTHS AND LIMITATIONS

The strength of this study is the achieved deeper understanding of physiotherapists clinical reasoning in examination. Moreover, having participants from both Southern and Eastern Finland provided heterogeneity in terms of, for example, continuing education the physiotherapists underwent, the varying practices in different hospital districts and possibly other factors that might influence the decision-making processes of the individual physiotherapists. However, the physiotherapists were predominantly female. It could be that additional participants might have added alternative aspects to our findings.

Theory-driven qualitative content analysis was a functional way to analyse such rich data. The clinical reasoning models as theoretical frameworks were used to explore how clinical reasoning in examination is performed and further to identify what clinical reasoning models physiotherapists used. The use of the known clinical reasoning models in this qualitative content analysis also adds reliability to this study by enabling a systematic approach to analysing the data and allowing the analysis to be replicated at any time point or by other researchers.

This study also has several limitations. The participating physiotherapists were selected through a preselection process with the help of physiotherapy managers. The nature of the sample was therefore limited by the chosen sampling technique. The risk of bias due to the manager´s decision on whose information to forward to the Principal Investigator might also be higher. However, the managers had specific information on who was currently working in direct access making the sample reliable for the purpose of this study by ensuring that the participants were experts in direct access. This study did not examine the influence of the differences between the backgrounds of the participants or the possible updates of the continuing direct access education courses or work experience. Examination of these differences could have enabled even deeper understanding of clinical reasoning

processes of individual physiotherapists. Examining the backgrounds in more detail in relation to the clinical reasoning processes would be an interesting research target for the future.

A semi-structured thematic interview frame with open-ended questions was used to explore the clinical reasoning in examination. Focusing more on the specifics of the studied topic might have produced more material for the analysis. However, the interview data gained from this study that were not utilised here could be used in a wider research project in the future.

Another limitation was that the printout of the client record was only used by the physiotherapist as their memory-aid and the clinical reasoning in examination was freely described. For some of the physiotherapists, more time had passed since the client situation of their choosing, and they took more time to recall the client than the others which might have influenced the content of the description. It is also debatable how reliable the information gathered in the purpose of this study is, as only the physiotherapists had the printout of their client case at hand during the interview because of patient register restrictions. In the future it might be beneficial to also analyse the written client report more deeply together with the oral description of the client case or video tape the examination and explore it together with the physiotherapist.

CONCLUSION

Based on the data as described by the physiotherapists, clinical reasoning in examination was performed through interview, clinical assessment and decision-making in interaction with their LBP client in DA practice. By having worked in DA practice, the physiotherapists described performing clinical reasoning in examination by extracting facts from the interview in relation to symptoms or certain diagnosis identifying and excluding red flags, identifying the factors that were important to consider in acute MSK pain in relation to client's problem. They also stated having improved differential diagnostic skills, wider range of physical assessment techniques as well as more precise assessment by undergoing the continuing direct access education and having worked in DA practice. In this study, the physiotherapists' clinical reasoning in examination was presented by their use of either hypothetico-deductive or systematic clinical reasoning model.

DISCLOSURE STATEMENT

The authors report there are no competing interests to declare. The authors alone are responsible for the content and writing of the article.

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TABLE 1

Table 1. Characteristics of participants.

Physio-therapist (PT)	Work experience as physio-therapist (years)	Work experience in direct access (years)	Time passed since continuing direct access education (physiotherapist's estimation in years)	Number of clients treated in direct access per week (physiotherapist's estimation of number of clients)	Most common client group treated by physiotherapist in direct access
1	10–20	2–5	2	5 or less	Back and shoulder pain
2	> 20	2–5	3	15–25	Varied, all MSK clients
3	< 10	2–5	2	5–15	Varied, all MSK clients
4	10–20	1 or less	1	5 or less	Shoulder and back pain
5	> 20	5–10	9	5 or less	Back pain
6	> 20	2–5	4	5–15	Shoulder and back pain
7	> 20	2–5	20	15–25	Varied, all MSK clients
8	> 20	> 10	10	5 or less	Back pain
9	< 10	5–10	6	5 or less	Back pain
10	< 10	1 or less	3	5 or less	Back pain

TABLE 2

Table 2. Interview frame.

Background information
- Could you first talk about your work history in physiotherapy and in direct access practice?   - When have you participated in the continuing direct access education and started working in DA practice?   - Do you work in DA full or part-time and how many clients per week do you have in DA?   - What kind of clients do you treat in DA and what would say is the most common client group for you?   - Could you talk about how you ended up working in DA practice?
Client case example
- You have a printed client case with you as we asked. Could you talk about the reasons why you chose this client?   - Could you talk about the client situation and what guided your actions with this client?   - Could you describe in a bit more detail why you chose to proceed with the way that you described?   - Could you talk about how you ended up with your conclusion with this client?   - Could you describe on what basis you made your conclusion?   - How justified do you see your reasoning with this client?   - Could you ponder out loud in retrospect if there was any other way to proceed with this client? Would you do anything differently now?   - Is there something more that you would like to talk about the client case?
Continuing direct access education
- Could you describe the continuing direct access education that you underwent? How was it?   - How did you personally experience the continuing education?   - If you think about the continuing education that you underwent now afterwards, how do you feel that the content of that corresponds to the needs of the practical work?   - Do you have some ideas how the continuing education could be developed?   - Do you have some ideas how the practice in your workplace could be developed?   - Is there something more that you would like to talk about?

FIGURE 1.

Step 1

Familiarisation with the data set.

Step 2

Items relevant to the clinical reasoning in examination were underlined and then separated from the transcripts.

Example from data set type 1: "Client was under 50-year-old female, nurse working mainly sitting by computer. Had a sudden onset of LBP that started a few weeks ago that was radiating to lower extremities, more to the other leg, not a very clear dermatome lined radiation, but unspecific. Pain started after rolling a hula-hoop after a long break" (PT 1, p. 2, row 32)

Example from data set type 2: "Client is an adult male in working life, living in supported housing. Has had many episodes of LBP and visited physiotherapy many times over the years. He has exercises but he has not done them because of the pain. Walking is his hobby now because he has ended training in the gym because of the pain" (PT 7, p.87, row 2901)

Step 3

The relevant items were explored to identify the different ways to proceed in clinical reasoning in examination deductively.

Example from data set type 1: "The spine was quite lordotic. There was palpation soreness in the spinosus and ligaments of the lower spine and in L4-S1 when compressing and very tight fascias so I rolled the fascia, taped the back, and gave exercises for functional instability for that part of the back, and explained to her why I made this conclusion"" (PT 1, p.2, row 55)

Example from data set type 2: "I have a clinical interview and test frame, I observe the standing and sitting positions, how he walked and the posture. Toe and heel walks, squats, SLUMP, SLR, Babinski, reflexes, skin sense, muscle strength, mobility in spine and hips, and also knee and ankle, and palpation also. This was a very long termed back pain, so I though there was no need to check anything specific. There was no radiation, the pain was local and there was tension and tenderness in glutes and back muscles and the sitting posture was collapsed" (PT 7, p.86, row 2870)

Step 4

The different clinical reasoning models identified in the data set were compared with the clinical reasoning models.

Example from data set type 1: "there were clear findings that supported the anamnesis so then I examined and did the manual treatment and gave self-treatment guidance" (PT 1, p.2, row 48)

Example from data set type 2: ".I thought it was an unspecific sciatica like pain. The back pain was long term and coming and going over the years. We repeated the old control exercises for the core and I guided him some stretches for lower extremities because he walks a lot" (PT 7, p.87, row 2887)

FIGURE 2.

Clinical reasoning

in examination in DA practice

Type 1

Type 2

- Extracting facts from the interview in relation to symptoms or certain diagnosis
- Identifying and excluding red flags
- Identifying the factors that are important to consider in acute MSK pain
- Improved differential diagnostic skills
- Wider-range of physical assessment techniques
- More precise assessment

Selection of clinical tests according to symptoms

Hypothetico–deductive reasoning
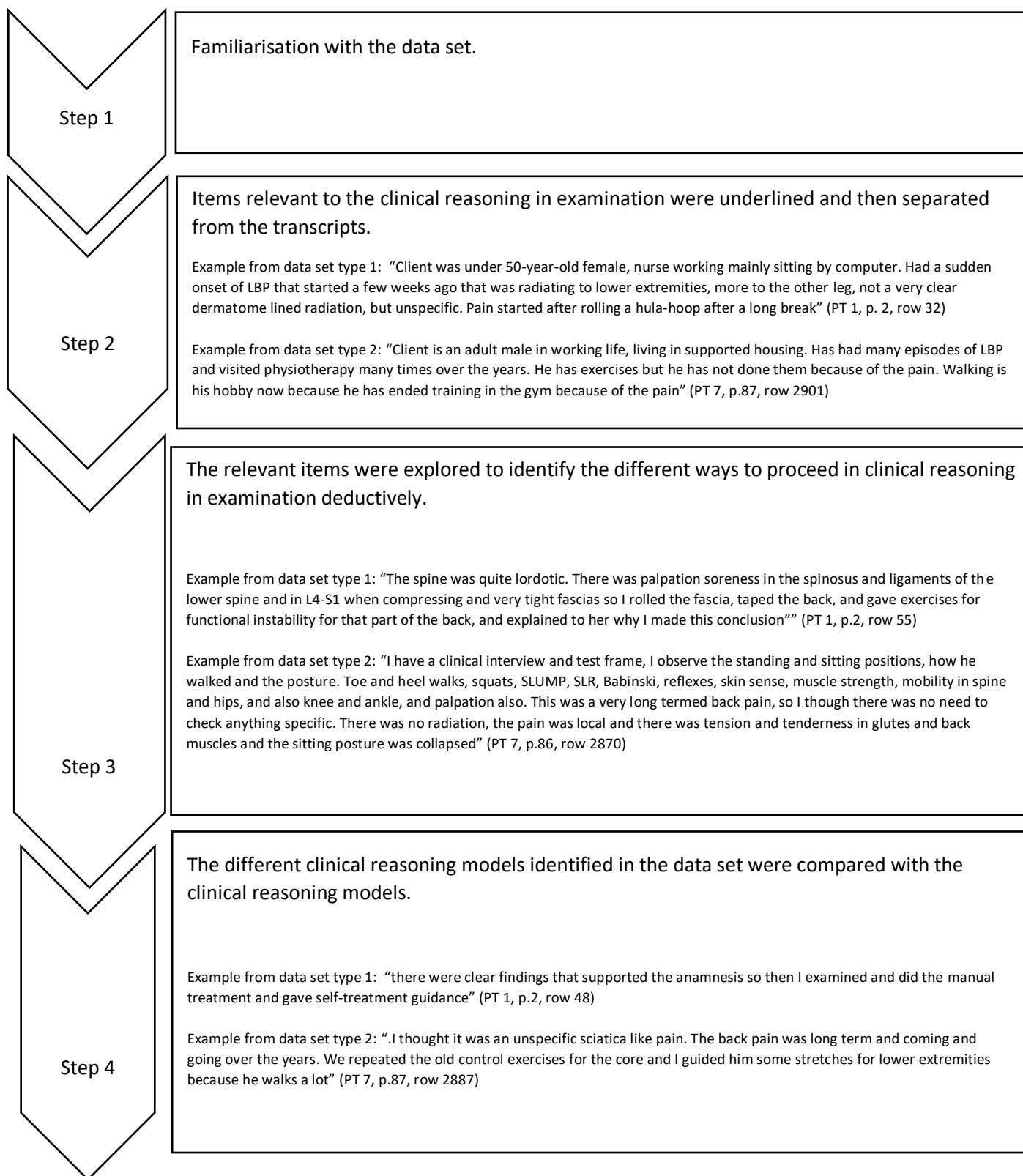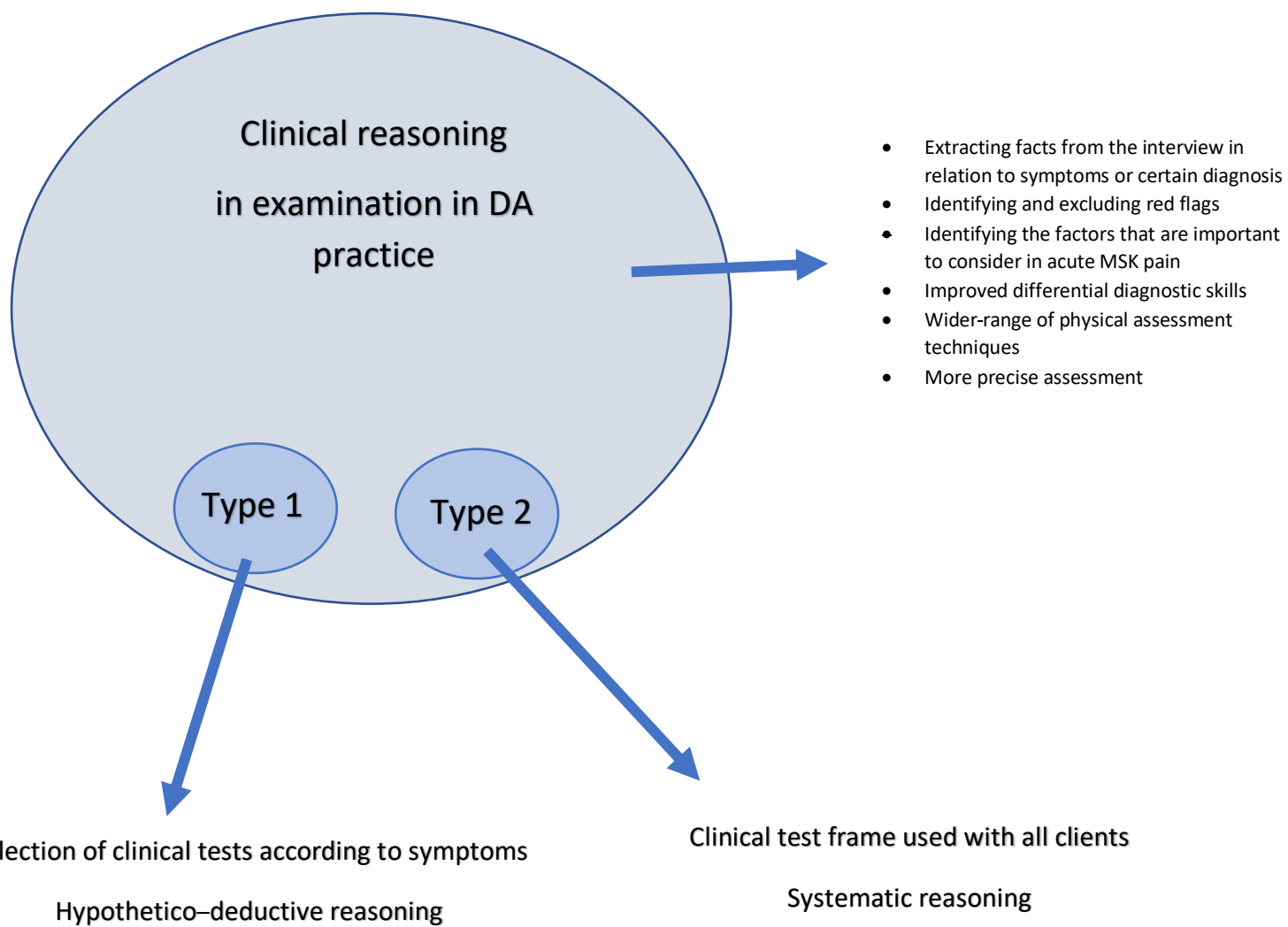
Clinical test frame used with all clients

Systematic reasoning

FIGURE CAPTIONS.

Figure 1. Four steps and actions of qualitative content analysis adapted from Schreier (2012).

Figure 1 Alt text. Four arrows are pointing downwards in a line, and each arrow describes a stage of the performed data analysis starting from familiarisation with data, followed by separating relevant items, placing items in coding frame and finally comparing the findings to clinical reasoning models.

Figure 2. Clinical reasoning in examination of low back pain clients after completing continuing education in direct access practice.

Figure 2 Alt text. Clinical reasoning in examination presented as a circle with arrows pointing out of to the circle naming the two identified hypothetico-deductive and systematic reasoning types. The circle also has an arrow pointing out of it presenting the manifestation of clinical reasoning in examination in DA practice according to physiotherapists´ descriptions.