

TITLE

Personalizing Education: the clinical reasoning processes of physiotherapists using education for the treatment of people with chronic low back pain.

ABSTRACT

Background: Physiotherapists may use a diverse range of educational approaches during the treatment of people with chronic low back pain (CLBP). However, little is known about how physiotherapists clinically reason their use of education in practice.

Purpose: The aim of this study was to develop insight into physiotherapists' clinical reasoning when using education for the treatment of people with CLBP.

Methods: This qualitative study used a constructivist grounded theory inspired methodology. A purposive sample of five musculoskeletal physiotherapists from the United Kingdom were recruited via social media. Data were collected through audio recorded semi-structured interviews, field notes and memos, and were coded and analyzed using a constant comparative method.

Findings: A concept of 'Personalizing Education' underpinned by three main categories termed 'Exploring the Person's World', 'Making Sense of the Person's World' and 'Tailoring Education', has been constructed to explain the participating physiotherapists' clinical reasoning.

Conclusion: The findings highlight how communication and interaction underpin the clinical reasoning process for using education with people who have CLBP. Participating physiotherapists explored and made sense of a person's world before tailoring their educational

approach for the individual. Physiotherapists can use this paper to reflect on their practice to inform their own clinical reasoning.

KEYWORDS

Clinical reasoning; decision making; patient education; physiotherapy; chronic low back pain.

INTRODUCTION

Low back pain (LBP) is the leading cause of disability worldwide (Vos et al, 2016). The term chronic LBP (CLBP) is often used to describe LBP which persists for more than three months. CLBP can have a significant impact on a person's lifeworld; affecting multiple dimensions of their physical, psychological and social well-being (Bunzli et al, 2013; Froud et al, 2014; MacNeela et al, 2015; Snelgrove and Lioffi, 2013; Stensland and Sanders, 2018). The National Institute for Health and Care Excellence (NICE) (2016) recommend the provision of advice and information during the treatment of people with LBP to enable them to better manage their condition. This recommendation is shared with Lewis and O'Sullivan (2018) who suggest that chronic musculoskeletal conditions should be treated like other long-term health conditions. Therefore, education is a recommended first-line treatment for people with CLBP to facilitate their ability to self-manage (Foster et al, 2018; NICE, 2016).

In a healthcare context, education has been defined as "a planned learning experience using a combination of methods such as teaching, counselling and behavior modification techniques which influence patients' knowledge and health behavior" (Bartlett, 1985, p. 323). In physiotherapy practice, education may be used with individuals or groups of people, presented orally or in writing, and may focus on different topics such as anatomy or pain-neurophysiology (McAuley, 2015). Research has found that education is an integral and extensive part of physiotherapy practice (Caladine, 2013; Forbes, Mandrusiak, Smith, and Russell, 2017;

Harman, Bassett, Fenety, and Hoens, 2011; Rindfleisch, 2009). However, the literature provides a limited understanding about how physiotherapists make decisions regarding the use of education in practice.

Exploring the decision-making processes underpinning physiotherapists' approach to patient care has been recognized as a current research priority (James Lind Alliance, 2018). These decision-making processes are embedded within the wider concept of clinical reasoning (Higgs and Jensen, 2019). Clinical reasoning has been defined as "a context dependent way of thinking and decision making in professional practice to guide practice actions" (Higgs and Jones 2008, p. 4). Clinical reasoning has been explored widely within the context of physiotherapy. Seminal research by Edwards et al. (2004) gave a comprehensive insight into clinical reasoning across several fields of physiotherapy. More recently, research has focused on specific aspects of physiotherapy practice. For example, Stenner, Swinkels, Mitchell, and Palmer (2016) studied the shared decision-making processes during the prescription of exercises for people with CLBP. However, the reasoning specifically associated with using education with people who have CLBP has not been investigated. Researching current practice in this area is important because it will help to inform the international drive for reforming practice and developing high quality evidenced-based care for people with persistent LBP (Buchbinder et al, 2018). Therefore, the aim of this study was to explore physiotherapists' clinical reasoning for using education for the treatment of people with CLBP.

METHODS

Study design

A qualitative research design was used to enable an in-depth exploration of the participating physiotherapists' views and experiences of clinical reasoning within the context of using education for the treatment of people with CLBP (Petty, 2015). A constructivist grounded

theory inspired methodological approach was used to investigate the actions and processes within their clinical reasoning (Charmaz, 2014). Adopting a constructivist philosophical view enabled the researcher to acknowledge that the findings were co-constructed with the participants and to accept that the participants may have multiple perspectives to viewing or describing their clinical reasoning (Charmaz, 2014).

Ethics approval

This study was granted ethics approval from a School Research Ethics and Governance Panel at a university in southern England.

Recruitment

Musculoskeletal physiotherapists who were based in the United Kingdom and were able to reflect on recent experiences of treating people with CLBP were purposively sampled and recruited via an advertisement on social media. Physiotherapists who emailed the first author to register their interest in taking part were sent an information sheet about the study and any questions that they had about participating were answered. Those who were then happy to participate were sent a written consent form in the post. Participants who completed and returned the written consent form were offered a face-to-face, Skype or telephone interview. All participants who gave written informed consent completed an interview. There were five respondents who were not recruited to this study because they did not reply to emails during the consent process, needed to withdraw due to personal reasons or specialized in treating adolescents. Members of an advisory group set up for this study and physiotherapists working within the same department as the first author were excluded from participating.

Data collection and analysis

Data collection and analysis were conducted by the first author who is a musculoskeletal physiotherapist and has relevant training in conducting research interviews, qualitative research methodologies and research ethics. The first author discussed and confirmed all stages of data collection and analysis with the other two authors. The second author is well acquainted with qualitative research and musculoskeletal physiotherapy and the third author has specific expertise in conducting grounded theory research.

Semi-structured interviews were used to provide an in-depth exploration of the participants' views and experiences of clinical reasoning (Charmaz, 2014). Table 1 provides example questions from a topic guide used during the interviews. Participants were encouraged to talk about recent experiences of treating people with CLBP. Prompts and secondary questions were used during the interviews to explore answers in greater depth. Data collection and analysis were conducted concurrently, and therefore questions were adapted in subsequent interviews to explore the emerging findings (Charmaz, 2014).

[Table 1: Example interview questions]

Each participant completed an audio-recorded interview. The mean duration of the interviews was 56 minutes. Four interviews were carried out via Skype and one via telephone. The interviewer (first author) made brief field notes about topics that were discussed and asked for further details or to clarify the meaning of statements when required. The researcher (first author) transcribed all interviews verbatim. All participants were offered a copy of the transcript to check and make amendments. Two participants chose to receive a copy of their transcript, but no amendments or additional comments were made. Transcripts were initially coded line-by-line to label the data with words that reflected actions or processes (Charmaz,

2014). Significant or common initial codes were raised to a higher level of conceptualization through focused coding (Charmaz, 2014). A constant comparative method of data analysis and memo-writing were used to construct the codes, categories and the final concept (Charmaz, 2014).

Trustworthiness

The trustworthiness of this study was enhanced through several strategies. For example, the same researcher (first author) carried out the data collection and analysis procedures and therefore they had a prolonged engagement with the data (Lincoln and Guba, 1985). The researcher discussed the emerging findings with the other authors to check that the findings resonated with all authors and to ensure that they were grounded within the data (Charmaz, 2014). The researcher also kept an audit trail of the data collection and analysis procedures and a reflexive journal (Lincoln and Guba, 1985). The reflexive journal helped the researcher to reflect on their thoughts and actions throughout the study to help reduce the influence of their knowledge, beliefs and preconceptions on the data collection and analysis procedures (Charmaz, 2014).

FINDINGS

Participants

Five physiotherapists participated in this study. The participants had been qualified as a physiotherapist for between 3 and 16 years (mean average 6.4 years). Four of the participants were senior physiotherapists in the National Health Service (NHS), and one was a university lecturer. All participants were able to reflect on recent clinical experience of treating patients who had CLBP.

Categories and Concept

Three conceptual categories have been constructed to explain the participating physiotherapists' clinical reasoning. These categories are termed 'Exploring the Person's World', 'Making Sense of the Person's World' and 'Tailoring Education'. 'Tailoring Education' has three subcategories; 'Evaluating Education', 'Building Education' and 'Influencing Factors'. A concept termed 'Personalizing Education' has been constructed to link the categories. These findings are described below and are supported by example participant quotes.

Exploring the Person's World

When explaining their reasoning for using education for the treatment of people who have CLBP, all participants discussed communicating and interacting with the person to explore their world.

"...rather than just talk about stuff, you have to ask them questions and relate their problems in a better way to them. So kinda have to go into their world almost and ask them..." P4

Participants talked about exploring multiple dimensions of the person's world including their history, feelings, knowledge, social life, perceptions, beliefs, thoughts, behaviors, concerns, expectations and physical function.

"So my questioning during my subjective interview is to, sort of explore to see, you know, how are things going at work? How does this impact upon your work? What about your sport? What about your quality of life and your family situation?" P3

The participants reported using different forms of interaction and communication to explore the person's world including listening, questioning, observing, physically examining and using

questionnaires or outcome measures. The use of questioning was the method most frequently discussed by participants. Verbal questions were either open, and enabled the person to tell their story, or focused on exploring a specific part of the person's world.

“...I just looked at her and then I was like, “why do you think bending would be harmful for you?” P1

Participants talked about Exploring the Person's World across different parts of the person's care episode including the examination and treatment components of the consultation and across treatment sessions.

“...sometimes people don't necessarily know what their expectations—or don't really vocalise it when they first come. So, I think some of it develops over time and, you know, they might say the first time, they just want the pain to go away or something like that. But actually, if you—when you see them a few times and you kind of asking them again, they then have a—give a different impression of what they kind of want from the situation and if it hasn't changed then, you know, they might want something different from what they started off with” P5

One participant explicitly talked about their views and experiences of establishing a therapeutic relationship with the person receiving care. When describing the therapeutic relationship, the participant talked about good interpersonal interaction and effective communication. They explained that they try to 'go into the person's world' by using questions, active listening, being friendly and using terms that the person uses or talking to them about things that they want to talk about. This participant explained how they felt it was important to establish a good therapeutic relationship before using education.

“With regards to decision making, if you are getting on very well with someone and they’re understanding—there’s good communication, then I’m—I’d be less reticent to start doing that [using education]. If there was a barrier around that [communication], then it’s more of a case of what—got to start working on that communication side of things rather than whether I start educating them right now....” P4

Making Sense of the Person’s World

When discussing their reasoning for using education for the treatment of people with CLBP, all participants talked about how their communication and interaction with the person helped them to make sense of the person’s world.

“...the subjective—the story in my view gives you—tells you a lot of what you need to know, not just about what’s going on but also about the person.” P2

Participants discussed how they made sense of multiple dimensions of the person’s world including areas such as the person’s thoughts, knowledge or the nature of their CLBP.

“...from the subjective history I do get a good idea of whether it’s an actually specific radiculopathy or a proper non-specific chronic pain...” P1

Some participants talked about understanding the specific factors contributing to the person’s CLBP and identifying whether these are biological, psychological or social in nature.

“...through your interview you start to get what’s the biggest driver to their pain, whether its biological, psycho or social.” P3

One participant explicitly explained how they tried to think of the whole person rather than a particular part of their anatomy or a condition which needs to be treated.

“So being able to pick all the information that she’s given me, relate it to her—how she’s presenting, how she’s moving, how’s she’s behaving. Think of her as a whole person rather than those few discs and a few muscles.” P4

Tailoring Education

All participants talked about how they tailored their educational approach for the person receiving their care. Most participants discussed how they would adapt their educational approach to enable the person to understand the information that they were providing. This included using visual, written and verbal methods of communication.

“...mainly communicating it [education] in a way that they [people with CLBP] understand. So, the right level for them and sometimes using things like models and stuff to help with the communication...” P5

Some participants talked about how they would use education to address what they thought were the main contributing factors to the person’s problem.

“...use your education to tailor [address] what you think is driving it [CLBP] the most.” P3

Some participants discussed how they may tailor their educational approach based on other factors such as the nature of the person’s CLBP, the person’s level of understanding or judgements about the person’s personality.

“So the way I talk to them [people with CLBP] and go through it all [education] with them would depend more on what I judge as their personality...” P2

Evaluating Education (subcategory)

Some participants discussed adapting their educational approach based on their evaluation of the effectiveness of the education or whether they were meeting the person's expectations. These participants explained how they asked the person if they understood the education, monitored outcome measures and; assessed the person's reactions, body language or levels of engagement with the treatment.

"... I've tried different types of education to try to explain the same thing... I tried to show her and then I tried to show her in a different way because the first way didn't work." P5

Building Education (subcategory)

Some participants talked about how they may decide to increase the amount or complexity of the education that they use with people who have CLBP. These participants explained how they based these decisions on factors such as the person's level of understanding or whether the person was interested in knowing more. They also described how they may build the education within or over treatment sessions and that they tried to avoid overloading the person with too much information.

"...next time you educate more and build up on it. So, each session you are trying to build up with more information, but you are not trying to overload them." P3

Influencing factors (subcategory)

Participants briefly discussed factors which may influence their approach to education. This included using their experience, shared decision making, research evidence or other literature; and contextual factors such as time, resource availability and service pressures or pathways.

“...I think the one thing that made my decisions, well aided my decisions, pushed them that way, was pressure from the service actually...they pushed it a lot that we had to use persistent pain education...” P4

Personalizing Education

All participants shared views about education being a core, principal, first-line or routine treatment for people with CLBP. These four views are exemplified respectively in the quotes below.

“I think that [education] essentially makes the backbone of the treatment in such cases [patients with chronic pain].” P1.

“Everything else we do, the exercises and stuff, is just to support education. But for me education is number one.” P3

“...so most of the people that I see with chronic low back pain I will, I will generally educate first.” P2

“...as a bog-standard initial approach I would just—I’ll always want to educate patients.” P4

As participants appeared to view education as an inherent part of their treatment for people with CLBP, their decisions seemed to center on how to use education rather than whether to use it.

“I think I always—there’s always some element of education. It’s just about how much you put in really, depending on the person.” P5

When discussing their clinical reasoning for using education with people who have CLBP, all participants talked about how they endeavor to make education relevant for the person receiving their care.

“...I try to use—make it [education] as relevant to them [people with CLBP] as possible.” P2

The theoretical construct linking the categories together is the customization of education for the person. The conceptual flow of the process starts with the physiotherapist ‘Exploring the Person’s World’ before ‘Making Sense of the Person’s World’ and then ‘Tailoring Education’ for the person. The findings suggest that this process is ongoing through the person’s episode of care. Figure 1 provides a conceptual representation of Personalizing Education.

[Figure 1: A conceptual model of Personalizing Education.]

DISCUSSION

The Personalizing Education concept constructed in this study provides insight into the participating physiotherapists’ clinical reasoning processes when using education with people who have CLBP. This concept resonates with the ‘reasoning about teaching’ strategy proposed by Edwards et al. (2004) which was described as a thought process guiding physiotherapists’ provision and evaluation of teaching in practice. The findings from this study expands the work of Edwards and colleagues by providing a deeper insight into the interactive nature of the physiotherapists’ clinical reasoning within the context of using education for the treatment of people who have CLBP.

The Exploring the Person’s World category highlights how the participants used communication and interaction to inform their reasoning. The interactive nature of clinical reasoning has been reported in research across physiotherapy (Edwards et al, 2004; Jensen, Gwyer, Shepard, and Hack, 2000), osteopathy (Thomson, Petty, and Moore, 2014), nursing (Benner, Tanner, and Chesla, 1992) and occupational therapy (Fleming, 1991a; Fleming, 1991b; Mattingly, 1991; Unsworth, 2001). The findings from this study adds to this body of evidence by providing a contextualized insight into how communication and interaction enables the physiotherapists to personalize education for people with CLBP.

In this study, the physiotherapists described using communication and interaction to help them make sense of the person's world which in-turn helped guide their use of education. For example, some participants talked about how the subjective interview helped them to understand the person's problem before explaining how they adapt their educational approach based on this understanding. This finding has parallels with narrative reasoning (Mattingly, 1991) and sensemaking theory (Dowding et al, 2016; Weick, Sutcliffe, and Obstfeld, 2005) which suggest that clinicians' treatment approach will be guided by how they make sense of a person's situation.

Participants discussed exploring and making sense of biological, psychological and social domains of a person's world. Therefore, these physiotherapists described practice in-line with the biopsychosocial model of care which is recommended for the effective management of people with LBP (Foster et al, 2018). One participant explicitly stated that they try to think about patients as people rather than focusing on an impairment which needs to be treated. This holistic view is aligned to narrative reasoning (Fleming and Mattingly, 2008; Mattingly, 1991), communicative decision-making (Edwards et al, 2004) and an interpretivist philosophy (Edwards and Richardson, 2008). Whereas other participants discussed identifying and addressing specific biological, psychological or social contributing factors to the person's problems. This portrays a reductionistic view of the person's problem consistent with diagnostic reasoning models and positivist philosophy (Jones, Jensen, and Edwards, 2008).

Overall, the participants in this study seemed to adopt both positivist and interpretivist forms of reasoning. For example, participants described using objective and subjective methods to explore a person's world such as standardized quantitative questionnaires and open invitations for the person to tell their story. This interplay between different paradigms of reasoning supports the understanding that physiotherapists embrace multiple philosophical views of knowledge and action in clinical practice (Shaw and DeForge, 2012) and is consistent with

findings of previous research from physiotherapy (Edwards et al, 2004) and occupational therapy (Gillette and Mattingly, 1987).

The Tailoring Education category explains how participants adapt their educational approach for people with CLBP. This concept is consistent with findings from previous research which found physiotherapists tailored (Doody and McAteer, 2002) or individualized (Josephson, Hedberg, and Bülow, 2013) treatment. The findings also have similarities to concepts of individualization or personalization across nursing (Radwin and Alster, 2002), sociology (Fine, 2005), occupational therapy (Fleming, 1991a), medicine (NHS England, 2016) and pedagogy (Stewart, 2017). This category provides an insight into how participating physiotherapists customize education based on factors such as the person's level of understanding, and illuminates the role of building, evaluating and influencing factors during the process. This category highlights how the physiotherapists' practice of tailoring their educational approach for the person receiving care is consistent with physiotherapy competencies (Forbes, Mandrusiak, Smith, and Russell, 2018) and national clinical guidelines for the management of LBP (NICE 2016). On the other hand, participants' use of education did not appear to be underpinned by principles of adult learning theory as recommended in physiotherapy practice competencies (Forbes, Mandrusiak, Smith, and Russell, 2018). Alternatively, their reasoning centered on their understanding of the person's world.

The concept of Personalizing Education resonates with a lifeworld-led approach to healthcare. Lifeworld-led care is underpinned by the clinician having an in-depth understanding of the patient's lifeworld (Dahlberg, Todres, and Galvin, 2009; Todres, Galvin, and Dahlberg, 2007). The findings from this study suggest that participants followed the general principles of lifeworld-led care because they explored and made-sense of the person's world to inform their use of education. Although participants explored the person's world across the biopsychosocial domains, the depth to this practice captured within their verbal descriptions was limited. A

holistic understanding of the person's experience of CLBP across the lifeworld dimensions of temporality, spatiality, intersubjectivity, embodiment and mood was missing from the participants' accounts (Dahlberg, Todres, and Galvin, 2009; Todres, Galvin, and Dahlberg, 2007). Therefore, the practice described by participants in this study may be inconsistent with recent literature which suggests that clinicians should take time to listen and gather wider information about a person's unique experience in order to provide appropriate education for people with LBP (O'Keeffe, O'Sullivan, and O'Sullivan 2019; O'Sullivan et al, 2018). Nevertheless, the findings from this study highlight that the person's world was central to the participants' decisions for how they used education as a treatment.

Previous research has found that people with CLBP think person-centered physiotherapy should involve good communication, information sharing and individualized care (Cooper, Smith, and Hancock, 2008). Broader conceptualizations of person-centered care include the need to explore the person's disease and illness experience (Mead and Bower, 2000; Stewart et al, 2014), listen to the person's narrative (Ekman et al, 2011), adopt a biopsychosocial framework (Mead and Bower, 2000), understand the whole person (Bower, 1998; Stewart et al, 2014) and customize the care to people's needs and values (Kitson, Marshall, Bassett, and Zeitz, 2012). This means that the concept of Personalizing Education resembles a person-centered approach to the treatment of people with CLBP because it shares these properties to varying degrees.

Person-centered care should also include the sharing of power, responsibility and decisions between the clinician and the person (Stewart et al, 2014). These concepts were generally missing from the data in this study. Only one participant briefly mentioned how they used a collaborative approach to decision-making. Conversely, participants seemed to conceptualize education as a core part of the care for people with CLBP and expressed a bias to using it as a treatment. This view portrays a more therapist-centered orientation and this finding is

consistent with previous research in physiotherapy (Stenner, Swinkels, Mitchell, and Palmer, 2016). Consequently, there are both person and therapist centered orientations evident within the Personalizing Education concept constructed in this study.

Study limitations

This study was conducted as part of a master's degree and therefore its scope of inquiry was limited by time constraints. As the timeframes for participant recruitment and data collection were limited, only a relatively small number of interviews were conducted. Consequently, theoretical saturation and theory construction were not achieved (Charmaz, 2014). Not achieving theoretical saturation will reduce the transferability of the findings from this study (Polit and Beck, 2010). Furthermore, participants were not observed in practice and their descriptions may not accurately reflect their clinical practice. The findings from this study were co-constructed between the researcher and the participants based on the interview questions, the participants' interpretation of these questions and the researcher's interpretation of the answers (Charmaz, 2014). Most of the views and experiences shared by the participants were based on their practice within the NHS and therefore the findings may not reflect practice within the private sector. Finally, most participants in this study had a similar level of practice experience and this limited analytical comparisons between clinicians with different levels of expertise.

Study Implications

This is the first study to explore the clinical reasoning processes of physiotherapists when using education for the treatment of people with CLBP and therefore the findings are a novel contribution to the literature. The findings highlight how communication and interaction underpin the clinical reasoning process. Therefore, this paper illustrates how communication, interpersonal skills and time with people receiving care are important factors in providing

physiotherapy treatment centered on a person's lifeworld. Participants in this study appear to adopt different philosophical forms of reasoning in relation to the biopsychosocial model of care. This may stimulate the wider physiotherapy community to reflect on their personal worldview and critique their own philosophical assumptions about ontology, epistemology and how these inform their clinical practice (Shaw and DeForge, 2012). The findings from this study may also help to inform educational or in-service training programs which may focus on integrating pedagogy and shared decision-making concepts into clinical practice to develop a more collaborative approach to patient education. Finally, this study provides a foundation for further research which may build on this work to construct a theory, explore physiotherapists' clinical reasoning when using education within a wider context of physiotherapy practice and study the perspectives of people receiving care.

CONCLUSION

This study provides insight into the clinical reasoning processes of the participating physiotherapists when describing their use of education for the treatment of people with CLBP. A concept of Personalizing Education has been constructed to conceptualize these clinical reasoning processes. This paper can be used by physiotherapists to stimulate reflection on their clinical practice and to inform developments to their own clinical reasoning.

TABLE

Please think back to a time recently when you used education as part of the treatment of a patient who had CLBP. Can you describe your reasoning around how you used education as part of their treatment?

What do you think were the reasons for you using that form [or type/amount/style/approach] of education?

Table 1: Example interview questions

FIGURE

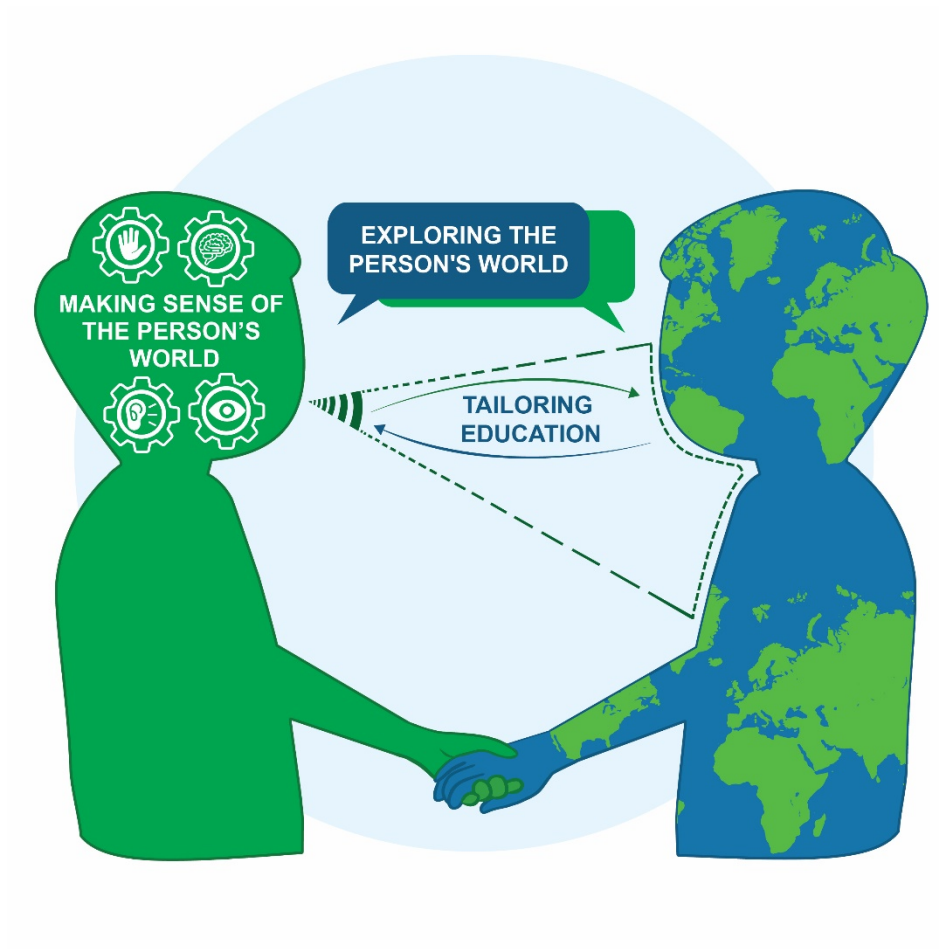


Figure 1: A conceptual model of Personalizing Education.

REFERENCES

- Bartlett EE 1985 At last, a definition. *Patient Education and Counseling* 4: 323-324.
- Benner P, Tanner C, Chesla C 1992 From beginner to expert: gaining a differentiated clinical world in critical care nursing. *Advances in nursing science* 14: 13-28.
- Bower P 1998 Understanding patients: implicit personality theory and the general practitioner. *British Journal of Medical Psychology* 71: 153-163.
- Buchbinder R, van Tulder M, Öberg B, Costa LM, Woolf A, Schoene M, Croft P, Hartvigsen J, Cherkin D, Foster NE, et al. 2018 Low back pain: a call for action. *The Lancet* 391: 2384-2388.
- Bunzli S, Watkins R, Smith A, Schütze R, O'sullivan P 2013 Lives on hold: a qualitative synthesis exploring the experience of chronic low-back pain. *The Clinical journal of pain* 29: 907-916.
- Caladine L 2013 Physiotherapists construction of their role in patient education. *International Journal of Practice-based Learning in Health and Social Care* 1: 37-49.
- Charmaz K 2014 *Constructing Grounded Theory* (2nd ed). London: Sage Publications Ltd.
- Cooper K, Smith BH, Hancock E 2008 Patient-centredness in physiotherapy from the perspective of the chronic low back pain patient. *Physiotherapy* 94: 244-252.
- Dahlberg K, Todres L, Galvin K 2009 Lifeworld-led healthcare is more than patient-led care: An existential view of well-being. *Medicine, Health Care and Philosophy* 12: 265-271.
- Doody C, McAteer M 2002 Clinical reasoning of expert and novice physiotherapists in an outpatient orthopaedic setting. *Physiotherapy* 88: 258-268.
- Dowding D, Lichtner V, Allcock N, Briggs M, James K, Keady J, Lasrado R, Sampson EL, Swarbrick C, Closs SJ 2016 Using sense-making theory to aid understanding of the recognition, assessment and management of pain in patients with dementia in acute hospital settings. *International journal of nursing studies* 53: 152-162.
- Edwards I, Jones M, Carr J, Braunack-Mayer A, Jensen GM 2004 Clinical reasoning strategies in physical therapy. *Physical Therapy* 84: 312-330.

- Edwards I, Richardson B 2008 Clinical reasoning and population health: decision making for an emerging paradigm of health care. *Physiotherapy Theory and Practice* 24: 183-193.
- Ekman I, Swedberg K, Taft C, Lindseth A, Norberg A, Brink E, Carlsson J, Dahlin-Ivanoff S, Johansson IL, Kjellgren K, et al. 2011 Person-centered care—Ready for prime time. *European Journal of Cardiovascular Nursing* 10: 248-251.
- Fine M 2005 Individualization, risk and the body: Sociology and care. *Journal of Sociology* 41: 247-266.
- Fleming MH 1991a Clinical reasoning in medicine compared with clinical reasoning in occupational therapy. *American Journal of Occupational Therapy* 45: 988-996.
- Fleming MH 1991b The therapist with the three-track mind. *American Journal of Occupational Therapy* 45: 1007-1014.
- Fleming MH, Mattingly C 2008 Action and narrative: two dynamics of clinical reasoning. In: Higgs J, Jones MA, Loftus S, Christensen N (Eds) *Clinical reasoning in the health professions* (3rd ed), p. 55-64. London: Elsevier.
- Forbes R, Mandrusiak A, Smith M, Russell T 2017 A comparison of patient education practices and perceptions of novice and experienced physiotherapists in Australian physiotherapy settings. *Musculoskeletal Science and Practice* 28: 46-53.
- Forbes R, Mandrusiak A, Smith M, Russell T 2018 Identification of competencies for patient education in physiotherapy using a Delphi approach. *Physiotherapy* 104: 232-238.
- Foster NE, Anema JR, Cherkin D, Chou R, Cohen SP, Gross DP, Ferreira PH, Fritz JM, Koes BW, Peul W, et al. 2018 Prevention and treatment of low back pain: evidence, challenges, and promising directions. *The Lancet* 391: 2368-2383.
- Froud R, Patterson S, Eldridge S, Seale C, Pincus T, Rajendran D, Fossum C, Underwood M 2014 A systematic review and meta-synthesis of the impact of low back pain on people's lives. *BMC musculoskeletal disorders* 15: 50.
- Gillette NP, Mattingly C 1987 Clinical reasoning in occupational therapy. *The American Journal of Occupational Therapy* 41: 399-400.

Harman K, Bassett R, Fenety A, Hoens AM 2011 Client education: communicative interaction between physiotherapists and clients with subacute low back pain in private practice. *Physiotherapy Canada* 63: 212-223.

Higgs J, Jensen GM 2019 *Clinical Reasoning: Challenges of Interpretation and Practice in the 21st Century*. In: Higgs J, Jensen GM, Loftus S, Christensen N (Eds) *Clinical Reasoning in the Health Professions* (4th ed), p. 3-11. London: Elsevier.

Higgs J, Jones MA 2008 Clinical decision making and multiple problem spaces. In: Higgs J, Jones MA, Loftus S, Christensen N (Eds) *Clinical reasoning in the health professions* (3rd ed), p. 3-17. London: Elsevier.

James Lind Alliance 2018 *Physiotherapy priorities 65 questions – final ranking*. <http://www.jla.nihr.ac.uk/priority-setting-partnerships/physiotherapy/downloads/Physiotherapy-PSP-full-list-of-65-unanswered-questions-identified.pdf>

Jensen GM, Gwyer J, Shepard KF, Hack LM 2000 Expert practice in physical therapy. *Physical therapy* 80: 28-43.

Jones MA, Jensen G, Edwards I 2008 Clinical reasoning in physiotherapy. In: Higgs J, Jones MA, Loftus S, Christensen N (Eds) *Clinical reasoning in the health professions* (3rd ed), p. 245-256. London: Elsevier.

Josephson I, Hedberg B, Bülow P 2013 Problem-solving in physiotherapy—physiotherapists' talk about encounters with patients with non-specific low back pain. *Disability and rehabilitation* 35: 668-677.

Kitson A, Marshall A, Bassett K, Zeitz K 2012 What are the core elements of patient-centred care? A narrative review and synthesis of the literature from health policy, medicine and nursing. *Journal of advanced nursing* 69: 4-15.

Lewis J, O'Sullivan P 2018 Is it time to reframe how we care for people with non-traumatic musculoskeletal pain? *British Journal of Sports Medicine* 52: 1543-1544.

Lincoln YS, Guba EG 1985 *Naturalistic inquiry*. Newbury Park, California: Sage Publications Ltd.

MacNeela P, Doyle C, O'Gorman D, Ruane N, McGuire BE 2015 Experiences of chronic low back pain: a meta-ethnography of qualitative research. *Health Psychology Review* 9: 63-82.

- Mattingly C 1991 The narrative nature of clinical reasoning. *American Journal of Occupational Therapy* 45: 998-1005.
- McAuley J 2015 Educational approaches to pain management. In: Jull G, Moore A, Falla D, Lewis J, McCarthy C, Sterling M (Eds) *Grieve's Modern Musculoskeletal Physiotherapy* (4th ed), p. 265-269. London: Elsevier.
- Mead N, Bower P 2000 Patient-centredness: a conceptual framework and review of the empirical literature. *Social science and medicine* 51: 1087-1110.
- National Health Service [NHS] England 2016 Improving outcomes through personalised medicine. <https://www.england.nhs.uk/wp-content/uploads/2016/09/improving-outcomes-personalised-medicine.pdf>
- National Institute for Health and Care Excellence [NICE] 2016 Low back pain and sciatica in over 16s: Assessment and management. London: NICE guideline (NG59) <https://www.nice.org.uk/guidance/ng59>
- O'Keeffe M, O'Sullivan PB, O'Sullivan K 2019 Education can 'change the world': Can clinical education change the trajectory of individuals with back pain? *British Journal of Sports Medicine* 0:1-2.
- O'Sullivan PB, Caneiro JP, O'Keeffe M, Smith A, Dankaerts W, Fersum K, O'Sullivan K 2018 Cognitive functional therapy: an integrated behavioral approach for the targeted management of disabling low back pain. *Physical Therapy* 98: 408-423.
- Petty N 2015 Qualitative Research. In: Jull G, Moore A, Falla D, Lewis J, McCarthy C, Sterling M (Eds) *Grieve's Modern Musculoskeletal Physiotherapy* (4th ed), p. 223-226. London: Elsevier.
- Polit DF, Beck CT 2010 Generalization in quantitative and qualitative research: Myths and strategies. *International journal of nursing studies* 47: 1451-1458.
- Radwin LE, Alster K 2002 Individualized nursing care: an empirically generated definition. *International Nursing Review* 49: 54-63.
- Rindfleisch AB 2009 A grounded-theory investigation of patient education in physical therapy practice. *Physiotherapy theory and practice* 25: 193-202.
- Shaw JA, DeForge RT 2012 Physiotherapy as bricolage: Theorizing expert practice. *Physiotherapy Theory and Practice* 28: 420-427.

- Snelgrove S, Lioffi C 2013 Living with chronic low back pain: a metasynthesis of qualitative research. *Chronic illness* 9: 283-301.
- Stenner R, Swinkels A, Mitchell T, Palmer S 2016 Exercise prescription for patients with non-specific chronic low back pain: a qualitative exploration of decision making in physiotherapy practice. *Physiotherapy* 102: 332-338.
- Stensland M, Sanders S 2018 Living a life full of pain: Older pain clinic patients' experience of living with chronic low back pain. *Qualitative health research* 28: 1434-1448.
- Stewart D 2017 Personalised Learning Pedagogies within Contemporary Schools. *Journal of Initial Teacher Inquiry* 3: 7-11.
- Stewart M, Brown JB, Weston WW, McWhinney IR, McWilliam CL, Freeman TR 2014 *Patient-centred medicine: transforming the clinical method* (3rd ed). London: Radcliffe Publishing Ltd.
- Thomson OP, Petty NJ, Moore AP 2014 Clinical decision-making and therapeutic approaches in osteopathy - A qualitative grounded theory study. *Manual Therapy* 19: 44-51.
- Todres L, Galvin K, Dahlberg K 2007 Lifeworld-led healthcare: revisiting a humanising philosophy that integrates emerging trends. *Medicine, health care and philosophy* 10: 53-63.
- Unsworth CA 2001 The clinical reasoning of novice and expert occupational therapists. *Scandinavian Journal of Occupational Therapy* 8: 163-173.
- Vos T, Allen, C, Arora M, Barber RM, Bhutta, ZA, Brown A, Carter A, Casey DC, Charlson FJ, Chen AZ, et al. 2016 Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet* 388: 1545-1602.
- Weick KE, Sutcliffe KM, Obstfeld D 2005 Organizing and the process of sensemaking. *Organization science* 16: 409-421.