

This article is downloaded from



CHARLES STURT  
UNIVERSITY

CRO

CSU Research Output  
*Showcasing CSU Research*

<http://researchoutput.csu.edu.au>

**It is the paper published as:**

**Author:** M. Smith, J. Higgs and E. Ellis

**Title:** Characteristics and processes of physiotherapy clinical decision making: a study of acute care cardiorespiratory physiotherapy

**Journal:** Physiotherapy Research International

**ISSN:** 1358-2267

**Year:** 2008

**Volume:** 13

**Issue:** 4

**Pages:** 209-222

**Abstract:** Background and purpose. Physiotherapists have been increasingly interested in investigating physiotherapy clinical reasoning and decision making processes. Cardiorespiratory physiotherapy has received little attention within this increasing body of research. This study aimed to investigate characteristics and processes of cardiorespiratory physiotherapy decision making and to contribute to the broader understanding of physiotherapy reasoning and decision making. Methods Fourteen cardiorespiratory physiotherapists took part in the study. Qualitative research methods were used guided by a philosophical hermeneutic approach. Participants were observed undertaking their usual daily patient care activities, and were later interviewed about their decision making. In-depth, iterative hermeneutic strategies were used to interpret the texts created by these processes to identify the nature and processes of decision making. Results Clinical decision making in cardiorespiratory physiotherapy is focussed on making decisions about the nature of patient's problems, physiotherapeutic intervention and interaction, and evaluation of effectiveness of actions. Cardiorespiratory physiotherapy decisions varied in their difficulty according to the attributes of the decisions. The variable nature of decisions influenced the reasoning processes used. Clinical decision making involved complex reasoning processes that were cyclic, evolving and flexible in nature, with inter-dependence and inter-relation between the different foci of clinical decision making. Clinical decision making was also found to be a social and collaborative process. Conclusions This study contributes to the body of literature on physiotherapy reasoning and decision making by revealing details about the characteristics and processes of cardiorespiratory physiotherapy decision making. This research can be used to shape the education of beginning practitioners and provide practising physiotherapists with a basis for critical appraisal of their decision making.

**Author Address:** [mesmith@csu.edu.au](mailto:mesmith@csu.edu.au)  
[jhiggs@csu.edu.au](mailto:jhiggs@csu.edu.au)

**URL:** <http://dx.doi.org/10.1002/pri.419> [www.interscience.wiley.com](http://www.interscience.wiley.com)

[http://researchoutput.csu.edu.au/R/-?func=dbin-jump-full&object\\_id=8381&local\\_base=GEN01-CSU01](http://researchoutput.csu.edu.au/R/-?func=dbin-jump-full&object_id=8381&local_base=GEN01-CSU01)

[http://bonza.unilinc.edu.au:80/F/?func=direct&doc\\_number=001484762&local\\_base=L25XX](http://bonza.unilinc.edu.au:80/F/?func=direct&doc_number=001484762&local_base=L25XX)

**CRO Number:** 8381

**Characteristics and processes of physiotherapy clinical decision making: a study of acute care cardiorespiratory physiotherapy**

**Short title:** Cardiorespiratory physiotherapy clinical decision making physiotherapy

Word count: 4002 words

**Key words:** Clinical decision making, clinical reasoning, cardiorespiratory physiotherapy

**Dr Megan Smith** PhD, MAppSc(CardiopulmPhysio), GradCertUT&L,

BAppSc(Physio)

Senior Lecturer Charles Sturt University

**Professor Joy Higgs** AM PhD, MPHEd, GradDipPhty, BSc

Strategic Research Professor in Professional Practice

The Research Institute for Professional Practice, Learning & Education

Charles Sturt University

**Dr Elizabeth Ellis** PhD MHL, Grad DipPhty

Honorary Senior Lecturer, The University of Sydney

**Corresponding author**

Dr Megan Smith

School of Community Health,

Charles Sturt University

PO Box 789 Albury NSW 2640 AUSTRALIA

Ph 02 6051 6738 Fax 02 6051 6772

Email [mesmith@csu.edu.au](mailto:mesmith@csu.edu.au)

**Characteristics and processes of physiotherapy clinical decision making: a study of acute care cardiorespiratory physiotherapy**

**Sponsors:**

Australian Physiotherapy Research Foundation (no:006/04)

Charles Sturt University Faculty of Health Studies Seed Grant

## **Abstract**

**Background and purpose.** Physiotherapists have been increasingly interested in investigating physiotherapy clinical reasoning and decision making processes. Cardiorespiratory physiotherapy has received little attention within this increasing body of research. This study aimed to investigate characteristics and processes of cardiorespiratory physiotherapy decision making and to contribute to the broader understanding of physiotherapy reasoning and decision making. **Methods** Fourteen cardiorespiratory physiotherapists took part in the study. Qualitative research methods were used guided by a philosophical hermeneutic approach. Participants were observed undertaking their usual daily patient care activities, and were later interviewed about their decision making. In-depth, iterative hermeneutic strategies were used to interpret the texts created by these processes to identify the nature and processes of decision making. **Results** Clinical decision making in cardiorespiratory physiotherapy is focussed on making decisions about the nature of patient's problems, physiotherapeutic intervention and interaction, and evaluation of effectiveness of actions. Cardiorespiratory physiotherapy decisions varied in their difficulty according to the attributes of the decisions. The variable nature of decisions influenced the reasoning processes used. Clinical decision making involved complex reasoning processes that were cyclic, evolving and flexible in nature, with inter-dependence and inter-relation between the different foci of clinical decision making. Clinical decision making was also found to be a social and collaborative process. **Conclusions** This study contributes to the body of literature on physiotherapy reasoning and decision making by revealing details about the characteristics and processes of cardiorespiratory physiotherapy decision making. This research can be used to shape the education of beginning

practitioners and provide practising physiotherapists with a basis for critical appraisal of their decision making. (word count 276).

## **Introduction**

Clinical decision making is a fundamental component of physiotherapy clinical practice. Clinical decision making refers to the process of choosing a course of action (Hastie, 2001) and it can be considered both a component and outcome of the broader process of clinical reasoning. Clinical decision making involves judgements in which practitioners consider likely outcomes and estimate possible consequences of decisions being made (Hastie, 2001). High levels of accountability in decision making are expected of physiotherapists and evidence-based practice guidelines are being increasingly promoted to guide practitioners in their clinical decision making (Beattie, 2006). It is relevant to our profession to more deeply understand the nature of physiotherapy clinical decision making.

Cardiorespiratory physiotherapists in acute care settings make decisions in clinical situations where patients can be critically ill and decisions can result in adverse outcomes. A search of the literature (using the search terms clinical reasoning and clinical decision making and physiotherapy and physical therapy and including related terms) revealed limited research of cardiorespiratory physiotherapy decision making. Case et al (2000) identified differences in the organisation of knowledge between novices and experts using paper-based cases but little further literature in the field of cardiorespiratory decision making exists. Much of the clinical reasoning research has been undertaken in fields such as musculoskeletal and neurological physiotherapy practice. There are considerable differences in the nature of presenting conditions and the contexts of practice between acute care cardiorespiratory physiotherapy and other



fields of physiotherapy practice. It is unclear if the existing research is relevant and applicable to cardiorespiratory physiotherapy.

In recent literature the reasoning process used to make physiotherapy decisions has been portrayed as a dynamic and inter-related sequence of activities, involving collaboration with patients, which consists of gathering and interpreting data, exploring alternatives or hypotheses for diagnosis and management, and making choices for action with subsequent re-evaluation (Jones et al., 2000). Research investigating physiotherapists' clinical reasoning processes indicates that they use the cognitive processes of hypothetico-deductive reasoning and pattern recognition to make decisions about patient diagnosis (Edwards et al., 2004; Payton, 1985; Plummer et al., 2006; Rivett and Higgs, 1997). Jones et al (2000) also suggest that a process of generating and testing hypotheses is used to make decisions about patient management.

However, clinical decision making is being increasingly understood as involving more complex reasoning than encompassed by hypothetico-deductive reasoning or pattern recognition. With ongoing research it is becoming apparent that clinical decision making is a complex and contextual phenomenon requiring task-specific strategies and ways of thinking (Thornquist, 2001; Edwards et al., 2004). It also appears to involve a collection of dynamic reasoning processes rather than a single process of making a fixed choice between a limited number of alternatives. Physiotherapy research indicates that physiotherapy reasoning has broad and multi-dimensional foci of thinking that extend beyond a simple view of clinical decision making as determining diagnoses of physical impairment and choosing interventions (Edwards et al., 2004; Smart and Doody, 2003).

This brief literature review reveals a developing understanding of physiotherapy clinical decision making and reasoning processes. However, the complex nature of physiotherapy decision making warrants further investigation to more fully understand its nature. The critical nature of decision making and the absence of specific research in cardiorespiratory physiotherapy support the need to specifically research this field of practice. The findings reported in this paper relate to the types of decisions cardiorespiratory physiotherapists make and the processes they use to make these decisions.

## **Method**

Qualitative research methods are most appropriate to investigate a complex human activity like decision making as it occurs in the real and consequence-laden contexts of clinical practice. Philosophical hermeneutics based on the work of Gadamer (1992) was used as the guiding method for this research. Originally used in the interpretation of biblical texts hermeneutics but has been extended to research investigating of human action (see Ajjawi et al 2007; Barnitt and Partridge, 1997; Thornquist 2001a for examples from physiotherapy). The method of philosophical hermeneutics provided a method of engaging participants in bringing to awareness, describing and interpreting a particular aspect of their clinical practice (decision making) and making this accessible to the interpretation by the researchers. Other qualitative research strategies such as ethnography, which might focus on understanding and portraying a broader concept like culture of a workplace, or hermeneutic phenomenology, focussing on understanding lived experience of being a cardiorespiratory physiotherapist, were considered less

suiting for this purpose. Hermeneutics involves the construction of texts (in this study, the interview and observation records) and the interpretation of these texts in order to produce a deeper understanding or interpretation of a human phenomenon (in this study, decision making in acute care cardiorespiratory physiotherapy).

Purposive sampling was used to recruit fourteen physiotherapists working in acute care cardiorespiratory physiotherapy practice in three metropolitan Australian hospitals to the study. Participants were recruited who were typical of physiotherapy practitioners making clinical decisions in cardiorespiratory physiotherapy clinical practice and included participants with a range of clinical experience. Participants were included if they were engaged in the practice of cardiorespiratory physiotherapy for more than 24 hours a week and had more than 4 weeks clinical experience in cardiorespiratory physiotherapy practice. Stratified purposive sampling was used to ensure that representatives from the range of clinical experience and areas of cardiorespiratory practice were included. The final participants had between 4 months and 12 years experience of physiotherapy practice. Three categories of experience (novice, intermediate and experienced) were identified (see Table 1 for participant details). Recruitment of participants and intensive engagement with them during text development (interview and observation) phase continued until saturation was considered to have occurred in relation to the research questions, that is, no further new findings were identified.

Insert Table 1 approximately here

The hermeneutic texts were constructed by the first author using observation and semi-structured in-depth interviews. Observation of clinical practice involved “shadowing” participants as they conducted all aspects of their clinical practice. Each participant was observed on two separate days for between five and eight hours undertaking their normal patient care activities. Comprehensive field-notes were taken during the period of observation with attention given to recording the words and actions of the participants as they occurred. These field-notes texts were also subject to interpretation. Following the period of observation participants were asked to confirm that activities that were typical of their clinical practice had been observed. Although video-taping may have allowed recording of the breadth and reality of the clinical situation the researchers were concerned that it may have adversely affected the authenticity of the findings. It is likely participants and patients would have been unfamiliar with video-taping occurring in the setting of a hospital and they may have acted significantly differently from their usual behaviour. Practitioners were considered to be more familiar with being “shadowed” by another practitioner (for example students or colleagues).

Semi-structured interviews were conducted to access practitioners’ descriptions and understanding of their clinical decision making processes and actions. Short interviews (10-15 minutes) were conducted following observation of an episode of patient care and participants were asked to describe their thought processes and factors they had considered in their decision making. A longer interview (45-60 minutes) was also conducted at a time convenient to the participant on each day, after a significant period of observation had been undertaken. An interview guide was used to structure the longer interviews. Participants were asked to describe stories and memorable incidents

recalled from their experience that involved decision making. Probing questions were used to collect in-depth data from the participants and to explore the texts created during the observations sessions. All longer interviews were audio-taped and then transcribed verbatim producing an interview transcript that was used for hermeneutic analysis. All the individual texts were entered into the data management software QSR NVIVO 2.0 to facilitate interpretation of individual texts as well as the entire text set.

The interpretation of the texts was guided by the principles of hermeneutics and was principally conducted by the first author. At the beginning of the study the pre-understandings and beliefs of the researchers about the phenomenon of cardiorespiratory decision making were determined. The concept of the hermeneutic circle was used to guide the text interpretation process and develop a deep understanding of the texts. This involved a cyclic process of reading, questioning and interpreting each participant's texts and the whole text set (i.e. interview transcripts and field-notes for all fourteen participants). With repeated returning to the texts an increased understanding and a more complete interpretation of decision making was developed. The process followed for interpreting the texts is shown in Figure 1. The process of interpretation also involved discussion between the researchers in which the emerging understanding by the first author was critiqued and developed further. The interpretation resulted in an understanding by the researchers of the characteristic approaches practitioners were using in their decision making and the range of factors that were informing and affecting their decision making. The aim throughout the text interpretation phase was to shift the researchers pre-understanding of decision making to a new understanding of decision making as revealed by the texts.

Numerous strategies were used throughout the research to ensure the authenticity of the texts and the credibility of the findings. Hermeneutics involves researchers acknowledging, suspending and reconnecting with pre-existing beliefs about the phenomenon they are researching throughout the research process (Moss, 2005; Warnke, 1994). In this study of decision making all researchers involved had practised as cardiorespiratory physiotherapists and had taught decision making in their academic careers. As noted the researchers reflected upon and made explicit their pre-existing beliefs about the nature of cardiorespiratory decision making and implemented reflexive strategies throughout the research process to ensure that the decision making of those being studied was the clear focus of this study. Trustworthiness of the findings of this study was ensured by collecting data while practitioners were engaged in their everyday work. Multiple sources of texts (triangulation) were used to ensure a more complete, critical understanding of the phenomenon. Authenticity was also ensured by returning preliminary text interpretations to the participants prior to the second day of observation and interview. This allowed participants to comment on the extent to which the texts and the preliminary interpretation made by the researcher was representative of their decision making. Throughout the study procedural and analytical logs were kept to document reflections and decision making in the research. This study was conducted with approval from the Human Research Ethics committee of The University of Sydney and the ethics committees of all hospitals where data were collected.

## **Results**

The cardiorespiratory physiotherapists in this study made decisions to determine optimal, effective and justifiable courses of action. Across all levels of experience clinical decision making was found to be a complex, cyclic process where decisions and actions were intertwined, building on and informing each other in an evolving process specific to each patient's care. Decision making was also found to be a contextual process requiring integration of factors surrounding the decision.

The findings subsequently reported focus on the features of cardiorespiratory decision making that were common across all levels of experience. Differences in decision making with experience were found and included: more experienced practitioners adopted approaches to decision making that were more specific, creative and refined towards the individual needs of patients and more reflective of practitioners' individual experience and ways of practice. More experienced practitioners aimed to make decisions that were optimal given the circumstances rather than seeking a single right choice. They were more confident in their decision making and handled uncertainty in decision making more effectively by adopting a practical certainty, being better able to engage in making decisions that balanced risk versus benefit.

### **Characteristics of cardiorespiratory physiotherapy decisions**

The clinical decisions made by the participants in this study focussed on identifying patient's problems, making concurrent and inter-related decisions about interaction and intervention and making evaluative decisions. Decisions had a range of attributes that influenced the practitioners' clinical decision making processes (Table 2). These attributes referred to the circumstances surrounding the decision and how the

practitioner making the decision interpreted the situation given their previous experience. The summation and interplay between these attributes contributed to decision making difficulty and complexity.

Insert Table 2 approximately here

### **The processes of decision making**

The process of making decisions used by the participants varied according to the focus of the decision (problems, intervention, interaction and evaluation) and the decision characteristics. Clinical decision making was noted to vary from conscious deliberation through to rapid less conscious processes according to the perceived difficulty of the decision.

#### Clinical decision making about patients' problems

Identifying patients' problems involved a cyclical, flexible, evolving, and cascading process, where practitioners' described how emerging ideas were repeatedly compared and interpreted against patient findings and their own knowledge base. Clinical decision making about problems was described as a process of constructing a picture or mental representation of patients' problems.

*You're just clearly focused on the factors directly around the patient. ... I like to get a really clear **picture**, ... just really clearly understand what's happening to the patient, and what I'd like to do with the patient (Isabella).*

The process of identifying problems involved determining if the characteristics of the patient's problems 'fit', that is, the practitioners were able to recognise typical



presentations of patients and their problems. Where there was no fit this was a stimulus to collect and interpret additional patient data.

*It also depends on the situation, but you know roughly when someone by this time, who is at this stage in their post-operative course or in the clinical course of their disease, this fits or doesn't fit... Some things go more on a gut feeling, particularly when things don't match up. You will see someone and they just don't look right. They don't look like they should look at that particular time, knowing the information that you know. In terms of treatment I... would then confirm that with a thorough assessment. But you will have a gut feeling about where they should be, better than they should be, worse than they should be or has something been missed (Eleanor).*

The outcomes of this process for the participants were decisions about patients' problems on a continuum from a clearly identified problem list to sufficient understanding to proceed to intervention. The participants conveyed an acceptance that a clearer understanding of the patient's problems may evolve over a number of episodes of care as further relevant information emerged. In such circumstances the response to intervention was often used in an effort to improve the understanding of the patient's problems.

*Things change over time and sometimes it needs to be played out. Often on the first or second day, or during your treatment you won't know all the answers, you will be making your best guesses, and you have to think on your feet and change what you do on your feet, according to how the story evolves (Eleanor)*

#### Clinical decision making about intervention

Making clinical decisions about intervention involved complex flexible and adaptive processes that involved generating and assessing options for intervention, identifying and assessing barriers and limitations to intervention and practitioners establishing their confidence in being able to provide optimal interventions. Key questions that guided decision making about intervention are shown in Figure 2.

Insert Figure 2 approximately here.

Factors that influenced the range of intervention options that practitioners considered included their personal preference for and experience with different interventions, local practices (such as protocols), patient preferences, research evidence, opinions of other health professionals and the availability and location of equipment and resources.

The nature of the process of decision making varied according to the difficulty of the decision. When decisions were considered to be simple (for example there was little uncertainty, the outcomes were easy to predict and there were limited factors involved) participants described choosing preferred or usual options and constructing interventions that were more ideal to patients' needs. Where there were few changes in a patient's condition or where there was less certainty about a new direction for intervention, previous interventions might be repeated with limited new or original decision making. When the participants perceived the decision to be of greater difficulty, clinical decision making involved greater deliberation where risks were balanced against benefits and practitioner confidence was tested. Participants described choosing interventions where there was increasing use of experimentation and risk taking, progressive modification of interventions or avoiding of risk, with the outcomes of intervention used to determine the suitability of the chosen action. As the perceived difficulty increased there was increasing sharing of clinical decision making with other health-care professionals such as physiotherapy colleagues, nursing and medical staff. Table 3 illustrates this variability in processes used with examples from the texts.

Insert Table 3 approximately here.

Clinical decision making about interaction

Clinical decision making about interaction was found to occur concurrently with clinical decision making about intervention. Early in the clinical decision making process

participants made judgements about a patients' capacity to interact and actively engage in physiotherapy intervention. A key element of making judgements about patients' capacity to interact was an assessment of their cognitive state.

Decisions were made about using interaction within interventions (e.g. collaborating with patients in decision making, asking questions), using interaction as an intervention (for example teaching and guiding patients), and establishing therapeutic relationships through interaction (e.g. building rapport). Clinical decision making about interaction also involved interaction with other health professionals and patients' significant others.

#### Clinical decision making about evaluation

The final focus of clinical decision making was making specific evaluative decisions about the effects and outcomes of physiotherapy intervention. Throughout all aspects of an episode of care the practitioners made decisions that were subject to revision, be it a revised understanding of a patient's clinical problems, a revision of strategies to achieve an optimal intervention, or to incorporate changes in patients' condition or medical care.

*I'm aware that you assess, you treat, you reassess. But as you're going through the treatment there are things in assessment you do like: How does that feel as I do that shake? Is there something in palpation? Can I feel secretions moving? How does that huff sound as they try and do that? Are they getting the volume right in terms of modifying treatment as you go? Sometimes those cues that you're picking up about the sound and the feel of their clearance, and maybe also trying to tune the patient into that as well if they're a CF patient.... I'm getting used to listening to their huff and feeling how it's rumbling and thinking about was that huff volume right, is it right there, do I need to go do another cycle first? Trying to teach them how to give themselves feedback, and pick up on the day to day changes. In terms of that ongoing assessment, for example, is sputum still the biggest problem, or actually is that becoming less of a problem and do I need to move to the other problem now, which may be more shortness of breath on exertion. So, how am I structuring my treatment as I go?  
(Emma)*

Clinical decision making was also found to involve meta-cognition involving ongoing review by practitioners of the quality of the clinical decision making process itself. In this reflexive way, evaluation of individual experiences contributed to the deepening understanding of cardiorespiratory physiotherapy practice that guided their subsequent practice.

## **Discussion**

The findings of this study indicate that decision making in acute care cardiorespiratory physiotherapy involves a range of reasoning processes that vary according to the decision task and the difficulty and complexity of the decision. This interpretation is consistent with the growing understanding that physiotherapy clinical decision making involves a complex set of reasoning processes or ways of thinking that are relevant to the field of practice and the task being undertaken (e.g. (Edwards et al., 2004; Higgs and Jones, 2000)).

This study identified that cardiorespiratory physiotherapists use processes of decision making consistent with hypothetico-deductive reasoning and pattern recognition. That is, they consider options and test these and also recognise typical patterns of presentation and response. However, the findings of this study suggest that that these well-established processes of deliberation and recognition are embedded within more complex processes that underpin decision making. Restricting the understanding of decision making to hypothetico-deductive reasoning and pattern recognition poorly represents the nature of decision making as used in the real world of cardiorespiratory physiotherapy practice.

This study supports the role of collaboration with others as an integral element of decision making. The use of collaboration with the patient was a focus of decision making itself and was dependent upon the patient's capacity to interact rather than a fixed aspect of all clinical decision making and reasoning. This is consistent with findings described by Beeston & Simons (1996) in neurological physiotherapy.

Decision making in acute care settings is a social and collaborative process involving the integration of information and advice from other health professionals. This is consistent with the findings of Jette et al (2003) who found the same consultative processes were used in physiotherapists' decision making about discharge. This use of others served an important function (particularly for less experienced practitioners) in allowing them to work well and safely within their professional boundaries. However, such action means that physiotherapists need to be able to critique the information they are being provided with, develop skills of self-reflection and be able to develop and refine their independent reasoning processes.

Accountable and justified cardiorespiratory physiotherapy decision making needs to be supported by the identification and application of rigorous research. This research has revealed that decision making in cardiorespiratory physiotherapy involves decision-action cycles with an evolving understanding of the patient's problems and a search for an optimal intervention as opposed to a process of making a single right choice between fixed alternatives. The findings indicate that decision making in practice is a complex, unique, patient-focused and creative process that is adjusted according to patients' needs into which research findings need to be integrated. The application of research findings

may occur against parallel and at times competing influences on decision making. The promotion of quality decision making in clinical practice and education may require explicit discussion of strategies for choosing and applying optimal research-based interventions or clinical practice guidelines within the context of this understanding of decision making. Although there was strong recognition of the potential adverse effects of cardiorespiratory physiotherapy, interestingly explicit consideration of medico-legal issues did not emerge as a factor that was considered in decision making. This may reflect a perception of relatively low risk of litigation directed towards physiotherapists in Australian public hospitals.

These research findings report on a qualitative study of a select group of cardiorespiratory physiotherapy practitioners. The sampling process aimed to recruit participants engaged in practice that was typical of contemporary cardiorespiratory physiotherapy practice, however, the nature of the research method implies that readers should determine if the results are relevant and transferable to their own clinical practice rather than generalising these findings to all cardiorespiratory physiotherapy practice. This study is limited to the practice of adult cardiorespiratory physiotherapy in acute care settings and may not be applicable to cardiorespiratory practice in rehabilitation settings, rural practice or in paediatrics. Further research in other settings and areas of cardiorespiratory physiotherapy practice would be appropriate to investigate the robustness of the findings.

### **Implications**

The deeper understanding of decision making reported here might contribute to methods educators use to optimally prepare beginning practitioners for decision making in

cardiorespiratory physiotherapy practice. These findings may also have implications more broadly to other areas of physiotherapy practice. It is apparent that students and also new graduates require a broader range of complex clinical reasoning skills and decision making than previously understood. The incorporation of methods to guide decision making such as clinical practice guidelines may be enhanced through a greater understanding of processes practitioners are using in clinical practice. As a result of this research further study could now be undertaken to more deeply understand the complex nature of cardiorespiratory physiotherapy reasoning and the applicability of the findings to educational practice.

## **References**

- Beattie P, Nelson R. Clinical prediction rules: What are they and what do they tell us? *Australian Journal of Physiotherapy* 2006; 52: 157-163.
- Beeston S, Simons H. Physiotherapy practice: practitioners' perspectives. *Physiotherapy Theory and Practice* 1996; 12: 231-242.
- Case K, Harrison K, Roskell C. Differences in the clinical reasoning process of expert and novice cardiorespiratory physiotherapists. *Physiotherapy* 2000; 86:14-21.
- Edwards I, Jones M, Carr J, Braunack-Mayer A, Jensen G. Clinical reasoning strategies in physical therapy. *Physical Therapy* 2004; 84: 312-335.
- Hastie R. Problems for judgement and decision making. *Annual Reviews of psychology* 2001; 52: 653-683.
- Higgs J, Jones M. Clinical reasoning in the health professions. In Higgs J, Jones M (eds.) *Clinical reasoning in the health professions*. 2nd ed. Oxford: Butterworth-Heinemann, 2000; 3-14

- Jette D, Grover L, Keck C. A qualitative study of clinical decision making in recommending discharge placement from the acute care setting. *Physical Therapy* 2003; 83: 224-236.
- Jones M, Jensen G, Edwards I. Clinical reasoning in physiotherapy. In Higgs J, Jones M (eds.) *Clinical reasoning in the health professions*. 2nd ed. Oxford: Butterworth-Heinemann, 2000; 115-127
- Lewis ML. Decision making task complexity: model development and initial testing. *Journal of Nursing Education* 1997; 36: 114-120.
- May BJ. On decision making. *Physical Therapy* 1996; 76: 1232-1241.
- Moss PA. Understanding the other/understanding ourselves: toward a constructive dialogue about "principles" in educational research. *Educational Theory* 2005; 55: 263-283.
- Payton OD. Clinical reasoning process in physical therapy. *Physical Therapy* 1985; 65: 924-928.
- Plummer P, Morris M, Hurworth R, Dunai J. Physiotherapy assessment of unilateral neglect : insight into procedures and clinical reasoning. *Physiotherapy* 2006; 92: 103-109.
- Rivett D, Higgs J. Hypothesis generation in the clinical reasoning behaviour of manual therapists. *Journal of Physical Therapy Education* 1997; 11: 40-45.
- Schön DA. From technical rationality to reflection-in-action. In Dowie J, Elstein A (eds.) *Professional judgement: a reader in clinical decision making*. Cambridge: Cambridge University Press, 1988; 60-77
- Thornquist E. Diagnostics in physiotherapy - processes, patterns and perspectives. Part II. *Advances in Physiotherapy* 2001; 3: 151-162.



Warnke G Justice and interpretation. MIT Press: Cambridge, 1994.

Table 1: Summary of participant characteristics

<b>Pseudonym</b>	<b>Duration of experience</b>	<b>Area of cardiorespiratory practice</b>	<b>Duration of cardiorespiratory physiotherapy experience</b>
<b>Novice: &lt; 2 years experience, Cardiorespiratory physiotherapy for &gt;4 weeks, rotating position</b>			
Natalie	18 months	Abdominal surgery	15 months
Natasha	20 months	Cardiothoracic surgery	6 months
Nicole	15 months	Intensive Care Unit	8 months
Naomi	19 months	Intensive Care Unit	10 months
Nadine	4 months	Intensive care, post-surgery	4 weeks
<b>Intermediate: 3.5-5 years physiotherapy experience, 2.5-4 years Cardiorespiratory physiotherapy, non-rotating position</b>			
Isabella	4 years	Intensive Care Unit	3 years
Ingrid	5 years	Coronary care, cardiovascular conditions	4 years
Irene	3.5 years	Intensive Care Unit	2.5 years
<b>Experienced: 8-12 years physiotherapy experience, 7-10.5 years Cardiorespiratory physiotherapy experience, non-rotating position</b>			
Emma	12 years	Respiratory medicine	10.5 years
Eve	9 years	Cardiothoracic surgery/intensive care	7 years
Erin	10 years	Respiratory, post-surgery, student supervision	7 years
Erica	10 years	Intensive care/respiratory, student supervision	8 years
Eleanor	10.5	Respiratory, post-surgery, organ transplant	8.5 years
Elle	8.5 years	Post-surgery, post-trauma, intensive-care	7 years

Table 2: Attributes of acute care cardiorespiratory physiotherapy clinical decisions

Characteristic	Definition	Example from the texts
Uniqueness	The extent to which the features of this decision are unlike those of other decisions. For example, uniqueness in making decisions about problems relates to the unique features of this patient and his or her condition in this specific setting.	<i>I don't tend to walk into a patient and say – this is like [something] I have seen before. In different parts of my assessment I tend to think, this is what I have seen before, small things – like Mr XX who is short of breath and has pain after his PEG. These small parts of your assessment I have seen before. But the big picture of this patient, I don't tend to have, because they are all so very different (Elle).</i>
Clarity	The extent to which clear information and guidelines exist that allow the practitioner to adequately understand the patient's condition and to guide the course of action.	Yes, I think grey areas are areas that we don't have definite answers for. And be it because there is not enough clinical research to support some of the interventions that we do, and I also sometimes think that research itself doesn't always give you the answer, because with a lot of research projects they tend to have people of similar groups performing similar treatments. Quite often patients need individual assessment, individual treatments (Erica).
Importance/criticalness	The significance of the decision in relation to outcome and effects of negative consequences. Criticalness is used here to indicate the extent to which the outcome of the decision is of high importance with respect to outcome or where there is the high potential for a negative outcome.	<i>The patients were not as sick as they are here, so often the decision wasn't as critical. It felt like it was a lot easier to make (Natalie).</i>
Stability	The extent and rate at which the environment surrounding the decision is changing or evolving. For example, in an unstable decision environment the patient's medical condition is volatile such that new data are constantly being received and interpreted, requiring a dynamic decision making process.	<i>What's that patient likely to do within the next few hours? Are they likely to continue to deteriorate from sputum retention? Are they actually just fatigued at the moment? Do they need to rest, and if I come back in a bit of time will they clear (Emma)?</i>
Urgency	The extent to which an immediate decision needs to be made or whether it can be delayed.	<i>[It is] quite rare that you need to be there doing a treatment right there and then because it is absolutely, fundamentally necessary for that patient. It does happen when a patient is in acute respiratory failure and they have bucket loads of secretions and you need to suction them (Erica).</i>

Characteristic	Definition	Example from the texts
Familiarity	The extent to which the decision being made is similar to decisions made in the past.	I think sometimes unfamiliarity with what [visiting physiotherapists] are doing, perhaps they don't come up here [ICU] all the time. They come up and are perhaps trying to be very proactive, and try to do everything they can, and perhaps are not completely familiar with the technique; sometimes going ahead with the technique not realising the risks involved, not being familiar with all the contra-indications and precautions (Irene).
Congruence	The extent to which elements of the decision such as the inputs, goals, and environment of the decision fit, match and correspond with each other, as well as the extent to which therapists are able to achieve what they want to achieve.	<i>There is no ambiguity, it all makes sense, those straightforward patients – when everything fits (Eleanor)</i>
Number of variables	The amount of data that needs to be considered and interpreted in order to make a decision	<i>I think that impacts on clinical decisions a lot because in one patient there are so many different factors to take into account, and there's so much to learn in every patient (Isabella).</i>
Relevance of variables	The extent to which the data available contain information relevant to the decision being made, that needs to be sorted from irrelevant material.	If I was to assess a new patient I generally go to the ICU admission, rather than have to go through 20 pages, I make sure I read through the ICU admission note because that usually contains quite detailed and quite appropriate information about the patient. If they are a new patient, looking at haemodynamic trends whether they are on any inotropes, their ventilatory support, what their gases have been, the position they have been in recently, and quantities of sputum is, and obviously the monitor for their current parameters (Irene).
Risk	The estimation of the chance of an adverse outcome occurring as a result of the decision.	<i>Even if we were risking something with his pressures in his head, it is likely his lungs would become extremely unwell and potentially irreversible. So in the end, as with all decisions, it just became a matter of risk versus benefit (Natasha).</i>
Emotion/ethics	The emotional and personal value that the practitioner applied to the decision. This was typically linked to ethical aspects of the decision	<i>It is an easy decision if they are not for active treatment because you just don't go in there, but if they are not for escalation of treatment it poses an emotional challenge (Nicole).</i>



Table 3: Decision making processes in choosing an intervention

---

Choose a preferred option/construct an intervention for the individual	<p><i>I tend to just have a variety of treatment choices that I know I can use, and I pick out the most appropriate one ... you know you will change things if it's a patient with more multifactorial issues (Ingrid).</i></p> <p><i>Thinking about what is the best airway clearance technique for this person? Are they likely to benefit from postural drainage? Are they someone for who PEP is going to work well for? ...It's an ongoing process, it's an art in creation for that individual (Emma).</i></p>
Do what was done before	<p><i>I did usually follow what was done the day before, but having said that, I still looked at the parameters if there were any changes in condition that would need a change in treatment, but if a previous treatment was working and there was no particular changes in the patient as such then I usually did continue (Nadine).</i></p>
The balance between risk and benefit	<p><i>We did what we had to do, it sounds like something which you never... If you looked at it on paper, you'd think "I can't touch this person they're just so unwell". But I guess in reality it has to get done, and it was just a risk versus benefit situation. The patient's lungs were deteriorating so badly that we did sort of have to forget a little about the neurological side of things (Natasha).</i></p> <p><i>You just find down here that bit of fear about making them worse. Often you say I don't mind if they take a bit longer to get over this consolidation. I know that if I treated them more aggressively then it would help them clear it but in terms of their overall management, is it worth submitting them to that increased bit of risk? Then it does come down to pure fear I am no longer going to touch this person because the potential to do something, even though they could get worse without it. I am just not prepared to at this stage (Nicole).</i></p>
Share decision making	<p><i>If there was something that I was not sure about, then I just wouldn't do it – I would leave it until the next day when I could ask someone else, or that kind of thing, I would probably do it the next day, not do it there and then (Nadine).</i></p>

---

Figure 1: Steps in the process of text interpretation

**Step 1**

*Listening, reading and being immersed in each participant's texts*

**Step2**

*Making notes of key ideas, surprises and messages in their texts*

**Step 3**

*Collating messages for each individual, choosing labels to capture the meaning in the texts*

**Step 4**

*Categorising the labels into groups after finding commonalities in the texts*

**Step 5**

*Repeating the process for other participants*

**Step 6**

*Reading and interpreting texts as a whole with repeated return to the research questions and texts in a process of deepening understanding.*

Figure 2: Questions involved in generating intervention options

---

What are the cardiorespiratory physiotherapy treatment options?  
What am I expected to do?  
What am I being asked to do?  
What does the patient want to do?  
What is already being done?  
What is the best intervention?  
What are the practicalities involved in providing cardiorespiratory physiotherapy intervention for this patient?

---