

Complexity of hospital physical therapy is about making the right decisions: a grounded theory study.

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"ONDERGETEKENDE

Feije Lieven de Zwart,

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ABSTRACT

Background: Physical therapy in a hospital setting is considered as a complex job, with a need for specific knowledge and skills. Complexity can influence providing the right care at the right time. To date, it is not known which variables contribute to the experience of complexity for hospital physical therapists (PTs). With this knowledge, it is possible to improve care for patients during the hospital stay by understanding the complexity of hospital physical therapy.

Aim: This study aims to get understanding of complexity in hospital physical therapy care from the perspective of hospital PTs.

Methods: A grounded theory study was performed to increase our understanding of experienced complexity. Semi-structured interviews were conducted in three hospitals with hospital PTs. Purposeful sampling was used in order to get maximum variation in rich cases. Interviews were transcribed, coded, and analyzed. A grounded theory was modelled after two research team meetings.

Results: Twenty-four hospital PTs were interviewed. Experienced complexity is the process from experienced competence to the experience making the right decisions. Seven themes were identified: Being, becoming, and remaining competent; Disrupting the routine; Solving the puzzle; Dealing with unexpected and complicated factors; Taking responsibility; Feeling unfamiliar and uncomfortable; Making the right decisions. The grounded theory describes the process with complexity as an experience in the process of making the right decisions.

Conclusion: The current study increases understanding in which themes are predominantly experienced when PTs talk about complexity of hospital physical therapy. This model could help understand the experienced complexity and the influencing factors and improve care by understanding when the routine gets disrupted and what helps to solve the puzzle. PTs should aim to become more competent, deal with unexpected and complicated factors, and take responsibility to lower the experience of complexity. The experienced complexity ultimately comes together in making the right decisions.

Clinical Relevance: The abstract term complexity for hospital PTs has been given understanding. By understanding complexity, opportunities are presented to decrease the experienced complexity for PTs. Future research could further explore the influence of the setting and environment on complexity.

Keywords: Complexity, Hospital, Physical Therapy, Interviews, Grounded Theory.

INTRODUCTION

In the hospital setting, complexity is a widely used term, which is correlated to the term difficulty, for example difficult tasks or treatment difficulty (1). Also in the specific guideline for hospital physical therapy, other guidelines and many articles the term complexity is used, although often vague or insufficiently described(2-8). In medicine, a general definition for complexity is: a dynamic state in which the personal, social and clinical aspects of the patient's experience operate as complicating factors(9). Increasing age, comorbidities, self-care routines, burdensome treatments and environmental and social factors are mentioned as common aspects of complexity(9-16). However, it remains to be seen whether this general definition explains how hospital PTs experience complexity. Hospital Pts: 1) see a wide-range of patients with different backgrounds, 2) work in multi-disciplinary teams, and 3) can experience complexity in more than patient care-related context (2, 3, 5, 6, 17-20).

The major tasks of the hospital physical therapist (PT), is to start and improve mobility and assess the level of functioning of hospital patients(21). The hospital setting demands specific knowledge and skills which must be deployed in a short period of time(5, 6). The hospital PTs must be able to: adapt to medical conditions, align with other medical disciplines, and handle acute medical situations(5, 22, 23). The hospital PT is expected to focus on the overall function of the patient instead of only one system of body part, which is in contrast to regular physical therapy (6). Over the years the role of the PT in acute care is changing, which is partly subject to hospital restructuring, an increase in patient related complexity (by increase of lifespan, number of comorbidities, and frailty) and extended tasks (2, 6, 24-27). However, the role of the PT should still mainly focus on direct patient care(18). In short, the hospital PT has to deliver the right care, and the right time at the right place.

Understanding complexity for hospital PTs could improve our understanding of guidelines and could contribute in improving care. But the abstractness and dynamic nature of the term complexity, makes it hard to display it in one number(28-32). A study which explores the experiences of PTs might suit the needs for complexity research. Therefore, the goal of this qualitative study is to increase our understanding of what complexity of physical therapy care means to hospital PTs.

METHODS

Study design and data collection

A qualitative constructivist grounded theory study was performed to increase the understanding of what hospital PTs consider as complex within their profession(33). The goal was to describe a theory that fits the data and reflects the real world(34, 35).

A total of 21-36 individual in-depth interviews were conducted between February 2019 and May 2019. The range is in accordance with the recommendations of Charmaz, Malterud and Creswell(33, 36, 37). Interviewing and observing stopped when new data no longer give new theoretical insights nor unveil new properties of the core categories(33). The semi structured interviews took approximately 40 minutes and contained open-ended and non-judgmental questions. All interviews were conducted in private meeting rooms in the participants' work institute to improve open and safe answering, with the availability of relevant examples to the specific context for the participant(38). Purposeful sampling was used to provide a diverse group of PTs. Analytical memos were written throughout the entire study process and serves as a record of early detection of main themes, speculations and relationships between themes, revisions and reflexivity. All interviews were audio-taped. The memos were added along with the transcripts of interviews. Audio recordings and transcripts of the interviews were stored separately from the respondents' names and identifiers on a secured disk where only researchers had access to.

Additional to the interviews, observations were done to observe whether PTs took notion of the concept of complexity during their work tasks, like during medical information exchanges, division of labour, etc. Observations took place in the lunch/coffee room of the PTs. Noticeable findings were noted and served as a source for questions during the interviews, but are not described in the manuscript.

After the interview was completed, member check was done. The interview recordings were transcribed verbatim and individually coded (LdZ, NK) using f4 and ATLAS.ti 8.3.16. In the initial coding stage, core characteristics of the interview data were coded in-vivo line-by-line. Secondly, focused coding was used to develop core categories from the codes of the initial coding stage. Analyzing also involved re-reading of

transcripts and re-listening of audio until the researchers became familiar with the data. Last, theoretical coding was used to provide relationships between core categories. Throughout the coding stages, constant comparison analysis between data, codes, memos and categories was applied. The research team met two times during the period of data collection and analysing the data. The content of these meetings was to review specific codes and categories, refine interview questions in light of these categories, discuss emerging themes, and talk about how to shape the model. Research team meetings did increase the methodological rigour by theoretical triangulation of the data analysis(39, 40). The members of the research team meetings have experience in general research methods qualitative research, clinical care, and non-clinical care and content experts. The group composition differed at both meetings.

Ethical approval was granted by the Radboud University Medical Center medical ethics committee (number 2018-5049). At least 24 hours was planned between invitation and interview. Informed consent was signed prior to the interview.

Rigour of the study

Charmaz's criteria of credibility, originality, resonance and usefulness were taken into account while conducting the qualitative study(33). Credibility was maintained through: (I) Purposeful sampling of the therapists. This was done by the two researchers in consultation with the managers of the physical therapy departments. (II) Member checking after the interview. (III) Independently coding and categorizing by two researchers (LdZ and NK). (IV) The interview guide was discussed, and the codes, categories and themes were reviewed in researches meetings with a divers research team. The originality and resonance were kept up by: (I) using previous interviews to adjust the interview guide and thereby highlight underexposed themes, and (II) purposeful sampling in academic and regional hospitals to provide a broad view about complexity in different settings in a heterogeneous group. The usefulness of this research is to expose complexity according to hospital PTs within their profession. This could result in better management and might identify opportunities for improvement for hospital PTs.

Participants

Hospital PTs working in clinical patient care employed at Radboudumc (Nijmegen), Radboudumc Dekkerswald (Groesbeek), Rijnstate (Arnhem) or Gelderse Vallei (Ede) were selected for this research. Among the participants there was a variety in hospital work experience, field of expertise, and gender. The PTs were purposefully sampled to get information-rich cases(41, 42). Theoretical sampling was used to explore emerging themes and adding new interview questions(33). The included therapists have to: (I)work at least eight hours a week on average in hospital clinical care, (II)have at least six months postgraduation experience in hospital clinical care and (III) have to speak and understand the Dutch language. There were no exclusion criteria.

RESULTS

Table 1 shows the participant characteristics. In total, 24 interviews were conducted at the Radboudumc (n=13), Rijnstate (n=5) and Gelderse Vallei (n=6). Four males and twenty females participated in this study. The work experience of the respondents was 10 months to 41 years (mean 13.8 years, standard deviation (SD): 12.4 years). The interviews lasted 35 to 58 minutes (mean: 46 min, SD: 5 min). The respondents worked at a variety of hospital departments such as Intensive Care, Orthopaedics, Neurology and Oncology. New themes or categories emerged from the data in the first 22 interviews. Interview 23 and 24 showed no new results, indicating data saturation.

Table 1. Participant characteristics.

ID	Sex	Work experience	Main expertise	Duration of interview (minutes)
PT01	Female	5 years	Intensive care.	43
PT02	Male	15 years	Haematology, Gastroenterology, Medical oncology.	41
PT03	Female	2 years	Internal medicine, Haematology, Intensive Care.	48
PT04	Female	15 years	Neurosurgery, Intensive Care, Medium Care.	35
PT05	Female	12 years	Orthopaedics.	41
PT06	Male	10 months	Traumatology, Orthopaedics, Oncology.	42
PT07	Female	26 years	Traumatology.	45
PT08	Female	26 years	Orthopaedics.	40
PT09	Female	1,5 years	Pulmonary Diseases, Intensive Care.	46
PT10	Female	13 years	Intensive Care.	48
PT11	Female	34 years	Oncology, Otorhinolaryngology, Abdominal Surgery.	42
PT12	Female	10 years	Geriatrics, Psychiatry.	47
PT13	Female	5 years	Pulmonary Diseases, Pulmonary Rehabilitation.	46
PT14	Female	3 years	Orthopaedics, Traumatology, Neurology.	37
PT15	Female	7 years	Pulmonary Diseases.	51
PT16	Female	3 years	Medium Care, Intensive Care, Orthopaedics.	46
PT17	Male	34 years	Orthopaedics, Pulmonary Diseases, Oncology.	49
PT18	Female	12 years	Geriatrics, Neurology.	43
PT19	Female	2 years	Paediatrics.	46

PT20	Female	3 years	Orthopaedics, Traumatology.	47
PT21	Female	41 years	Neurology.	49
PT22	Female	22 years	Intensive Care, Medium Care.	53
PT23	Female	7 years	Paediatrics.	50
PT24	Male	33 years	Cardio-thoracic surgery, Cardiology.	58

Meaning of complexity

The respondents talked about complexity from three views: (i) Complexity of patients, which includes all complexity related to direct patient care, (ii) complexity of care, which means all complexity related to PT tasks, thoughts, interdisciplinary cooperation without direct involvement of the patient, and (iii) complexity of environment, this is complexity related to institutional facilities, national policies and cultural aspects as work ethos and ambience at the workplace(s).

PTs used synonyms to describe complexity such as: difficult, burden, (physically) vulnerable, heavy, hard and unclear. For PTs, complexity meant that they have to think longer and harder, should be more focussed, that they have to use all their skills, and should stay alert. The opposite of complex was described by the participants with words such as: clear, stable, basic, and per-protocol. PTs told that complexity can make them feel unsure and more tense. However, several PTs mentioned that complexity of hospital physical therapy is challenging in a positive way and made them feel excited about their job.

“I think it is very complex when I have more trouble with a patient case... When there is more emotional burden for example. Complex is when I think: ‘Phew, it becomes really difficult’.”(PT16)

“For me, complexity means something like: difficult, complicated... While it is also a challenge and that makes me excited about my job.”(PT19)

Table 2 shows the main themes and categories. Quotes have been added to illustrate the content of the theme. Seven themes emerged from the data; Being, becoming, and remaining competent; Disrupting the routine; Solving the puzzle; Dealing with unexpected and complicated factors; Taking responsibility; Feeling unfamiliar and uncomfortable; Making the right decisions. The grounded theory describes the process with complexity as an experience in the process of making the right decisions. All themes consist of a verb and a noun which supposes the themes related to complexity are best described with a dynamic part and a static part. The content of the themes contain parts of the patient, care and environmental domain and has been clarified using characteristic quotes from the PTs.

Table 2 Themes, categories and quotes related to complexity of hospital physical therapy from the perspective of hospital physical therapists

Theme	Categories	Quotes
Being, becoming and remaining competent	- Approaching a patient ^a	^a "And especially approaching, and guiding, and estimating the needs of a patient. Sometimes patients need caring, sometimes laughter, sometimes you have to be directive. [...]. But if I can't connect with a patient, it takes a lot of energy." (PT12)
	- Motivating a patient	
	- Having skills ^b	
	- Having knowledge	^b "I think it's important to discuss a complex case with colleagues when you get stuck or you can't figure it out. And if necessary, ask someone else to take a look at it, or support you, or look at it with a new perspective." (PT13)
	- Supporting work environment ^{b, c}	
	- Opportunities for professional development ^{b, c}	^c "I think you need a good team to take care to a higher level. The working environment is important, and you need to be facilitated to improve a protocol, to deepen your knowledge or to improve something." (PT02)
	- Affinity with professional tasks ^d	^d "For some colleagues it is less complex because they're more skilled on that domain of physical therapy, and have more affinity with it. Therefore, they can treat those patients better than I can." (PT15)
	- Domain of physical therapist	
Disrupting the routine	- Deviate from the standard ^a	^a "Patients are not 10% complex, or 20% complex. But when you have to rationalize more, or must deviate more from the protocol. Then, the complexity often increases." (PT06)
	- Need for support by colleagues	^b "For example, I think that the patients with obesity are going to be a problem in the future. My physical ability to help these patients is limited, therefore I need to ask tall, strong colleagues to help me out." (PT22)
	- Policy	
	- New treatment (options)	^c "Last year, the hospital underwent a reorganisation. The collaboration between departments changed and was re-established with other departments. As a result, the time to discharge increased by more than one day. Before the reorganisation, the nurses supported the PTs by stimulating and preparing the patients for therapy, the new nurses did not have these routines." (PT08)
	- Adapting to changes over time ^b	
	- Reorganisation of tasks ^c	
Solving the puzzle	- Collecting and processing information ^a	^a "I asked the doctor: What can I physically ask of the patient? What information can I give the patient? [...] I needed medical information to tailor my approach. I needed clarity." (PT11)
	- Treatment policy ^b	^b "If the treatment policy is clear, for example when it is policy to mobilise or not. That makes treatment for physical therapy very clear. That makes it less complex for a PT." (PT06)
	- Clarity ^{a, b}	
	- Type of care ^c	^c "Care at the polyclinical has a more multidisciplinary point of view, that's the biggest difference. [...]. You are fully involved in the multidisciplinary team and they explicitly want to hear your clinical reasoning during the process." (PT02)
	- Role within the team ^c	
Dealing with unexpected and complicated factors	- Presence or interfering of behaviour, cognitive status, cognitions, emotions, (many) comorbidities, medical condition, and pre-existent home situation ^{a, b}	^a "I'm thinking what are complex patients for me? I think, the patients with a lot of different things involved. For example, an unclear diagnosis, cognitive problems, physical problems, sometimes psychosocial problems. Where many factors, or for example, one condition is influenced by another." (PT18)
		^b "A complex patient? A patient I have treated with a paraplegia, who also got a distal femur fracture. They fixed the fracture, but he got an infection which led to fever and a high CRP-level. Eventually they had to amputate his leg. All this, with a pre-existent paraplegia. I think this is a complex case." (PT14)
	- Aftercare (availability)	^c "Complex care means you can't help or treat a patient alone. You need each other." (PT12)

	- Lack of social support	^d “The intensive care is, in my opinion, always complex care.” (PT10)
	- Collaborating ^c	^e “If someone has too many fractures, [...], he will be treated in an academic hospital, he won’t be sent to a regional hospital.” (PT11)
	- Department specific ^d	
	- Type of setting ^e	
Taking responsibility	- Personal care ^a	^a “We spend 30 minutes treating a knee problem or teaching how to use walking aids. But in the meantime, you are connecting with the patient: asking about their grandchildren who will come by, or listening to personal frustrations. You focus on people in their social context.” (PT08)
	- Tailored care ^a	
	- Contributing to a higher quality of care	^b “At the moment there is a patient with a severe rare disease who normally got treated in primary care. Her situation is so complex, we think that it would be irresponsible to send her home and continue in the primary care. The mild cases are treated in primary care, but the more severe cases are treated here (in the hospital). Because we have more knowledge and more experience.”(PT24)
	- By specialising in specific care ^b	
	- Secondary job tasks ^c	^c “I think it is part of the job as physical therapist to share your knowledge and teach your colleagues.” (PT09)
	- Ambitious career choices	^d “One part of complexity is personal ambition. How far do you want to go? It’s possible to work 20 years at a basic level. If you don’t want to dig deeper, you won’t dig deeper. And you can perform just fine. [...]. But complexity is something you have to seek for yourself.”(PT02)
	- Different sense of responsibility between PTs ^d	
Feeling unfamiliar or uncomfortable	- Routine ^a	^a “When the patients knows who you are and why you are there, there is a bond between you and the patient, even when this is very minimal. [...] In general, if the patient knows you, it makes the treatment a lot easier for me.”(PT 20)
	- Bond with the patient ^a	
	- Experience	^b “If the collaboration goes well, the job easier becomes easier, because you sort of need each other. But when it repeatedly not works out, or you can’t find each other, or the collaboration is not going smoothly at all, all tasks become a lot more difficult and you often don’t get it done.” (PT16)
	- Knowing the team ^b	
	- Logistics	^c “If you see the same patient population more often, you will recognize more paths characteristics or patterns that someone else won’t see so quickly. [...]. By doing more of the same, you simply start to recognize more diversity within the same.” (PT08)
	- Recognizing variables ^c	
	- Confidence	
Making the right decisions	- About treatment ^a	^a “I have to answer the following questions... What is somebody’s capacity? Can I asses a patient’s capacity with my knowledge and vision? Is the patient able to mobilise, yes or no? Is he able to go to nursing department, yes or no? Is it possible to remove his tube yes or no? Would it be possible to place a tracheotomy tube?”(PT10)
	- Prioritizing in patient care	^b “Especially in the group of people who shouldn’t go home after discharge... unfortunately it’s their only possibility... When people are registered for long-term care, they are not eligible for a nursing home. And when for some reason rehabilitation is also not entitled, they have to go home.”(PT18)
	- Completing the recovery period ^a	
	- Aftercare consultation ^b	
	- Future healthcare ^c	^c “We must revise our mission and vision within our team. We should stop teaching patients how to use walking aids for example. Instead, we should test maximum inspiratory pressure or interpret steep ramp test in specific populations. And sharing our expertise in a multidisciplinary setting is important. But to do this, choices have to be made. Now we focus too much on quantity and numbers, but not on quality.”(PT02)
	- Ethical dilemmas ^b	

Being, becoming and remaining competent

Physical therapy becomes more complex when the therapist is less competent. Competence can occur on the affective (approaching or motivating a patient), psychomotor (having skills) and cognitive level (having knowledge about disorders and comorbidities) according to PTs. A supporting work environment, opportunities for development, affinity with the professional tasks and a clearly defined domain of the PT are mentioned as preconditions which increases competence and reduces experienced complexity.

Disrupting the routine

Physical therapy becomes more complex if the routine is disrupted. The routine is disrupted if the patient deviates from the standard, a PT need the support of his colleagues, the PT has to adjust to a policy or new treatment options and have to adapt to changes over time. Reorganisation of tasks also results in disrupting a routine.

Solving the puzzle

Experienced complexity increases when a PT is not able to solve the puzzle. Collecting and processing of all gathered information is mentioned as complex. Weight the information from the patient file, the policy of the doctor and additional information can be hard. Especially if there is unclarity about the treatment policy. The role within the team and the type of care (e.g. care at the polyclinical vs clinical care) influence the own expatiations and the expectations of others in solving the puzzle.

Dealing with unexpected and complicated factors

Physical therapy is experienced as more complex if a PT has to deal with many unexpected and complicated factors. The presence of determinants such as: medical disorder, cognitive status, behaviour, comorbidities, and differences in patient's cognitions compared to those of the PT are

mentioned as complicated factors. Interference or unexpectedly coming forward of above-mentioned factors could worsen the complexity according to the PTs. Also (unexpected) factors related to (the availability of) aftercare, lack of social support or suddenly needing collaboration is mentioned as complex.

Within the environmental view, specific departments are mentioned several times as more complex, for instance; intensive care, psychiatry and geriatric. An academic hospital is told to be more complex than a regional hospital. Also different locations of a single hospital can vary in complexity according to the PTs.

Taking responsibility

Physical therapy becomes more complex when the PT takes more responsibility. The attitude toward the different domains is key, according to some respondents. In the domain more personal patient care by focussing on more than the disorder or injury, executing more than a basic treatment, investing in the bond with the patient and strive for tailored care is mentioned. Also contributing to higher the quality of care by, deepen your knowledge, wanting to know more, specializing in a specific care, make proposals and, perform secondary job tasks as giving education or executing research. This is often mentioned as not necessary but ambitious choices which indicates differences between PTs.

Feeling unfamiliar or uncomfortable

The PTs feel more unfamiliar or more uncomfortable when the physical therapy is experienced as more complex. The PTs told that familiarity increases when a PT has a routine, treats a patient consecutive days, has bonded with the patient, has more experience with a specific disorder or longer involvement in specialised care, knows the caregivers (i.e., nurses, doctors, occupational therapists), can find all the devices and walking aids and understands the logistics of the department. This leads to early recognition of important treatment variables, which improves the efficiency and decreases the

complexity. Feeling familiar with the PT-team seems to make experienced complexity better tolerated. The Pts said that a lack of confidence is often coherent with unfamiliarity.

Making the right decisions

Complexity of PTs is ultimately about making the right decisions. Examples of complex decisions by the PTs are: decisions about treatment (the proceedings, completion and adjustments), prioritizing in patient care, completing the recovery period, aftercare consultation, and the role of the PT in future healthcare. Within these decisions, ethical dilemmas may come forward which were repeatedly mentioned as hard decisions PTs have to make. Also the unpleasant feeling PTs get when they have to make a choice when all options are not completely fitting.

Complexity is an experience in the process of making the right decisions

Figure 1 illustrates the grounded theory that explains the experienced complexity of hospital physical therapy by hospital PTs. If PTs experience a feeling of competence, can follow their work routine and are being able to make the decision they experience as the right decision, hospital physical therapy can be as familiar or comfortable and practically not complex. If the routine is disrupted, the PTs experiences this as more complex. They have to solve a puzzle. This issue can be positively or negatively affected by the themes: becoming competent, dealing with unexpected and complicated factors and taking responsibility. If an issue can't be solved, this leads to the experience of not being able to make the right decision which may be associated with an unfamiliar or uncomfortable feeling. If the puzzle can be solved, the PT will experience coming to the right decision which can make them feel familiar or comfortable with the decision. Have made the right decision can lead to the experience of being competent or remaining competent. Experiences after not making the right decision remain subject for future research.

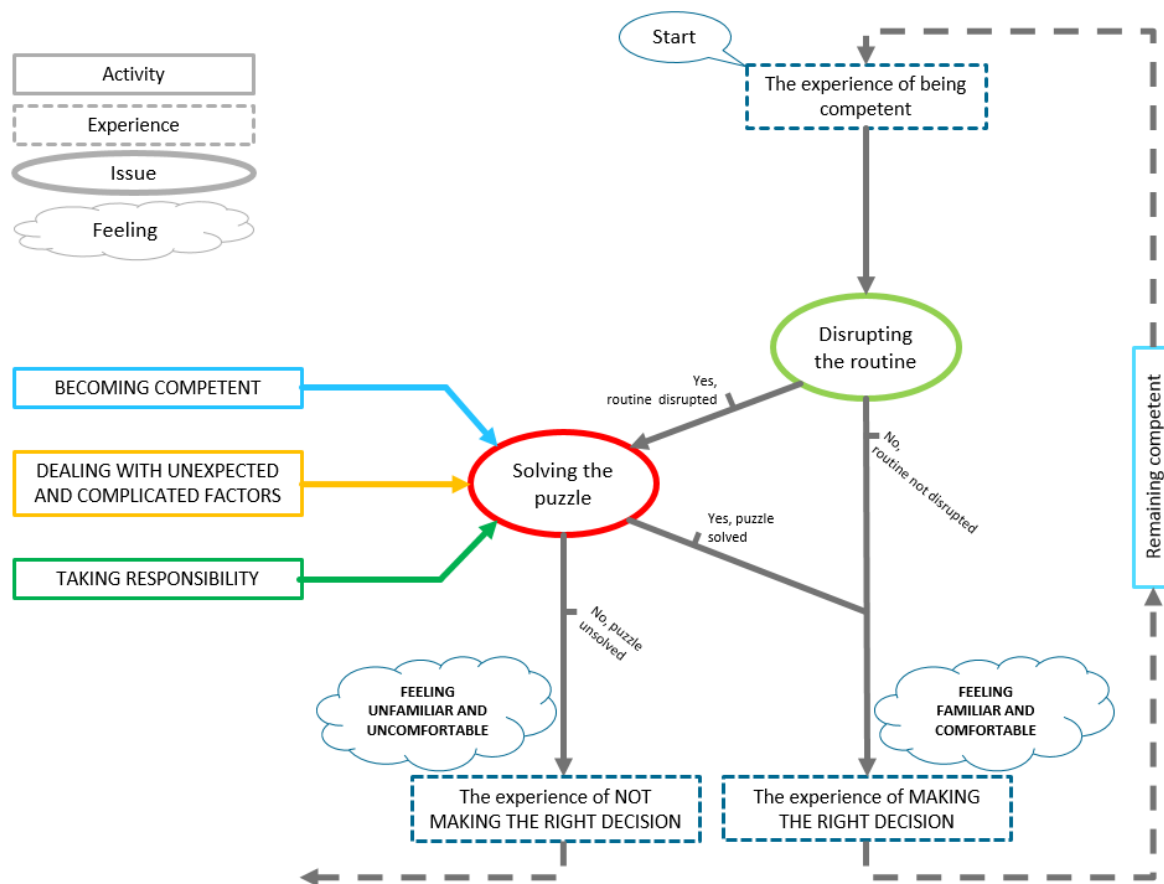


Figure 1. The grounded theory with seven themes to understand the experienced complexity in hospital physical therapy from the perspective of hospital physical therapists.

DISCUSSION

This study is the first to increase our understanding of what complexity of physical therapy care means to hospital PTs. The complexity ends in the need to make the right decision. The experienced complexity of physiotherapy by PTs starts with the experience of becoming (or remaining) competent, the complexity increases if the routine is disrupted, this leads to a puzzle that has to be solved. If the puzzle can be solved the right decision can be made. The puzzle can be solved if the PT becomes competent, can deal with unexpected and complicated factors and takes his or her responsibility. A familiar or comfortable feeling is linked to the ultimate experience of making the right decisions. This model provides an opportunity to understand the complexity of hospital physical therapy and provide insight in successive steps of clinical reasoning upon which complexity can engage.

Many articles describe that decision making or performing a proceeding is the outcome of many steps of clinical reasoning(7, 8, 43-45). This process is comparable in other health care disciplines, such as nursing, medicine, pharmacy, psychology(7, 8, 43, 44). In the different professions surrogate terms for clinical reasoning were used, such as medical reasoning, diagnostic process, problem solving (medicine), critical thinking (pharmacy), preferred thinking style (nursing)(7).

Although complexity isn't mentioned as an isolated factor, it seems to be connected to the process of decision making. The article of Josephson et al. described cases ascending from easy to very complex, Baker et al. mentioned the complex and subconscious nature of the decision making process, Holder et al. and Nibbelink et al. stated decision making is complex and in the concept analysis of Hunh et al. the struggle to describe clinical reasoning is stated(7, 8, 45-47). Even though some characteristics of complexity are stated, no in-depth analysis of this phenomenon is provided. Moral distress is linked to complex situations or complex issues, which could indicate that moral distress is closely linked to complexity(48, 49). Moral distress is known as the experience knowing what the right decision would be but being constrained about acting upon it because of intuitional, regulatory, legal or interpersonal factors. The current study found an unfamiliar and uncomfortable feeling when having the experience of not making the right decisions, which closely links to the concept of moral distress. This phenomenon is known for nurses, pharmacists, psychologists and more (48, 50, 51). Which suggests that the experienced complexity of decision making is not exclusive for hospital PTs.

Interestingly, increasing knowledge and competence can lead to both an increase as a decrease in experienced complexity. Figure 2 illustrates this paradigm. Several PTs told that novice PTs experience a lot of complexity when they start, but the complexity decreases as they gather more knowledge and become more competent as hospital PT. But more knowledge and development also lead to more recognising of deviations within the population, which ask for a disruption of the routine by providing tailored care that increases the complexity. This process is a repeating phenomenon with a decreasing amplitude. The amplitude decreases because the new knowledge and development get relatively less,

which is comparable with the law of the diminishing returns. The complexity won't be zero, because decisions will always have to be made and it might be hard to distinguish between not making the right decision and making the right decision.

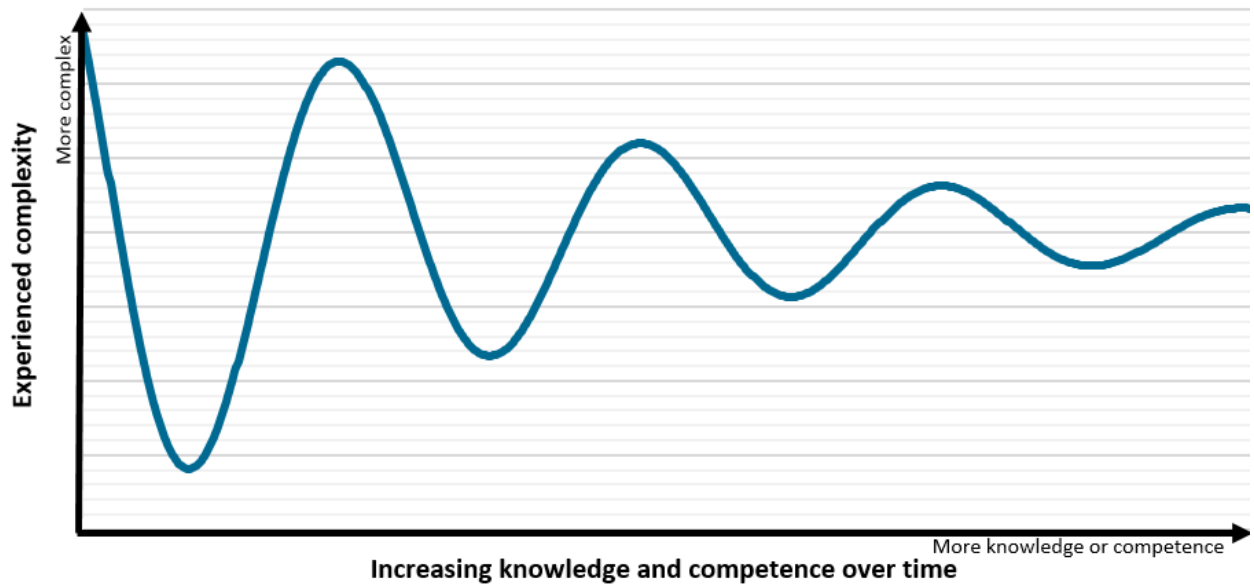


Figure 2. The paradigm that experienced complexity is dependent on the increasing knowledge and competence of PTs.

Strengths and limitations

There are several strengths of this study. First, the generalizability of our findings is improved by conducting interviews in three hospitals with six different physical therapy departments and PTs with different main expertise. Second, data saturation was achieved after 22 interviews. No new categories or themes were found in the last two interviews. Third, the grounded theory was established by discussing the preliminary and final results in two research meetings. This helped to more precisely define and understand the successive order of the themes.

There are some limitations. First, new insights during the study could not be checked by PTs in all hospitals as a result of the interview order. It was logistically not possible to adequately allocate the PTs of each hospital before and after the revising of the interview guide. Ideally there would have been an iterative process of interviewing. Second, data triangulation was limited by the lack of participation

during all work processes. Participatory observations were performed during administration and breaks. Observations in patient care might have provided valuable information about the experienced complexity of hospital physical therapy.

Implications for clinical practice and future research

The grounded theory shows which themes are predominantly explaining experienced complexity. The process can be used to more explicitly indicate how factors influence the complexity. Also understanding the experienced complexity process gives input to decrease the PT's experience and can lead to adequate decision making. For example, this model could help to improve care by understanding when the routine of PTS gets disrupted and what helps to solve the puzzle. The experienced complexity might be lower when PTs can work in agreement with up-to-date treatment guidelines as their routine might be less frequently disrupted. Therefore, regular updates of guidelines are advised. Peer-to-peer contact and multidisciplinary collaboration contribute to a lower experienced complexity while solving the puzzle. Therefore, investing in multidisciplinary team meetings would be valuable. In addition, coaching on the job or education could help to become competent, deal with unexpected and complicated factors, and take responsibility to lower the experience of complexity by the PTs.

Future research in other healthcare professionals could help to understand monodisciplinary and interprofessional complexity. In addition, more information on the complexity indicates if the process is exclusively for PTs and could give valuable information about environmental aspects affecting complexity. Furthermore, future research could aim to improve our understanding what happens when PTs experience not having made the right decision.

CONCLUSION

This study shows how experienced complexity is dependent on: becoming and remaining competent, disrupting the routine, solving the puzzle, dealing with unexpected and complicated factors, taking

responsibility and feeling unfamiliar or uncomfortable. Complexity of hospital physical therapy ultimately leads to the experience of making the right decisions by the hospital physical therapist. This model helps to understand which factors influence the puzzle after a routine gets disrupted. By becoming more competent, dealing with unexpected and complicated factors and taking responsibility the physical therapist might lead to the right decisions. The model shows that the process existed of a successive order and all themes are influenced by the patient, care and environmental domains. With this grounded theory we better understand the experienced complexity, which gives information to decrease the experienced complexity by better decision making.

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