Exploring the clinical decision-making used by experienced cardiorespiratory physiotherapists: A mixed method qualitative design of simulation, video recording and think aloud techniques

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A B S T R A C T

Background: The ability of physiotherapists to make clinical decisions is a vital component of being an autonomous practitioner, yet this complex phenomenon has been under-researched in cardiorespiratory physiotherapy. The purpose of this study was to explore clinical decision-making (CDM) by experienced physiotherapists in a scenario of a simulated patient experiencing acute deterioration of their respiratory function.
Objectives: The main objective of this observational study was to identify the actions, thoughts, and behaviours used by experienced cardiorespiratory physiotherapists in their clinical decision-making processes.
Design: A mixed-methods (qualitative) design employing observation and think-aloud, was adopted using a computerised manikin in a simulated environment.
Setting: The participants clinically assessed the manikin programmed with the same clinical signs, under standardised conditions in the clinical skills practice suite, which was set up as a ward environment.
Participants: Experienced cardiorespiratory physiotherapists, recruited from clinical practice within a 50-mile radius of the University(*).
Methods: Participants were video-recorded throughout the assessment and treatment and asked to verbalise their thought processes using the 'think-aloud' method. The recordings were transcribed verbatim and managed using a Framework approach.
Results: Eight cardiorespiratory physiotherapists participated (mean 7 years clinical experience, range 3.5–16 years. CDM was similar to the collaborative hypothetico-deductive model, five-rights nursing model, reasoning strategies, inductive reasoning and pattern recognition. However, the CDM demonstrated by the physiotherapists was complex, interactive and iterative. Information processing occurred continuously throughout the whole interaction with the patient, and the specific cognitive skills of recognition, matching, discriminating, relating, inferring, synthesising and prediction were identified as being used sequentially.
Conclusions: The findings from this study were used to develop a new conceptual model of clinical decision-making for cardiorespiratory physiotherapy. This conceptual model can be used to inform future educational strategies to prepare physiotherapists and nurses for working in acute respiratory care.

1. Introduction

Clinical decision-making, clinical judgment, problem solving or clinical reasoning are terms used interchangeably and are defined as "*the cognitive thought processes, or thinking used in the evaluation and management of a patient*" (Jones, 1992 p.876). Clinical decision-making (CDM) is seen as essential for being an autonomous practitioner, as it enables practitioners to take 'wise action', which means taking the best-judged action in a specific context (Cervero, 1988; Harris, 1993).

Clinicians often have to care for patients with multifaceted issues and consider patients with a variety of conflicting and complex factors and take the best course of action (Lasater, 2007). In the context of acute respiratory care such as surgical high dependency units, acute surgical and medical wards, clinical decisions often have to be made in unpredictable circumstances, with many competing factors, and CDM is subject to human error. For this reason, CDM is regarded as a highly complex skill that requires several years of clinical experience to master (Jensen et al., 1992), which can make it challenging to teach students with little or no prior clinical experience to transfer their theoretical knowledge into a practical application. If however, the complex processes can be broken down and smaller components identified by scrutinising good practice of experienced staff, then this information

can be used to facilitate the development of appropriate skills. Furthermore, if we can use teaching methods that facilitate the cognitive stages of the clinical decision making process, then potential errors in practice maybe reduced.

2. Background

Given the importance placed on clinical decision-making, it is perhaps unsurprising that interest has grown over the past four decades. CDM has been particularly well researched in the field of medicine, and it is from this discipline that the hypothetico-deductive model was proposed, based on studies of novice and expert doctors (Elstein et al., 1978). In this model, clinicians begin with a hypothesis about a patient that develops as the clinician questions and examines the patient. This questioning and examination is instrumental to the clinician confirming or disconfirming their original hypothesis. Further research into the differences between experts and novices and their organisation of knowledge; such as memory recall and mental representations, led to the concept of pattern-recognition (Groen and Patel, 1985; Boshuizen and Schmidt, 1992). This can also be referred to as inductive or direct automatic retrieval, which Patel and Groen, (1986a, 1986b) observed was characterised by speed and efficiency. Furthermore, illness scripts (Barrows and Feltovitch, 1987) were recognised in experts, these too are a form of pattern recognition, whereby knowledge and clinical experience have become encapsulated, further enhancing the speed and efficiency of decision-making. In contrast, novices, and some experts, when faced with a more complex problem, tend to use a deductive process (which is much slower than pattern recognition) to analyse information and form a hypothesis (Elstein et al., 1978; Arocha et al., 1993). Furthermore, Croskerry (2009) suggests that CDM is based on a 'dual process theory' in which system 1: is heuristic and intuitive, system 2: is systematic and analytical with experienced practitioners tending to favour system 1 and novices system 2.

At a broad level, similarities to the medical model (Elstein et al., 1978) have been shown to occur within physiotherapy and reasoning has been described as being primarily a diagnostic process (Payton, 1985). In contrast, the clinical decision making and clinical judgments in nursing, are most often influenced by what nurses bring to the situation rather than the objective data about the situation at hand (Tanner, 2006); decision making rests on knowing the patient and his or her typical pattern of responses, as well as an engagement with the patient and his or her concerns. Clinical judgments are influenced by the context in which the situation occurs and the culture of the nursing care unit (Tanner, 2006). However, there appears to be a compromise in physiotherapy as subsequent research within musculoskeletal and neurological physiotherapy (Jensen et al., 1992; Edwards et al., 2004) has identified that CDM involves more than making a diagnosis about the patient and the process is 'interactive and collaborative' with the patient (Jones et al., 2000). Despite the differences in the processes observed in these disciplines, there appears to be agreement that there are essential elements required for the clinical decision making process, these are: a strong underpinning of discipline-specific knowledge, context-specific cognitive skills, reflection on practice and metacognition, which provides the interaction between cognition and knowledge (Higgs and Jones, 2008).

To date, there have only been a few studies that have specifically explored the CDM in cardiorespiratory physiotherapy (Case et al., 2000; Roskell and Cross, 2001; Mishoe, 2003; Smith et al., 2007). Whilst these studies have given some valuable insight into the complex nature of the CDM process, none of these studies have identified the components of CDM commonly employed by cardiorespiratory physiotherapists, which would be particularly useful to educators and clinicians tasked with facilitating these skills. Furthermore, most of these studies did not use methods that allowed real time CDM to be captured and the data were gathered retrospectively. This dearth in the literature

highlighted the need for further research using methods that permit CDM to be recorded in action. This paper will describe how the clinical reasoning of experienced cardiorespiratory physiotherapists was explored and present a new conceptual model; discuss how this can be used educationally.

3. Objectives

The main objectives of this study were to identify the actions, behaviours and thought processes that constitute the CDM processes of cardiorespiratory physiotherapists as they undertake an assessment of a simulated patient, presenting with cardiorespiratory problems.

4. Methods

4.1. Study Design

As this study aimed to explore both participant actions and thoughts, a mixed methods study was appropriate, combing observation to capture actions and think-aloud practices to record physiotherapists' thought processes with a post intervention interview. Whilst mixed methods are usually associated with studies combing quantitative and qualitative methods, it is equally apt when describing studies that involve multiple qualitative methods (Cresswell, 2003). This study was undertaken using a pragmatic approach as the most suitable method for answering the research question (Patton, 2002; Snape and Spencer, 2003). A University Research Ethics Committee approved the study. All participants gave written informed consent before data collection began and debriefing following simulation was used to support and protect participants from harm.

4.2. Setting

Data were collected using a Human Patient Simulated (HPS) manikin (SimMan 3G Laerdal™) within a simulated surgical high dependency unit (HDU) at the University's clinical skills centre to replicate an acute clinical setting. Simulation was chosen over observing real life practice for two main reasons: Firstly, it enabled the scenario to remain consistent and controlled between participants, increasing the comparability of the CDM processes observed. Secondly, it meant that a controlled respiratory deterioration could be introduced without any risk to patients (Gaba, 2004, Lasater, 2007, Dreifuerst, 2009). Simulation is being used today in a variety of health care programmes to enhance clinical skills without danger of harming a patient and for this study, simulation enabled the CDM process of the participants to be the central focus of the study. The patient scenario was based on a real case study from clinical practice of a 54-year-old male, who had developed respiratory complications following an emergency laparotomy for abdominal pain two days earlier (see Appendix 1 for more detail). Psychological, and environmental fidelity (Norman et al., 2012) were considered carefully, the HDU was set-up like a four-bedded unit and appropriate supporting staff, data and equipment were used. A trained nurse acted as the HDU staff nurse to look after the HPS, for which an actor provided the patient voice. A doctor could be called to the unit if required by the physiotherapist. The nurse and patient actor followed a script to standardise the proceedings. Supporting data for this patient's care over the past two days in HDU was available at the bedside including notes, chest x-rays, charts and results of all tests and investigations.

4.3. Participants

Recruitment of participants was based on the inclusion criteria used by Smith et al. (2007) in their observational study of the factors influencing clinical decision-making in which 14 cardiorespiratory physiotherapists, working in acute respiratory care, were directly