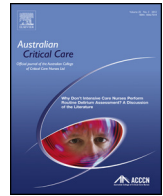


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## Expert clinical reasoning and pain assessment in mechanically ventilated patients: A descriptive study



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At the conclusion of this article a Continuing Professional Development activity is attached

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### ABSTRACT

**Background:** Pain assessment in mechanically ventilated patients is challenging, because nurses need to decode pain behaviour, interpret pain scores, and make appropriate decisions. This clinical reasoning process is inherent to advanced nursing practice, but is poorly understood. A better understanding of this process could contribute to improved pain assessment and management.

**Objective:** This study aimed to describe the indicators that influence expert nurses' clinical reasoning when assessing pain in critically ill nonverbal patients.

**Methods:** This descriptive observational study was conducted in the adult intensive care unit (ICU) of a tertiary referral hospital in Western Switzerland. A purposive sample of expert nurses, caring for non-verbal ventilated patients who received sedation and analgesia, were invited to participate in the study. Data were collected in "real life" using recorded think-aloud combined with direct non-participant observation and brief interviews. Data were analysed using deductive and inductive content analyses using a theoretical framework related to clinical reasoning and pain.

**Results:** Seven expert nurses with an average of 7.85 ( $\pm 3.1$ ) years of critical care experience participated in the study. The patients had respiratory distress ( $n=2$ ), cardiac arrest ( $n=2$ ), sub-arachnoid bleeding ( $n=1$ ), and multi-trauma ( $n=2$ ). A total of 1344 quotes in five categories were identified. Patients' physiological stability was the principal indicator for making decision in relation to pain management. Results also showed that it is a permanent challenge for nurses to discriminate situations requiring sedation from situations requiring analgesia. Expert nurses mainly used working knowledge and patterns to anticipate and prevent pain.

**Conclusions:** Patient's clinical condition is important for making decision about pain in critically ill non-verbal patients. The concept of pain cannot be assessed in isolation and its assessment should take the patient's clinical stability and sedation into account. Further research is warranted to confirm these results.

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### 1. Introduction

In intensive care, patients are at risk of experiencing pain due to the course of critical illness, diagnostic and therapeutic inter-

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ventions, hostile environment, equipment, and care.<sup>1–3</sup> Despite awareness internationally and at a smaller scale in the intensive care unit (ICU), pain remains under evaluated and undertreated, especially in intubated, ventilated and nonverbal patients.<sup>4,5</sup> Unrelieved pain can cause multiple physiological and psychological complications.<sup>6,7</sup> Pain requires systematic and accurate assessment for appropriate treatment.<sup>8</sup> The assessment of pain is particularly difficult when patients cannot communicate verbally because self-assessment, which is the gold standard, cannot be used. For this

nonverbal population, the use of observational pain rating scales is recommended, but pain scores should be interpreted within the patient's context.<sup>9,10</sup> This task requires specific advanced knowledge and skills to make appropriate judgement about pain,<sup>11</sup> as the decision to treat pain is influenced by many factors related to the critically ill patient, the ICU context, and the caregivers themselves. An interprofessional approach is required for appropriate pain management and all professionals need to serve as advocates for the person in pain. Critical care nurses play a major role in pain management, as they are constantly at the bedside monitoring the clinical status of the patient and performing comprehensive pain assessment.<sup>8</sup> In this context, critical care nurses' clinical reasoning becomes of foremost importance to initiate appropriate interventions and evaluate the effectiveness of those interventions.

## 2. Literature review

Clinical reasoning has been defined as “the cognitive processes and strategies that nurse use to understand the significance of patient data, to identify and diagnose actual or potential patient problems, to make clinical decisions to assist in problem resolution, and to achieve positive outcomes” (p. 236).<sup>12</sup> Clinical reasoning has been described by Aitken and colleagues<sup>13</sup> as “a highly complex iterative process” (p. 44). This concept is underpinned by theory and can be situated in two main paradigms: analytical and interpretative reasoning. The analytical approach is based on the assumption that rational analytical thinking precedes action. It is a systematic sequential logical process, used until a decision is made.<sup>14</sup> In contrast, the interpretative approach presumes that understanding relies no longer on analytical reasoning but on intuitive judgement to make appropriate action.<sup>15</sup> These two approaches have traditionally been viewed as two distinct types of reasoning, but since the late 1990s, a novel approach has viewed clinical reasoning as a cognitive continuum, on which reasoning moves between cognitive analysis and intuition as anchors.<sup>16</sup> It also appears that clinical reasoning is affected by nurse- and patient-related factors as well as contextual factors (e.g. culture, leadership, responsibility).<sup>17</sup> Understanding how nurses process information to make appropriate decisions in relation to patient's care is important to improve the quality as well as to inform nurses' education and training.

Studies on nurses' clinical reasoning in the context of critical care are limited. Clinical reasoning has been investigated in the context of education using simulated situations<sup>18,19</sup> and real-life care critical care situations related to (a) haemodynamic decision-making in patients following cardiac surgery,<sup>20,21</sup> (b) pressure ulcers nursing management,<sup>22</sup> (c) extubation<sup>17</sup> and (d) management of sedation in critical care patients.<sup>13</sup> To the best of our knowledge, there are no studies that specifically addressed clinical reasoning in relation to pain assessment and management. However, how critical care nurses assess pain and use their knowledge to make decisions remains unclear. Better understanding of the complex interplay between the patient in pain and the clinician decoding and managing the pain experienced would assist in the development of comprehensive recommendations for practice that goes beyond the implementation of pain measures and pharmacological guidelines. This descriptive observational study aimed to describe the indicators that influence expert nurse's clinical reasoning when assessing pain in ventilated patients, who received sedation and analgesia.

## 3. Materials and methods

### 3.1. Design and sample

The study took place in a 36-bed medical-surgical ICU of a tertiary referral hospital in Western Switzerland. Following ethics

approval, a purposive sample of seven expert nurses were invited to participate in the study, if they had postgraduate qualification in critical care or anaesthesia, more than 5 years of critical care experience, considered themselves as expert in the field or being recognised as such by their peers, were employed at a minimum of 0.6 full time equivalent (FTE) and spoke fluent French. As saturation was achieved with seven participants, no more nurses were recruited.

### 3.2. Data collection

For data collection, expert nurse participants who provided written consent had to care for ventilated patients who received analgesia and sedation, excluding those requiring minimal handling or who were in end of life situations. Due to the observational nature with no change in clinical management of the patient, the need for patients' written consent was waived by the human research ethics committee. Data collection started at the beginning of the morning shift and occurred in “real-life” for up to 4 h. Three methods of data collection were used, including recorded think-aloud, direct non-participant observation and brief (no more than 20 min) interviews.<sup>13,23</sup> The think-aloud method enabled the collection of data pertaining to the reasoning process.<sup>23,24</sup> Prior to data collection, the participants were trained in mock situations to get accustomed with the think-aloud technique. They were instructed to give a concurrent account of their thoughts and focus on the task without interpretation or explanation. This allowed determining the participant's ability to get accustomed with the technique and care safely for the patient. The verbal report was recorded via a collar clipped microphone attached to a digital recorder (Olympus® DS-5000). The researcher, as a non-participant observer, took notes on context-specific information. A 15-min brief interview was conducted at the end of the recording to clarify observed information and missing verbal report (e.g. analgesia was given with non verbal report). Think-aloud data were completed with the related notes and the interviews and transcribed verbatim without delay.<sup>25</sup>

### 3.3. Data analyses

Data were analysed by one of the trained nurse researchers (AG) using deductive completed with inductive content data analyses as described in Fig. 1.<sup>26</sup> Deductive data analyses were guided by the study framework developed from an expert clinical reasoning model<sup>27</sup> and completed with elements of the social communication model of pain to put clinical reasoning into the context of pain assessment and management (see Fig. 2).<sup>28</sup> Based on the study framework, a coding matrix was developed and included four categories and 10 sub-categories; this coding matrix was revised after 20% of the material.<sup>29</sup> During this revision phase, one category and nine subcategories emerged inductively. The final coding matrix used for data analyses included five categories and 19 sub-categories. The coding matrix served as a guide to identify and code indicators. The transcripts have been analysed and coded in an Excel file by two independent coders, who performed formative reliability checks. Frequencies of the results were tabulated as a final step. Descriptive statistics, using SPSS version 19, have been used to analyse demographic data of the nurse participants and the patients.

## 4. Results

Participants' demographic data and characteristics of the patients cared for by the participants. Seven expert nurses participated in the study. The majority (87.7%) were female nurses with considerable experience in nursing and intensive care. Out of the

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