Intuition and Clinical Decision-Making in Healthcare: What Do We Know?

Charmaine Farrugia Camilleri

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Abstract

This dissertation explores the complex relationship between intuitive and analytical decision-making in acute healthcare settings. Through a comprehensive scoping review, this study seeks to clarify the role of intuition in decision-making, identify influencing factors, and examine its interaction with evidence-based practices.

This study addresses three primary research questions focused on the role of intuition in clinical decision-making, the factors influencing its utilisation among healthcare professionals, and its interplay with evidence-based practice. Utilising Cochrane's framework and the PRISMA-ScR guidelines, a structured, systematic exploration of the literature was conducted, focusing on intuitive decision-making models and their cognitive underpinnings.

The search strategy was conducted using databases like PubMed, EBSCOhost, SCOPUS, and Web of Science, while studies were critically appraised via the Joanna Briggs Institute tools. The review primarily included qualitative and quantitative studies published over the past two decades that investigated the use of intuition during decision-making in acute healthcare settings. In all, 28 studies were identified and analysed.

The thematic analysis results highlight that intuition is an invaluable tool for healthcare providers. It enhances decision-making when swift judgements are required, particularly in specialities like emergency departments and intensive care units. The reviewed studies illustrate that intuition often stems from pattern recognition and experiential learning, emphasising its reliance on professional expertise.

However, the findings also underscore the variability in defining and applying intuition across different studies, pointing to a lack of a standardised framework. This variability poses challenges in comparing results, highlighting the need for further research to establish consistent metrics for measuring intuition in clinical contexts.

This review also demonstrates that intuition can provide rapid insights but is most effective when integrated with evidence-based practices. This synthesis facilitates a comprehensive approach to patient care, balancing empirical rigour with experiential knowledge.

This dissertation concludes that fostering a culture that values intuition and analytical thinking can optimise clinical outcomes, emphasising the necessity for continued exploration of the cognitive processes underlying intuitive decision-making within healthcare environments.

Keywords: intuition, clinical decision-making, decision-making, evidence-based practice, acute healthcare

Table of Contents

Acknowledgements ..... *ii*

Abstract ..... *iii*

Table of Contents ..... *v*

List of Tables ..... *xviii*

List of Figures ..... *xiix*

Abbreviations ..... *xiix*

Chapter 1 Introduction *2*

1.2 Research Objectives **3**

1.3 Methodological Approach **4**

1.4 Significance of the Study **5**

1.5 Conclusion **5**

Chapter 2 Literature Review *8*

2.1 Decision-making models *9*

2.1.1 The Rational Decision-Making Model **10**

2.1.2 The Dual-Process Theory **12**

2.1.3 The Naturalistic Decision-Making Model **14**

2.2 Clinical decision-making *15*

2.2.1 Hypo-deductive decision-making **17**

2.2.2 Descriptive decision-making **19**

2.2.3 Conclusion for Clinical Decision-Making **23**

2.3 The historical perspective of intuition ***24***

2.4 Defining Intuition ***27***

2.5 Main Characteristics of Intuition ***31***

2.6 Intuition and clinical decision-making ***36***

2.7 Intuition or Evidence-Based Decision-Making? ***43***

2.8 Conclusion ***45***

Chapter 3 Methodology ***49***

3.1 Exploring Intuition in Clinical Decision-making ***49***

3.2 Defining the population, interventions, outcomes, and time frame ***50***

3.3 Selecting relevant sources ***51***

3.3.1 Identifying Keywords **51**

3.3.2 Search Operators and Tools **51**

3.3.3 The Search Strategy **52**

3.4 Synthesising the results ***55***

3.4.1 Data Charting **55**

3.4.2 Critical Appraisal Tool **56**

3.4.3 Classifying the Results **56**

3.5 Challenges and Limitations ***57***

3.6 Conclusion ***58***

Chapter 4 Results ***61***

4.1 Descriptive summary *61*

4.2 Thematic Analysis *65*

4.2.1 RQ1. What is currently known about the role of intuition in clinical decision-making within acute healthcare settings? **68**

4.2.1.1 Types of Intuition 68

4.2.1.2 Integration with Rational Processes 68

4.2.1.3 Development with Knowledge, Experience, and Pattern Recognition 69

4.2.1.5 Defining Intuition 70

4.2.1.6 The Limitations of Intuition 70

4.2.2 RQ2. What factors influence the development and utilisation of intuition among healthcare professionals in acute care? **71**

4.2.2.1 The Influence of Knowledge and Experience 71

4.2.2.2 Contextual and Organisational Factors 71

4.2.2.3 Confidence and Autonomy in Applying Intuition 72

4.2.2.4 The Emotional and Cognitive Aspects of Intuition 73

4.2.2 RQ3. Is there an interaction between intuition and evidence-based practice in clinical decision-making? **73**

4.2.3.1Relationship with Clinical Competence 73

4.2.3.2 Decision-making Ability in Complex Cases 74

4.2.3.3 Integration with Analytic Systemic Methods 74

4.2.3.4 The Impact on Clinical Decisions and Patient Outcomes 75

4.2.3.5 Value in Specific Specialities 75

4.3 Conclusion *76*

Chapter 5 Discussion *78*

5.1 RQ1: What is currently known about the role of intuition in clinical decision-making within acute healthcare settings? *78*

5.1.1 Types of Intuition **78**

5.1.2 Integration with Rational Processes **80**

5.1.3 Development with Knowledge, Experience, and Pattern Recognition **81**

5.1.4 Benefits in Diagnosis and Complex Presentations **82**

5.1.5 Defining Intuition **84**

5.1.6 The Limitations of Intuition **86**

5.2 RQ2: What factors influence the development and utilisation of intuition among healthcare professionals in acute care? *87*

5.2.1 The Influence of Knowledge and Experience **87**

5.2.2 Contextual and Organisational Factors **89**

5.2.3 Confidence and Autonomy in Applying Intuition **91**

5.2.4 The Emotional and Cognitive Aspects of Intuition **93**

5.3 RQ3: Is there an interaction between intuition and evidence-based practice in clinical decision-making? *94*

5.3.1 Relationship with Clinical Competence **94**

5.3.2 Decision-Making Ability in Complex Cases **96**

5.3.3 Integration with Analytic Systemic Methods **98**

5.3.4 The Impact on Clinical Decisions and Patient Outcomes **100**

5.3.5 Value in Specific Specialities **102**

5.4 Limitations.....104

5.5 Conclusion.....106

Chapter 6 Conclusion.....110

6.1 Overview of the Study.....110

6.2 Findings of the Study.....111

6.3 Limitations and Recommendations for Future Research.....113

6.4 Funding.....114~~113~~

References.....116~~115~~

Appendices.....131~~130~~

Appendix 1.....132~~131~~

Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist.....133~~132~~

Appendix 2.....135~~134~~

List of Tables

TABLE 1 ***DEFINING INTUITION*** **28**

TABLE 2 ***LIST OF INCLUSION AND EXCLUSION CRITERIA*** ..... **53~~53~~**

TABLE 3 ***LIST OF DATABASES USED AND THE JUSTIFICATION*** ..... **54~~54~~**

TABLE 4 ***THE CHARACTERISTICS OF THE IDENTIFIED STUDIES*** ..... **64~~64~~**

TABLE 5 ***THEMATIC ANALYSIS TABLE*** ..... **66~~66~~**

List of Figures

FIGURE 1 ***PRISMA FLOW DIAGRAM*** ..... 62~~62~~

Abbreviations

JBI: Joanna Briggs Institute

MeSH: Medical Subject Headings

PRISMA ScR: Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews

RPD: Recognition-Primed Decisions

RQ: Research Question

Chapter 1 Introduction

Chapter 1 Introduction

This introductory chapter sets the stage for the study, positioning it within the broader field while highlighting the importance and relevance of the topic under investigation. It also provides a clear roadmap of the study's objectives and intended contributions to the existing body of knowledge. While a detailed methodology is presented in a separate chapter, an overview of the method employed is noted here as well. Additionally, this chapter discusses the significance and importance of this study, underscoring its potential impact and relevance.

1.1 Literature Background

Clinical decision-making is a fundamental component of healthcare practice, deeply influencing patient outcomes, safety, and the overall quality of care (Miller & Hill, 2018). Traditionally, decision-making in healthcare has been heavily reliant on evidence-based practices and clinical guidelines, which have gained significant traction over the years for their systematic and empirical approaches (Anderson et al., 2019). However, alongside these rational frameworks, healthcare professionals frequently draw upon their intuition – a process that is less understood and often undervalued, yet crucial for navigating the complex, dynamic environments typical of clinical settings.

Historically regarded as a mystical or enigmatic phenomenon, intuition has evolved into a recognised cognitive process characterised by unconscious knowledge, pattern recognition, and the rapid integration of complex information (Nalliah, 2016). As Cioffi (1997) noted, intuition's journey from mysticism to an acknowledged component of clinical cognition underscores its transformation through cultural, philosophical, and scientific lenses. Intuition has increasingly been recognised as a vital component of clinical decision-making, particularly

in situations characterised by uncertainty, complexity, and time constraints (Gosar & Solomon, 2019). Unlike the systematic, linear processing of evidence-based practices, intuition allows for rapid decision-making by synthesising past experiences and tacit knowledge (Chilcote, 2017). However, intuition involves an understanding that resides beneath conscious awareness and is often difficult to articulate.

This dissertation, titled *Intuition and Clinical Decision-Making in Healthcare: What Do We Know?* explores the intricate interplay between intuitive and analytical processes in healthcare decision-making. This study aims to clarify intuition's role in healthcare through a comprehensive scoping review, identify factors influencing its development and utilisation, and explore its interaction with evidence-based practices within acute healthcare settings.

The strength of this dissertation lies in its ability to bridge the gap between theoretical exploration and the practical application of intuition within acute healthcare settings. While evidence-based practice remains the backbone of clinical decision-making, there is an increasing appreciation and need for understanding how intuition can complement these practices, particularly in scenarios where empirical evidence is limited, ambiguous, or evolving.

1.2 Research Objectives

Acute healthcare environments, such as emergency departments, intensive care units, and trauma centres, are characterised by high-pressure situations and rapid changes in patient conditions, thus requiring quick, effective decision-making. It is, therefore, crucial to study intuition in clinical decision-making within acute healthcare settings.

The objectives of this study are threefold: first, to investigate and understand the role of intuition in clinical decision-making within acute healthcare settings; second, to explore the factors that influence the development and utilisation of intuition among healthcare professionals; and third, to examine the interaction between intuition and evidence-based practice in clinical decision-making.

Ultimately, the aim is to map the existing literature, delineate the body of knowledge surrounding intuition in clinical decision-making, and identify key themes and gaps that could inform future research, practice, and policy development.

1.3 Methodological Approach

To comprehensively address the aforementioned research questions, the study employed a scoping review methodology meticulously structured around Cochrane's framework and the Preferred Reporting Items for Systematic Reviews and Meta Analysis for Scoping Reviews (PRISMA_ScR) guidelines, ensuring a systematic exploration and synthesis of the available literature. This approach allows for a reliable overview of the current state of knowledge, focusing on themes such as the historical evolution of intuition, its cognitive underpinnings, and its practical implications in clinical settings.

1.4 Significance of the Study

The findings of this dissertation are expected to highlight the multifaceted nature of clinical decision-making, where intuition serves as both a complement and a counterbalance to analytical reasoning. By enhancing the understanding of intuition's role, this study intends to not only acknowledge its value but also advocate for its integration alongside evidence-based practices. Such integration promises a more comprehensive and effective approach to patient care tailored to the complexities of acute healthcare.

Recognising intuition's role in healthcare could lead to improved training methodologies, enhancing clinicians' ability to recognise patient patterns, make swift decisions, and effectively navigate the unpredictability of acute care environments.

In conclusion, this dissertation sets the stage for ongoing dialogue and exploration of intuition in clinical decision-making, promoting a balanced integration of cognitive processes that could transform patient care and clinical outcomes within dynamic healthcare landscapes.

1.5 Conclusion

In this introductory chapter, the study's focus on the role of intuition in clinical decision-making within acute healthcare settings was established, highlighting the importance of understanding both intuitive and analytical processes. Key research objectives were outlined, aiming to map the current body of knowledge and identify factors influencing the use of intuition alongside evidence-based practices. An overview of the methodological approach was

provided to frame the scoping review, which will systematically explore the literature on this topic.

In the following chapter, an in-depth review of existing literature will further contextualise intuition within the broader landscape of clinical decision-making, providing the foundational knowledge necessary to address the research objectives outlined here. This literature review will examine the theoretical and empirical perspectives on intuition and decision-making, its cognitive underpinnings, various definitions and its evolving role in healthcare practice.

Chapter 2 Literature Review

Chapter 2 Literature Review

Understanding how one makes decisions has fascinated scholars for centuries. In addition, the decision-making process is a fundamental aspect of human cognition that shapes actions, choices, and outcomes across various domains, including healthcare. Clinical decision-making is the cornerstone of outstanding healthcare practice, impacting patient outcomes, safety, and quality of care (Miller & Hill, 2018). Evidence-based practice has gained a lot of attention throughout the years, and clinical guidelines play a pivotal role in guiding health professionals; however, when it comes to clinical decision-making, healthcare professionals also rely a lot on their intuition.

Intuition has been a focus of extensive scientific inquiry for many years. The historical perspective on intuition in healthcare highlights its transition from a mystical concept to a recognised cognitive process influenced by cultural, philosophical, and scientific factors over time (Cioffi, 1997). Researchers have formulated various definitions of intuition, highlighting its unconscious nature and dependence on expertise, pattern recognition, and rapid insight into complex problems (Chilcote, 2017).

This literature review aims to provide a comprehensive overview of the conceptual framework surrounding intuition and clinical decision-making in healthcare. In this chapter, we delve into various decision-making models, such as the rational decision-making model, the naturalistic decision-making model, and the dual process theory, to lay the theoretical groundwork surrounding decision-making. Each model offers unique insights into the approaches and challenges involved in decision-making, highlighting the significance of context and experience in shaping decision-making processes (Katsikopoulos et al., 2022). By examining clinical decision-making, the author aims to comprehensively understand the

intricate interplay between cognitive processes, bias, and heuristics that influence decision-making in healthcare settings while gaining better insight into the concept of intuition.

Additionally, this review explores the complex relationship between rational and intuitive cognitive processes in healthcare decision-making. Although evidence-based practice remains fundamental, recognising the significance of intuition as a complementary component of decision-making highlights the need for a more holistic and balanced approach to the healthcare decision process.

2.1 Decision-making models

Decision-making, as highlighted by Adam and Dempsey (2020), is fundamentally a human endeavour, emphasising that the processes involved in making choices are inherently linked to human cognition and emotion. This perspective allows for an interdisciplinary approach, drawing insights from various fields such as healthcare, psychology, economics, political science, and business administration (Hogarth, 2010). Each of these disciplines contributes unique methodologies and frameworks for understanding how decisions are made.

A significant challenge in studying decision-making across these disciplines is the inability to directly observe the cognitive processes during decision-making, as our understanding is limited to external behaviours and self-reported experiences. That said, researchers have synthesised insights from theory, observation, research, and practice to counteract this challenge, creating several decision-making models (Banning, 2008). Such models serve as frameworks that describe the process individuals or groups use to choose alternative courses of action. There are several decision-making models, each with its unique approach and

emphasis. From a cognitive perspective, the three main models are the rational and naturalistic models and the dual process theory, which are discussed in the following subsections.

2.1.1 The Rational Decision-Making Model

The rational decision-making model has its roots in classical economic theory and the field of psychology. It emerged as a formalised approach to understanding how individuals make choices based on logical reasoning and the objective assessment of information. The notion of rationality began in the 18th century with philosophers like Jeremy Bentham and John Stuart Mill, who laid the groundwork for utilitarianism, an ethical theory that posits that the best action is the one that maximises overall happiness or utility (Simon, 1959). Utilitarianism is a fundamental component of rational choice theory, which is related to the expected utility theory. It was the pivotal work developed by John Von Neumann and Oskar Morgenstern in 1947, allowing for a more scientific approach to decision-making.

The rational decision-making model operates under the assumption that decision-makers are logical and objective, possess complete information, and will choose the most suitable options available to maximise outcomes (Calabretta et al., 2017; Croskerry, 2017). The typical steps in this model include identifying the problem, generating alternatives, evaluating them based on criteria, choosing the best option, and implementing the decision. However, due to its rigid and structured nature, this model can be time-consuming and demanding, making it unsuitable for dealing with complex or ambiguous problems under time pressure (Dane & Pratt, 2007). Additionally, the rational model is perceived as inhibiting the potential of the human brain by disregarding cognitive limitations and emotions (Nalliah, 2016).

In the 1950s, Herbert Simon challenged the idea of perfect rationality. A key figure in highlighting the limitations of the human mind, Simon's work on bounded rationality and decision-making processes has been influential in shaping our understanding of how individuals make choices in complex situations (Simon, 1959). Bounded rationality refers to the concept that individuals, when making decisions, do not aim for the optimal solution due to inherent cognitive limitations, the complexity of their environments, and constraints on the available information. In his work, Simon asserts that these factors prevent humans from fully maximising their decision-making capabilities, leading them instead to seek a satisfactory or adequate solution rather than the absolute best one (Adam & Dempsey, 2020).

As argued by Simon, human cognition is inherently limited, leading to constraints in processing and evaluating information (Betsch & Glöckner, 2010). Individuals cannot fully analyse and consider all possible options and consequences due to limitations in attention, memory, and processing capacity (Pearson, 2013). Moreover, in many decision situations, individuals do not have access to complete information. Uncertainty, ambiguity, and time constraints further limit the amount and quality of the information available for decision-making (Croskerry, 2005). In addition, decision situations often occur in complex and dynamic environments, making it challenging to fully comprehend and consider all relevant factors and interactions. According to Simon, when making decisions, it is imperative to consider three pivotal factors: the nature of the task at hand, the attributes of the surrounding environment, and the unique aspects of the cognitive system responsible for the decision-making process (Campitelli & Gobet, 2010).

Simon's notion of bounded rationality also inspired the work of other scholars, like Gerd Gigerenzer. Simon and Gigerenzer share a common interest in understanding how

individuals cope with the complexities of decision-making, acknowledging the cognitive constraints that shape human behaviour and the importance of adaptive and efficient decision strategies in real-world settings (Campitelli & Gobet, 2010). Gigerenzer worked further on the idea of bounded rationality by exploring how individuals use simple heuristics to make decisions efficiently within the bounds of their cognitive limitations.

The bounded rationality model inherently addresses intuition, although it is not explicitly named as such. Indeed, through this model, Herbert Simon suggests that individuals use heuristics or 'rules of thumb' to make decisions, which is where intuition plays a role. Intuition, according to Simon, is an essential part of decision-making under bounded rationality, as it allows individuals to make satisfactory decisions without exhaustive analysis.

2.1.2 The Dual-Process Theory

Conversely, the dual process theory is a cognitive framework that helps explain various aspects of cognitive processing, including decision-making, judgement, problem-solving, and reasoning (Miller & Hill, 2018). It is widely employed in psychology and behavioural economics to understand how individuals process information, make choices, and respond to stimuli in different situations (Małecka, 2020). This theory posits that human cognition and decision-making are influenced by two distinct cognitive systems: System 1 and System 2 (Abdulmohdi & Mcvicar, 2023). System 1 reduces cognitive load and operates automatically, effortlessly, intuitively, and quickly, while System 2 operates consciously, effortfully, deliberately, and slowly. This theory is often associated with the ground-breaking research of psychologists Daniel Kahneman and Amos Tversky, who demonstrated that when evaluating choices or consequences, individuals often focus on insignificant attributes to such an extent

that it influences their preferences and tend to rely more on System 1 (Campitelli & Gobet, 2010). Heuristics and biases form a key part of the dual process theory, highlighting how the interplay between automatic, intuitive thinking (System 1) and deliberate, analytical reasoning (System 2) shapes human decision-making.

Tversky and Kahneman (1974) argue that heuristics are efficient strategies that simplify complex tasks, stating that everybody uses them for everyday routine decisions. Common heuristics in healthcare include availability heuristics, representativeness heuristics, and anchoring heuristics. Such heuristics can be useful; however, they may also introduce systematic errors or biases in decision-making processes (Tversky & Kahneman, 1974). Biases, which are systematic deviations from rationality, can result from the use of heuristics; they can influence decision-making in various ways, such as through confirmation bias, overconfidence, and framing effects (Abdulmohdi & Mcvicar, 2023). Such biases are commonly found in novel or unfamiliar situations where reliance on past experiences can lead to poorer decision-making, especially if the context is significantly different.

Overall, the relationship between System 1 and System 2 highlights the balance between fast, intuitive decision-making and slower, analytical reasoning. Heuristics and biases are products of System 1's reliance on intuition, accentuating its strengths in efficiency while also revealing its vulnerabilities in accuracy. Acknowledging these dynamics is essential for understanding how people make decisions and the pathways through which cognitive errors can occur.

2.1.3 The Naturalistic Decision-Making Model

In contrast to the aforementioned models, the naturalistic decision-making model emphasises the role of intuition and real-world cognitive processes in everyday decision-making, particularly in complex and time-pressured situations. This model acknowledges that decision-makers often rely on pattern recognition, experience, and mental simulation to arrive at effective decisions without engaging in exhaustive analysis (Nibbelink & Reed, 2019).

Over the years, various decision-making models have been developed that demonstrate fundamental characteristics similar to those found in the naturalistic decision-making model. Gary Klein, a notable cognitive psychologist, is often recognised as a prominent proponent of the naturalistic decision-making model. Klein's research focused on how experts in various fields make decisions in uncertain situations and under time pressure. The resulting knowledge, in turn, contributed to the development of the recognition-primed decision (RPD) model (Klein, 1993). Klein developed this model through his study on decision-making processes in various fields, including firefighting, military operations, and healthcare. In his work, Klein describes how individuals make decisions in complex and dynamic situations based on their recognition of patterns and cues developed through experience. Indeed, he extensively addressed intuition in his RPD model, integrating it into the decision-making process.

Klein (1993) argues that instead of judging an option to be superior to others, the RPD model focuses on situation assessment. The decision-maker utilises patterns gathered from past experiences to align various situations with and then integrates these patterns into the decision-making process (Nibbelink & Reed, 2019). When using the RPD model, the decision-maker is

always ready to act quickly and effectively through a largely intuitive decision-making process. Experts often understand the dynamics of a situation almost instantaneously without needing to break it down analytically (Klein, 2008). This intuitive grasp is a result of their accumulated experience and knowledge. Once a pattern is recognised, the decision-maker intuitively runs mental simulations to envision the outcome of various actions (Hernandez & Ortega, 2019). Decision-makers must also intuitively pick up on subtle cues in their environment to inform their decisions. Thus, intuition in the RPD model also involves maintaining a high level of situational awareness.

This model is not without its challenges. While it improves an individual's performance under time pressure and in less stable conditions, one limitation of this model is that the decision-maker must possess relevant experience (Klein, 2015). Furthermore, intuitive decisions can be influenced by cognitive biases, such as overconfidence or availability heuristics. Such biases and heuristics can lead to systematic errors, particularly if the decision-maker's experience is not fully aligned with the current situation.

2.2 Clinical decision-making

Herbert Simon argues that decision-making is the heart of an organisation (Hernandez & Ortega, 2019). Indeed, in the United States, it is estimated that physicians' decisions make up 80% of healthcare expenditures, highlighting the weight each decision has on the patients and the system at large (Djulbegovic et al., 2018).

The previous subsections discussed various decision-making models, each offering valuable insights into the different approaches and challenges involved in decision-making.

The rational model, which emphasises logical analysis and the maximisation of outcomes, evolved into the bounded rationality model, which acknowledges the limitations of the decision-maker. Meanwhile, the dual process theory sheds light on the cognitive processes and potential pitfalls that can affect decision quality. Lastly, the naturalistic model recognises the significance of intuition and experience in real-world decision contexts.

In the realm of healthcare, particularly in clinical settings, the application of decision-making models plays a pivotal role in understanding how healthcare professionals navigate complex scenarios to make sound clinical decisions (Djulbegovic et al., 2018; McCaughey & Bruning, 2010). Integrating these theoretical frameworks while keeping in mind the practical challenges of clinical decision-making should shed light on the cognitive processes and strategies healthcare providers employ to deliver optimal patient care.

Clinical decision-making is a critical and complex process involving the rapid assessment, diagnosis, and treatment of patients who require immediate medical attention. On this note, Anderson et al. (2019) articulate that "clinical decision-making occurs when nurses and other health professionals gather and interpret data to inform a choice of action"(p.89). The dynamic and high-stress nature of acute care environments necessitates swift and effective decision-making by healthcare professionals; however, decision-making tends to get complicated with uncertainty; time pressure; limited information; and emotional, cultural, and ethical issues.

Healthcare professionals must efficiently assess and prioritise patient needs to deliver timely and appropriate interventions (Pearson, 2013). Additionally, close collaboration, effective communication, and teamwork among physicians, nurses, specialists, and other

healthcare providers are essential to ensure prompt, cohesive, and successful clinical decision-making in acute care. Clinicians often rely on standardised protocols and guidelines to facilitate quick and evidence-based decision-making (Croskerry, 2005). Apart from applying such protocols, however, healthcare professionals must also adapt to unique patient circumstances.

To better understand these complex processes, decision-making models provide frameworks for analysing the cognitive strategies and influences shaping clinical decisions. These models provide valuable insights into the factors influencing healthcare professionals' choices, the cognitive strategies they utilise, and the challenges encountered in complex healthcare settings. Within a clinical setting, decision-making can be divided into two categories: hypo-deductive decision-making and descriptive decision-making.

2.2.1 Hypo-deductive decision-making

Historically, clinical decision-making was based on normative and prescriptive models (Anderson et al., 2019) where the clinician was regarded as a wise and rational figure, making ideal decisions by using objective data. This approach typically involved guidelines and algorithms while following a hypothetical-deductive process to ensure systematic and evidence-based choices (Kovacs & Croskerry, 1999). Indeed, the hypothetico-deductive model is rooted in medical decision theories and emphasises the importance of generating and testing hypotheses systematically and logically (Buckingham & Adams, 2000b). By following this structured approach, healthcare providers can navigate complex clinical scenarios, integrate new information, and arrive at well-supported diagnoses and treatment plans (Kovacs & Croskerry, 1999).

Nevertheless, while the hypothetical-deductive approach provides a systematic framework for clinical decision-making, it does not inherently mitigate cognitive limitations that clinicians may face. This approach relies heavily on logical reasoning and structured analysis, yet it cannot entirely address the cognitive biases, limitations in working memory, or the effects of stress and fatigue that can influence decision quality. That said, several researchers still support this model. Croskerry (2017), in fact, argues that rationality is the hallmark of a competent decision-maker. Similarly, Pearson (2013) implies that the decision-maker should acknowledge the importance of logical, evidence-based information and follow the laws of science and probability.

In the nursing paradigm, this approach was adopted through the use of decision trees-tools used to aid decision-making by visually mapping out possible choices and their potential outcomes to assist nurses in decision-making (Banning, 2008). While observing 12 graduate Australian nurses managing patient medications, Manias et al. (2004) found that they relied mostly on the hypothetico-deductive model. The same was found by Abdulmohdi and Mcvicar (2023) while studying 23 nursing students in England. The students' clinical decision-making was investigated using simulations of a deteriorating patient scenario. One should note that the participants involved were all novices and that the first study focused solely on medication management activities.

The hypo-deductive decision-making model has its limitations. To begin with, it relies on making educated guesses or assumptions about potential explanations for observations or phenomena. Protocols and decision trees are not patient-specific, and the assumptions they are based on might not always be accurate, leading to potential flaws in the reasoning process (Nibbelink & Brewer, 2018). The effectiveness of hypothetico-deductive reasoning can also be

limited by the range of hypotheses that an individual can generate. If a relevant hypothesis is not considered, the reasoning process may overlook important explanations (Buckingham & Adams, 2000b). Moreover, in situations involving highly complex phenomena, the process of formulating and testing hypotheses can become challenging. The multifaceted and dynamic nature of real-world phenomena may not always neatly fit into the simplistic structure of hypothetico-deductive reasoning (Banning, 2008; Chilcote, 2017). In addition, the formulation of hypotheses and the interpretation of empirical evidence are susceptible to human biases, which can introduce error into the reasoning process (Croskerry, 2005, 2017).

2.2.2 Descriptive decision-making

Recently, however, there has been a shift in healthcare towards the descriptive decision-making approach. In healthcare, descriptive decision-making models involve understanding and describing how decisions are made as opposed to prescribing how they should be made (Anderson et al., 2019). These models acknowledge that decision-making in healthcare is often influenced by a variety of factors, including individual preferences, cognitive biases, organisational constraints, and social dynamics.

Several decision-making models align with the descriptive decision-making approach, acknowledging the actual process of how decisions are made within real-world settings. The main ones used in the healthcare environment include Herbert Simon's bounded rationality model; Kahneman and Tversky's dual process theory; and Gary Klein's RPD model, part of the broader naturalistic decision-making model.

As discussed, all three models offer a unique insight into decision-making. Within the healthcare context, the bounded rationality model, as proposed by Herbert Simon, recognises that healthcare providers often face time constraints, incomplete information, and cognitive limitations when making decisions. Consequently, their decisions are not always perfectly rational and optimal.

Healthcare professionals struggle for rationality, which is restricted to the limits of their knowledge (Hernandez & Ortega, 2019). No matter how big or small a decision is, one cannot verify all possible alternatives; consequently, clinicians often end up choosing the 'good enough' option rather than optimising their decisions. The patients themselves can also exhibit bounded rationality due to factors such as limited health literacy, cognitive impairments, emotional distress, or cultural beliefs. The restrictions of bounded rationality can be partly overcome by investing in evidence-based decision-support tools, improving clinicians' information access, promoting interdisciplinary collaboration, and empowering and educating patients (Hernandez & Ortega, 2019).

In contrast, the dual process theory is a pluralistic approach, and it plays a significant role in healthcare decision-making. It claims that in clinical practice, healthcare providers often rely on intuitive, pattern-based thinking (System 1) to make rapid diagnoses and treatment decisions while also engaging in analytical thinking (System 2) when considering complex cases, weighing treatment options, or deliberating ethical dilemmas. Abdulmohdi and Mcvicar (2023) consider this model capable of conducting both non-analytical and analytical decision-making. Both systems should be integrated to achieve the best possible decisions (Croskerry, 2017); however, thoroughly understanding how these two systems operate in healthcare decision-making could further improve diagnostic accuracy, reduce errors, and optimise

treatment choices. That said, the well-researched dual process theory attributes clinicians' biases to the interplay between the two distinct cognitive systems (De Neys & Pennycook, 2019).

Research suggests that most decision-makers are ready to ignore logical, mathematical, and probabilistic rules when a situation calls for an intuitive response that does not align with such rules, even if it may lead to biases. Indeed, as claimed by Tversky and Kahneman (1974), human beings tend to take the easy way out and avoid engaging themselves in complicated, slow, or deliberate processes when there is an available intuitive answer. In his extensive research, Kahneman (2017) acknowledges the vital role of intuitive processes in decision-making, asserting that such processes are essential for everyday functioning, enabling individuals to efficiently navigate a complex world. Nevertheless, in healthcare, complete reliance on System 1 may lead to over or undertreatment (Djulbegovic et al., 2012). In agreement with Kahneman, Dennstädt et al. (2021) emphasise that although System 1 helps us work more efficiently, it cannot carry out statistical analyses, making it more prone to cognitive biases and errors.

A common problem with biases is that clinicians tend to work hard to prove their intuitive ideas instead of trying to disprove them (Buckingham & Adams, 2000a). This issue was raised by Bonilauri Ferreira et al. (2010) while investigating the reasoning of 16 physicians. Not only did the physicians under study use heuristics in their daily reasoning, but they were also constantly trying to prove their initial hypotheses. However, as stated, while heuristics, or rules of thumb, provide quick and efficient decision-making, they can lead to predictable errors and irrational judgements. That said, De Neys and Pennycook (2019) believe that logic does not necessarily need System 2, arguing that one can process logical principles

intuitively. They also claim that there is a need for a revised dual process model since the original one was created in lab conditions and thus does not represent reality.

Meanwhile, Croskerry (2005) is one of the researchers who believe that experienced clinicians carry out better decisions than novices, implying that clinical decision-making performance should improve with experience. This reasoning fits with Gary Klein's RPD model, which is particularly relevant in healthcare contexts, especially in emergency medicine and critical care. This model suggests that experienced healthcare professionals quickly recognise patterns in clinical presentations and rely on intuitive reasoning to make rapid yet effective decisions (Klein, 1993).

In healthcare, where time is often critical, the RPD model highlights how clinicians draw on their expertise and prior experiences to make swift and often life-saving decisions. Decision-making training is lacking in medical and nursing education, so most improvement in clinical decision-making is gained through experience (Croskerry, 2017). As nurses gain experience, they become better at identifying several possible hypotheses at once before selecting patient-specific information and using pattern recognition to make the right decisions (Banning, 2008). Similarly, Buckingham and Adams (2000a) believe that as a clinician's experience grows, clues become automatically linked with outcomes, and rules become superfluous.

Although they are distinct concepts, the RPD model has features similar to those of the dual process theory. Both involve making decisions based on past experiences; both are designed to facilitate quick, efficient decisions when faced with time constraints or incomplete information; both rely on intuitive decision-making processes; both are frequently applied in

real-world, high-stakes situations, such as in emergency response, healthcare, and military operations, where quick decisions must be made based on limited information; and both are susceptible to cognitive biases (Woolley & Kostopoulou, 2013). The main difference is that the RPD model underscores the importance of training and experience when it comes to honing clinicians' intuitive decision-making skills and that whilst in the naturalistic decision-making model, intuition is looked at as essential and positive, in the dual process theory, it is more of a liability.

2.2.3 Conclusion for Clinical Decision-Making

Clinical decision-making is a complex process often examined through different models, each offering unique insights into how healthcare providers make judgments (Woolley & Kostopoulou, 2013). Two prominent models in this area are the hypo-deductive and descriptive decision-making models, which highlight distinct cognitive approaches in clinical settings. The hypo-deductive model emphasises a structured, analytical process where clinicians generate hypotheses based on initial patient data and systematically test them to reach a diagnosis. In contrast, the descriptive model focuses on how clinicians make decisions in real-world settings, often under time pressure and with incomplete information. This approach is particularly relevant when considering the role of intuition. In situations characterised by urgency and uncertainty, healthcare providers frequently rely on intuitive judgments shaped by their experience and knowledge. By understanding the interplay between these models and the intuitive processes employed by clinicians, we can gain deeper insights into the complexities of decision-making in healthcare.

2.3 The historical perspective of intuition

The role of intuition in healthcare has a long and varied history, shaped by cultural, philosophical, and scientific influences over centuries. During the Middle Ages, intuition in healthcare was closely associated with the concept of 'medical intuition', where healers claimed to have an innate sense or gift for understanding and diagnosing illnesses. Plato even described intuition as the key to true knowledge (Jo, 2013). With research, however, it evolved from a transcendent and divine concept to a cognitive process (Anderson, 2019).

Rational and empirical approaches to medicine, which emerged in the Hippocratic era, have undeniably shaped modern medical practice. Historically, in Western cultures, researchers have prioritised analytical, evidence-based approaches, resulting in the development of guidelines, decision trees, protocols, and algorithms that are seen as the gold standard for clinical decision-making (Grol & Grimshaw, 2003; Guyatt et al., 2008). Rational decision-making has indeed dominated clinical guidelines and practices; however, dismissing intuition as irrational and uncertain reveals an overly reductionist view of decision-making in healthcare (Cioffi, 1997). This outlook has marginalised the role of intuition, particularly among physicians, who are often viewed as practitioners of logic and reason.

The idea that intuition is less valid than rational approaches overlooks the growing body of evidence that supports its role in clinical decision-making. Recent studies challenge the dismissal of intuition, arguing that it plays a crucial role in high-stakes, fast-paced environments where clinicians must make rapid decisions with incomplete information (Benner et al., 2009). Turan et al. (2016) argue that intuition has always been an inherent component of care practices, not only in nursing but also in medicine in general, where seasoned physicians often rely on their 'gut feelings' when time or evidence is lacking.

Moreover, cognitive science research increasingly supports the RPD model, which posits that intuitive and analytical thinking work in tandem to guide expert decision-makers (Klein, 1993). Ignoring the value of intuition, especially in complex and ambiguous clinical situations, risks oversimplifying the decision-making process and potentially compromising patient care.

During the 20th century, psychologists and psychiatrists researched in depth the role of intuition in decision-making. Some of the early work was carried out by Barnard in 1938, who divided mental processes into two distinctive categories: logical and non-logical (Barnard 1938 as cited in Barnard, 1968). Then, in 1947, Herbert Simon investigated intuition based on behaviour and created the bounded rationality model (Gosar & Solomon, 2019). Later on, Gary Klein (1993) explored intuition using the naturalistic decision-making theory. Significant research was also carried out by Tversky and Kahneman (1974) while working on the dual process theory.

Intuition in the nursing paradigm was first rigorously examined by Carper (1978) and later expanded by Benner in 1982, whose work built on the Dreyfus and Dreyfus (1980) model of skill acquisition (Rovithis & Parissopoulos, 2005). Benner argues that nurses progress from analytical to intuitive decision-making as they gain expertise. A decade later, she validated this claim through her research on intuition among critical care nurses (King & Appleton, 1997). That said, however, intuition has historically been met with scepticism. Cioffi (1997), in fact, highlights how, for many years, intuition was dismissed as illegitimate knowledge and seen as unreliable and irrational. This scepticism was even more pronounced among physicians, who often viewed clinical decision-making as the exclusive domain of evidence-based, rational thought. Such attitudes not only undermined the credibility of intuition but also placed clinicians, particularly nurses, in a difficult position. Nurses frequently experienced intuitive

feelings when a patient's condition was deteriorating, but without a clear rational basis, these insights were often dismissed, leaving them unable to act on their instincts (Traynor et al., 2010).

Contrarily, a growing body of literature is arguing that intuition is far from irrational or baseless. Modern research shows that intuition, especially in high-stakes clinical environments, is a product of extensive experience and pattern recognition, contributing to swift, effective decision-making (Benner et al., 2009). Scholars are now exploring the mechanisms behind intuition, arguing that it plays a crucial role in situations where time constraints and incomplete information make analytical approaches insufficient (Turan et al., 2016). Despite these advancements, however, intuition continues to face resistance, particularly from those who still cling to the belief that rational, evidence-based processes are the only valid forms of decision-making in healthcare (Standing, 2008). This ongoing reluctance to fully embrace intuition not only limits the potential for improving patient outcomes but also disregards the complex cognitive processes that experienced clinicians rely on when making critical decisions under pressure.

In summary, the history of intuition in healthcare underscores a complex and often contentious interplay between rationality and intuition, tradition and innovation, and science and humanism. While evidence-based practice continues to dominate contemporary healthcare, this singular focus has often marginalised the role of intuition, especially in high-stakes clinical environments where swift decision-making is crucial. However, growing empirical evidence supports the idea that intuition is not an opposing force to rationality but a complementary one, enhancing clinical judgement and patient care. Despite this, scepticism persists among some healthcare professionals who view intuition as less reliable or scientifically valid. This

reluctance, however, overlooks the fact that seasoned clinicians, armed with years of experience, often rely on intuitive insights that can dramatically improve patient outcomes. Thus, fully integrating intuition into the decision-making framework is not only necessary but essential for holistic and effective patient care.

2.4 Defining Intuition

Literature about intuition is vast, yet defining the construct of intuition in healthcare can prove difficult, especially due to its multifaceted and subjective nature within the medical context (Farr-Wharton et al., 2012). It is impossible to develop a meaningful conceptualisation of intuition without understanding it (Dörfler & Ackermann, 2012). Definitions are the foundation for fostering a shared understanding, enabling precise measurement, supporting evidence-based practice, enhancing communication, driving quality improvement, and facilitating education and training, all of which are integral to delivering effective patient-centred care. Intuition has both academic and non-academic connotations, and it has been assigned a wide range of definitions (Dane & Pratt, 2007). Depending on their varied perspectives, researchers have defined intuition in diverse ways, presenting it as both a degraded or lazy concept and an expert, accurate way of reasoning (Epstein, 2010). Efforts to define intuition have revealed its complexity, with the researcher identifying 24 distinct definitions (see Table 1), highlighting the challenge of capturing its full scope.

TABLE 1

DEFINING INTUITION

Author	Definition
Adam & Dempsey (2020, p.102)	The part of human behaviour which does not rely on laws of probability and statistics and on logic to express itself and allows human decision makers to deliver fast judgements in complex situations
Adler (2022, p.363)	Intuition is practical knowledge that the user acquired through experience but is unable to verbalize.
Aghajani et al. (2022, p.160)	Intuition is not a phenomenon that occurs in a moment; rather, it is a result of complex interactions of individuals' internal characteristics, experience, knowledge, skills, personality, conscience, and environment.
Anderson et al. (2019, p.89)	A feature of expertise-the accumulation of knowledge, skills and experience
Benner & Tanner (1987, p.23)	Understanding without a rationale
Brien et al. (2011, p.1)	A multidimensional concept synonymous with insight and instinct
Chilcote (2017, p.62)	Intuition is a rapid, unconscious process based on global knowledge that views the patient holistically while synthesizing information to improve patient outcomes.
Cork (2014, p.244)	A well-known phenomenon within the nursing community, but it is an abstract concept that is difficult to substantiate
Dane & Pratt (2007, p.33)	Affectively charged judgments that arise through rapid, nonconscious, and holistic associations
Dreyfus & Dreyfus (1986, p.28)	The understanding that effortlessly occurs upon seeing similarities with previous experiences.
Epstein (2010, p.310)	It is nothing more and something less than the experiential system of cognitive-experiential self-theory.
Glass (2008, p.96)	We see it as wisdom that emerges from some unknown fount, a wisdom not necessarily to be trusted.
Gobet & Chassy (2008, p.129)	Rapid perception, lack of awareness of the process engaged, concomitant presence of emotions and holistic understanding of the problem situation
Gosar & Solomon (2019, p.5)	Intuition is how people rapidly detect coherent patterns in complex environments. It is how they generate solutions that work without the luxury of limitless time. Intuition is a genuine phenomenon that involves understandings and processes that are non-hierarchical, not based on formal education or years of experience, non-analytic, unpredictable, is quick and easy, and is made without extended conscious deliberation.
Hassani et al. (2016, p.67)	An understanding beyond and partly paradoxical to the clinical signs of patients
King & Appleton (1997, p.195)	Gut feelings, sixth sense, insight, instinct, presentient, common sense, inner feelings, hunches, premonitions, foreboding and presentiment

Klein (2015, p.164)	An expression of experience as people build up patterns that enable them to rapidly size up situations and make rapid decisions without having to compare options
Nelissen (2013, p.28)	A cognitive activity that can be typified as a quick exploration of thinking strategies. The exploration of internalized, compacted knowledge.
Price et al. (2017, p.1148)	A sudden 'a-ha moment'
Salas et al. (2010, p.943)	A type of cognition that is qualitatively different than conscious and analytical reasoning
Schraeder & Fishcher (1986, p.161)	Intuitive perception in nursing practice is the ability to experience the elements of a clinical situation as a whole, to solve a problem or reach a decision with limited or concrete information.
Sinclair & Ashkanasy (2005, p.353)	A non-sequential information-processing mode, which comprises both cognitive and affective elements and results in direct knowing without any use of conscious reasoning
Smith (2006, p.83)	The affective element of critical thinking in which a nonanalytic process of knowing is expressed through physical, emotional and spiritual connections
Woolley & Kostopoulou (2013, p.60)	Making judgments without any awareness of reason

Schraeder and Fischer (1987) argue that intuitive perception is best understood as "the ability to experience the elements of a clinical situation as a whole, to solve a problem or reach a decision with limited or concrete information" (p.161). This definition challenges the conventional emphasis on evidence-based decision-making by suggesting that intuition plays a crucial role, particularly when data are incomplete or unavailable. Moreover, in their seminal work, Dreyfus and Dreyfus (1986) expanded the understanding of intuition by identifying six key features of intuition: pattern recognition, similarity recognition, common-sense understanding, skilled know-how, sense of salience, and deliberate rationality. These features underscore the idea that intuition is not merely guesswork but is rooted in experience and expertise. These components align closely with Klein's RPD model, which posits that experienced professionals often make rapid, accurate decisions by drawing from past

experiences and recognising patterns (Klein, 1999). This growing body of evidence challenges the traditional view of intuition as unreliable and emphasises its importance in complex clinical environments where analytical reasoning alone may fall short.

Meanwhile, Benner and Tanner (1987), pioneers in the study of intuition in nursing, famously define it as "understanding without rationale" (p.23). This elusive definition is echoed by Woolley and Kostopoulou (2013), who describe intuition as "making judgments without any awareness of reason" (p.60), and by Price et al. (2017), who refer to it as "a sudden a-ha moment"(p.1148). Such definitions capture the essence of intuition as a seemingly inexplicable cognitive process, further contributing to its marginalisation within the scientific community. Indeed, the difficulty in clearly defining intuition makes it hard to measure, compare, and validate, leading to its frequent dismissal in favour of more empirically grounded decision-making models (Sinclair & Ashkanasy, 2005). Moreover, the lack of consensus surrounding what constitutes intuition results in inconsistent, vague, and often contradictory definitions, further undermining its credibility as a legitimate form of knowledge (Sinclair & Ashkanasy, 2005). Moreover, scholars disagree on whether intuition should be considered a process, an outcome, or a combination of both (Dane & Pratt, 2007), adding to the complexity of studying it. This fragmentation in the literature not only hinders its acceptance but also limits its integration into evidence-based practice, where measurable and repeatable outcomes are paramount.

Over time, however, definitions of intuition have evolved to capture its complexity more accurately. Aghajani et al. (2022) argue that intuition is not a singular, momentary occurrence but rather the culmination of intricate interactions involving an individual's internal traits, experience, knowledge, skills, personality, conscience, and environment. This

perspective challenges earlier more simplistic views of intuition as an inexplicable "gut feeling" and positions it as a multifaceted cognitive process shaped by various factors. Similarly, Chilcote (2017) defines intuition as a "rapid, unconscious process based on global knowledge that views the patient holistically while synthesizing information to improve patient outcomes" (p.62). This definition emphasises the practical implications of intuition in clinical settings, suggesting that it is not just a nebulous concept but a valuable tool for enhancing patient care. These more comprehensive definitions counter the long-standing scepticism towards intuition by framing it as a sophisticated process embedded in clinical expertise rather than an unreliable or irrational phenomenon. The shift in understanding reflects a growing recognition in the literature that intuition, far from being inferior to analytical reasoning, is a vital component of decision-making, particularly in fast-paced, high-pressure healthcare environments (Benner et al., 2009).

2.5 Main Characteristics of Intuition

Despite the absence of a universally accepted definition of intuition, certain characteristics consistently emerge across various interpretations. Researchers generally agree that intuition is marked by rapid insight into a problem (Epstein, 2010). In healthcare, this concept is particularly significant, as intuition often allows healthcare professionals to quickly recognise patterns, extract pertinent information, and make decisions without the need for step-by-step, conscious reasoning (Woolley & Kostopoulou, 2013). This implicit processing of complex clinical data is not random or irrational but is rooted in the clinician's extensive experience and expertise. Thus, in this context, intuition functions as a highly efficient cognitive tool, where a single, seemingly minor piece of information from long-term memory can trigger sudden awareness and insight (Woolley & Kostopoulou, 2013). Such insights

challenge the traditional emphasis on slow, deliberate analysis in clinical decision-making, showing that intuition, far from being an unreliable phenomenon, is a legitimate and crucial component of expert practice.

A defining characteristic of intuition is its unconscious nature, which sets it apart from more deliberate cognitive processes. In healthcare, the unconscious element of intuition is not a passive occurrence but a dynamic and complex process that involves implicit information processing, pattern recognition, social perception, and rapid decision-making, even in highly complex scenarios (Sinclair & Ashkanasy, 2005). Contrary to the assumption that intuition lacks rigour, it enables healthcare professionals to process vast amounts of clinical data quickly and without conscious deliberation, relying on tacit knowledge and the expertise cultivated through years of experience (Van Den Brink et al., 2019). This process is often dismissed as 'gut feeling' or irrational, but evidence suggests that it is deeply rooted in the clinician's subconscious integration of previous experiences and learned patterns (Klein, 2015). Moreover, intuition is not limited to clinical data alone; it is also shaped by the healthcare provider's unconscious interpretation of patients' emotional and social cues (Chilcote, 2017). These cues, such as non-verbal communication, subtle behaviours, or emotional states, can be crucial for understanding the patient's condition and anticipating treatment outcomes.

As indicated, another prominent attribute of intuition in healthcare is the presence of 'gut feelings', 'hunches', or an instinctual sense that something is wrong, even when clinical evidence may not immediately support that conclusion (Vanstone et al., 2019). These feelings are often visceral, instinctive, or somatic reactions that deeply inform clinicians' judgements and actions (Rovithis & Parissopoulos, 2005). Far from being arbitrary, these gut feelings serve as intuitive signals that guide decision-making, patient care, and interactions with patients. Numerous studies have identified this phenomenon among nurses and physicians as a core

component of clinical intuition, highlighting its relevance across healthcare professions (Nalliah, 2016; Rovithis & Parissopoulos, 2005; Woolley & Kostopoulou, 2013). However, the primary challenge with gut feelings is their often subjective and inarticulable nature, making it difficult for clinicians to rationalise or explain their intuition in a manner consistent with evidence-based practice (Vanstone et al., 2019). Through their study on clinical intuition in family medicine, Woolley and Kostopoulou (2013) identified gut feelings as one of three decision-making processes but noted that participants frequently experienced a conflict between their intuitive judgement and the more rational, step-by-step approaches traditionally valued in medicine. Despite this tension, their findings suggest that intuition in clinical judgement goes far beyond first impressions, with gut feelings playing a crucial role in shaping complex medical decisions. The challenge for healthcare, then, is to reconcile these instinctive insights with the demands of a rational, evidence-based framework without dismissing the value that gut feelings bring to patient care.

Meanwhile, expertise is the foundation of effective intuitive decision-making in complex organisational settings. Thus, understanding how to develop and manage effective intuition in such contexts is partially connected to understanding human expertise (Salas et al., 2010). The healthcare professional can only benefit from unconscious thinking when it is backed up by experience (Nyatanga & Vocht, 2008). Intuition relies on experience gained from years of clinical practice, exposure to varied patient cases, and continual learning (Nibbelink & Brewer, 2018). It allows clinicians to draw on this expertise to make swift and effective decisions, particularly in ambiguous or time-sensitive situations (Dörfler & Ackermann, 2012). To illustrate this point, the homoeopathic practitioners who participated in the interpretative phenomenological study conducted by Brien et al. (2011) agreed that their intuition is a

cognitive process dependent on knowledge and experience. Nevertheless, researchers disagree on whether the expertise should be domain-specific or if it can be transferable across domains.

An essential concept closely related to expertise in intuition is tacit knowledge, often referred to as "hidden knowledge" (Adler, 2022, p.363). Tacit knowledge equips healthcare professionals with a deep reservoir of experiential learning, implicit understanding, and practical wisdom, all of which play a critical role in shaping their intuitive responses (Adler, 2022). Far from being abstract, tacit knowledge forms the backbone of expertise in clinical practice, allowing practitioners to draw from previous experiences and make rapid, informed decisions. Both expertise and tacit knowledge are foundational elements of the naturalistic decision-making model and the dual process theory. In the naturalistic decision-making model, they are viewed as assets that enhance a clinician's ability to make sound judgements in complex, real-world settings where time and information are limited (Klein, 2015). However, the dual process theory regards tacit knowledge with more caution, implying that while valuable, it can also lead to reliance on heuristics (Buckingham & Adams, 2000). This tension highlights the need for a balanced view: tacit knowledge and intuition are powerful tools but must be tempered by awareness of their potential pitfalls to avoid biased decision-making. In this regard, healthcare professionals must navigate the fine line between leveraging their expertise and maintaining a critical, analytical approach to avoid errors in judgement.

Pattern recognition, the cognitive process through which individuals identify and interpret recurring structures or regularities within complex data or environments is another crucial dimension of intuition, particularly in the context of healthcare. As argued by Klein (1993), the unconscious mind excels at detecting subtle patterns, cues, and anomalies that may elude conscious, deliberate reasoning. This capability allows healthcare professionals to rely

on intuitive pattern recognition when identifying potential diagnoses, anticipating complications, or recognising subtle changes in patient conditions that may not be immediately evident through analytical thinking (Woolley & Kostopoulou, 2013). In fast-paced clinical environments, where time and information are limited, this skill can be a decisive factor in patient outcomes. Adler (2022) further elaborates on pattern recognition by describing intuition as a "sophisticated way of recalling knowledge", emphasising the intricate relationship between intuition, pattern recognition, and expertise (p. 363). Rather than being a random or irrational process, pattern recognition draws on years of experience and accumulated knowledge, allowing clinicians to make rapid yet informed decisions. However, while intuitive pattern recognition is often reliable, it also requires caution, as over-reliance on unconscious processes can sometimes lead to cognitive biases if unchecked by reflective, analytical thinking (Kahneman, 2017). Thus, integrating pattern recognition with deliberate reasoning ensures a more balanced approach to clinical decision-making.

When viewed from a cognitive perspective, intuition is frequently characterised as a non-analytical process of reasoning. Tversky and Kahneman (1974) famously describe intuition as finding a solution "without the use of analytical methods or deliberate calculation", highlighting its distinct departure from systematic, logical processes (p.1130). Similarly, Adam and Dempsey (2020) define intuition as "the part of human behaviour that does not rely on laws of probability, statistics, or logic", which allows decision-makers to deliver swift judgements in complex situations (p.102). This definition underscores the efficiency and adaptability of intuitive thinking, particularly in high-pressure environments like healthcare. Some scholars prefer the term "non-linear" to describe intuitive decision-making. However, as Epstein (2010) cautions, while intuition is indeed non-analytic, not all non-analytic processes should be conflated with intuition. Including irrational beliefs, religious beliefs, superstitions,

or extrasensory perceptions under the umbrella of intuition dilutes its scientific credibility and raises concerns about its empirical validity. Stretching the definition too far risks undermining the concept's relevance and utility in evidence-based fields, particularly when the goal is to differentiate intuitive decision-making from mere guesswork or unscientific reasoning (Epstein, 2010). Thus, it is crucial to maintain a rigorous distinction between intuition and other non-analytic processes to preserve its scientific merit and applicability in complex decision-making.

Despite its imperfect understanding, intuition is increasingly gaining acceptance in healthcare as a valuable and widely used decision-making tool (Gosar & Solomon, 2019). This growing acceptance is not merely a reflection of its ubiquity but stems from the clear advantages it offers in clinical practice. Intuition enables rapid insight and is integrated with tacit knowledge, enhancing its reliability, particularly among seasoned clinicians who can draw from years of experience. It also plays a critical role in fostering cognitive flexibility, enabling practitioners to adapt swiftly to evolving clinical scenarios. This flexibility is vital for delivering patient-centred care, as it allows healthcare providers to respond not only to clinical data but also to the subtle, often unspoken needs of the patient.

2.6 Intuition and clinical decision-making

The decision-making process is a concern for healthcare professionals, policymakers, and those affected by these decisions (Lamond & Thompson, 2000). As indicated, the two main cognitive processes used in clinical decision-making are analytical and intuitive (Miller & Hill, 2018). Most of the time, these two processes operate in tandem, interacting in complex ways (Salas et al., 2010). As discussed, while intuition has always been an informal part of clinical

decision-making, scientific disciplines studying decision-making often concentrate on explicit deliberation instead. However, it is becoming clear that this type of reasoning is only a small component of a much more complex cognitive system. Conscious deliberation and reasoning represent just the "tip of the iceberg" in the decision-making process and are often not the main influences on behaviour (Salas et al., 2010, p.942). Nonetheless, it is critical to consider the impact that reliance on intuition can have on both the process and the outcome of the decisions taken (Adam & Dempsey, 2020).

Hermann et al. (2017) advocate for the advantages of intuitive decision-making in healthcare, highlighting its holistic, efficient, and highly accurate nature. They argue that intuitive decision-making has two distinct advantages over deliberate, rational approaches, particularly in the health sector, where time-sensitive and complex decisions are the norm. First, intuition allows healthcare providers and patients to integrate vast amounts of information simultaneously, producing a compelling sense of the 'best' choice that reflects a more comprehensive understanding of the situation. This ability to synthesise information quickly is crucial, as most healthcare decisions involve high stakes and must be made under significant time pressure. Miller and Hill (2018) argue that intuitive practitioners are able to conduct rapid assessments that prevent patient deterioration, suggesting that intuition may actually enhance patient outcomes by facilitating quicker, more effective interventions.

The second major advantage of intuition over rational deliberation, as noted by Hermann et al. (2017), lies in its heightened sensitivity to emotions and affective cues, allowing for more patient-centred care. Given that healthcare decisions directly impact patients' lives, the emotional and empathetic elements of decision-making cannot be ignored. This argument is supported by the findings presented by Van Den Brink et al. (2019), who reported that

participants in their focus group highlighted empathy as a prerequisite for effectively using intuition in clinical settings. In allowing emotions to inform decisions, intuitive practice aligns more closely with the values of holistic care, making it a powerful tool for enhancing both clinical outcomes and patient satisfaction.

Meanwhile, Price et al. (2017) used an experimental design to investigate whether novice nurses use intuition. They found that intuition can aid novice nurses in making accurate clinical decisions during familiar complication scenarios but may impede decision-making in unfamiliar situations. Similar findings were found by Abdulmohdi and Mcvicar (2023) whilst investigating clinical decision-making among 23 third-year nursing students in England; although most of them used intuition to identify the important cues, at the end they resorted to deductive reasoning. In Australia, similar findings were obtained by Manias et al. (2004) while observing 12 recruits while managing patient medications.

The primary challenge with intuition lies in its inherently unstructured and subjective nature, which complicates both training and objective assessment. This ambiguity makes it difficult to systematically develop and evaluate intuitive decision-making skills in individuals, particularly in novice practitioners. Without a clear framework, novice healthcare professionals may struggle to discern when their intuitions are reliable and when further analysis is needed (Daemers et al., 2017). Educators and managers, therefore, play a critical role in helping these less experienced professionals develop a more refined understanding of their intuitive responses. As Miller and Hill (2018) suggest, rather than encouraging novice practitioners to act solely on their intuition, they should be guided to reassess the situation and combine their intuitive insights with more analytical approaches. This cautious integration of intuition with structured decision-making processes ensures that novice practitioners do not prematurely rely

on their instincts but instead learn to recognise when intuition can be a valuable complement to evidence-based practice. Fostering this balance is essential to ensuring that intuition is both effective and safe in clinical settings, particularly for those still developing their expertise.

The clinical decision-making processes of novice nurses have also been examined by Ruth-Sahd and Tisdell (2007), who conducted interviews with 16 novice nurses from various American hospitals. Surprisingly, these nurses reported frequent use of intuition in their practice, largely because they had already relied on it in numerous aspects of their personal and professional lives. This finding challenges the assumption that intuition is a skill exclusive to experts or developed solely through years of clinical experience. Rather, the study suggests that intuition in novice nurses is shaped by a broader range of prior experiences, such as life events, job experiences, or the influence of intuitive mentors, which collectively inform how they develop and understand their intuitive capabilities. This reliance on experience raises important questions about the assumption that intuition is purely domain-specific. The novice nurses in this study did not view intuition as confined to their clinical domain but rather as a transferable skill applicable across different contexts. While the result of this small study cannot be generalised to all healthcare professionals, its broader interpretation complicates the traditional view of intuition as an expertise-driven phenomenon and suggests that even those with limited clinical experience can draw on intuitive insights, although these may require careful refinement and validation in a clinical setting.

The controversial construct of intuition and clinical decision-making has been widely investigated in the nursing paradigm. Melin-Johansson et al. (2017) carried out a comprehensive mixed studies review, analysing 16 studies on the subject. They found that nurses consistently valued intuition in their decision-making processes, not only in daily tasks

but also in building relationships with patients and throughout the broader nursing process. This challenges the traditional dismissal of intuition as merely a ‘gut feeling’, with the researchers concluding that intuition has a legitimate role in evidence-based practice. Far from being an unscientific or irrational process, intuition was recognised by nurses as a vital complement to analytical methods, helping them integrate complex, often non-quantifiable information into their care strategies.

Similarly, Traynor et al. (2010) found that registered nurses heavily rely on their experiences to inform their clinical decision-making. Their findings illustrate a key limitation of purely technical decision-making tools: their participants felt it was impossible to fully adhere to such instruments, especially in fast-paced clinical settings where nuance, experience, and tacit knowledge often override rigid protocols. This reliance on experience suggests that intuition plays an indispensable role in navigating the complexities of patient care, further underscoring the need to balance evidence-based practices with intuitive insights. The tension between adherence to formal instruments and the experiential wisdom that intuition provides reflects the ongoing debate about how best to integrate these two approaches in clinical decision-making.

The role of intuition in the clinical decision-making of hospital specialists has also been thoroughly examined, particularly by Van den Brink et al. (2019), who conducted six focus groups involving 28 specialists in European hospitals. Their findings reveal that while many specialists admitted to using intuition, there were apprehensions about being misguided. It was unanimously agreed that intuitive hunches should be followed by analytical reasoning, reflecting the specialists’ cautious approach to integrating intuition into their clinical decision-making process. Meanwhile, Djulbegovic et al. (2023) explored the efficacy of specialist

intuition in a US academic centre by evaluating the delivery of anticoagulant therapy prescriptions in COVID-19 patients. Their findings indicate no major differences between the group of practitioners who used the algorithm and those who relied on individual discretion, except for a 10% to 13% shorter length of stay in the algorithm-utilising group. This suggests that the application of intuition in clinical care warrants further examination, with potential implications for patient outcomes and resource utilisation. The cumulative evidence from these studies indicates that the use of intuition in clinical decision-making by hospital specialists is a critical aspect that warrants careful consideration. Nonetheless, the differing perspectives on the validity of intuition and its potential impact on patient care and resource utilisation underscore the importance of ongoing research in this arena. Thus, further exploration of the implications of integrating intuition into clinical practice and the potential benefits or pitfalls associated with its use would be invaluable.

On this note, Lamond and Thompson (2000) highlight several critical issues associated with relying on intuition for decision-making, shedding light on the potential drawbacks that may arise in this context. One significant problem they identified is the lack of visibility in decisions made through intuition, hampering one's ability to understand and justify the rationale behind such decisions. This opacity in the decision-making process can pose challenges when attempting to defend or explain one's choices, leading to ambiguity and uncertainty in decision outcomes.

Moreover, studies on intuition in clinical decision-making introduce a notable limitation. Such studies generally focus on recalled incidents of successful intuitive judgement while often ignoring instances where intuitive judgement led to missteps or overlooked patient cues, resulting in suboptimal outcomes. Individuals may be more inclined to remember and

emphasise positive outcomes associated with intuition while downplaying or omitting instances of failure or oversight, thereby skewing the representation of the overall effectiveness of intuitive decision-making in clinical settings.

Lamond and Thompson (2000) also argue that the reliability of intuitive decision-making can fluctuate based on an individual's past experiences and emotional state during the decision-making process. Indeed, the emotional nature of intuition, often intertwined with positive feelings, contributes to its variability and potential unpredictability in outcomes. Positive feelings can enhance the effectiveness of intuition by promoting confidence and encouraging a more open mindset, which can lead to quicker and more decisive judgments. This variability introduces a level of uncertainty that may impact the consistency and accuracy of intuitive judgements, potentially leading to suboptimal results in clinical scenarios.

Moreover, Croskerry (2003) discusses the cognitive biases that can influence intuitive decision-making in healthcare settings. These biases, stemming from heuristics and cognitive shortcuts, can lead to errors in clinical judgement and decision-making. For example, a clinician might rely on a recent or prominent diagnosis when making a decision leading to misdiagnosis. Clinical guidelines and checklists can help mitigate such bias. Recognising and mitigating such biases is crucial to improving the reliability and accuracy of intuitive decision-making processes in clinical practice.

Ultimately, it is essential to acknowledge the nuanced nature of intuition in decision-making, as it can lead to accurate outcomes in certain circumstances while also potentially misleading decision-makers in others (Mamede et al., 2010; Turan et al., 2016). While intuition undoubtedly offers valuable insights, it is imperative to recognise its inherent limitations,

prompting the need for a more structured decision-making approach (Traynor et al., 2010; Woolley & Kostopoulou, 2013; Katsikopoulos et al., 2022; Nalliah, 2016; Pearson, 2013). This underlines the significance of aligning the cognitive mode used with the task at hand to optimise decision-making outcomes (Lamond & Thompson, 2000).

2.7 Intuition or Evidence-Based Decision-Making?

The long-standing debate between evidence-based and intuitive decision-making in healthcare underscores the strengths and limitations of each approach. Acknowledging the synergistic relationship between evidence-based and intuitive decision-making, as well as the unique strengths and weaknesses of both approaches, is paramount in shaping informed clinical decision-making practices while significantly boosting the efficiency and quality of healthcare delivery, ultimately benefitting patients and healthcare providers alike.

Evidence-based decision-making in healthcare is a well-established framework that emphasises the systematic evaluation and integration of research findings into clinical practice (Welsh & Lyons, 2001). By critically appraising published studies, healthcare professionals can identify interventions and treatments that have demonstrated efficacy and effectiveness through rigorous scientific evaluation. This evidence-driven approach not only minimises the influence of bias but also enhances the quality of care by aligning clinical decisions with objective and validated data (Buckingham & Adams, 2000b).

However, while evidence-based practice offers a valuable foundation for clinical decision-making, its application in a rigid, one-size-fits-all manner may overlook the nuanced complexities of individual patient cases (Sinclair & Ashkanasy, 2005). Each patient brings a

unique set of circumstances, including their medical history, preferences, and response to prior treatments. In complex medical scenarios, where standard protocols may not fully address the intricacies of a patient's condition, tailoring treatment plans to accommodate certain individual factors becomes essential (Croskerry, 2005).

On the contrary, intuition in healthcare encapsulates a reservoir of non-conscious knowledge derived from extensive clinical experience (Hermann et al., 2017). Expert healthcare providers often leverage intuition to swiftly discern patterns and anticipate potential issues, enabling them to make rapid diagnoses and implement timely interventions. This intuitive capacity is particularly invaluable in time-sensitive scenarios or when confronted with complex or ambiguous medical presentations that necessitate immediate action (Hall, 2002).

However, it is crucial to acknowledge that while intuition can offer distinct advantages, it is not without limitations. Personal biases can influence intuitive decision-making processes, potentially impacting the accuracy and objectivity of clinical assessments. Furthermore, variations in intuitive capacity among healthcare professionals imply that intuition may not guide decision-making consistently across all practitioners, potentially leading to inconsistent outcomes (Love et al., 2023). Additionally, inexperienced healthcare providers may lack the well-honed intuition that guides seasoned professionals, potentially posing challenges in accurately navigating complex clinical scenarios (Katsikopoulos et al., 2022). This underscores the need for a nuanced and comprehensive understanding of the role of intuition in clinical decision-making, acknowledging its potential benefits while also recognising the inherent limitations that may impact its reliability and consistency in healthcare practice.

The synthesis of evidence-based decision-making and intuition represents the most effective approach to clinical decision-making, offering a balanced integration of empirical rigour and experiential wisdom. Evidence-based decision-making furnishes a solid foundation for clinical practice, underpinned by rigorous research and objective data (Greenhalgh, 2002). Conversely, intuition contributes invaluable insights derived from accumulated experience and personalised patient interactions, enabling healthcare providers to efficiently discern complex patterns and make timely clinical judgements (Hermann et al., 2017).

By embracing a culture of critical thinking and open communication within healthcare teams, practitioners can maximise the strengths of both evidence-based decision-making and intuitive insights, resulting in enhanced patient outcomes (Greenhalgh, 2002). This integrative approach acknowledges the complementary nature of evidence-based guidelines and intuitive clinical reasoning, ultimately fostering a holistic and patient-centred model of care delivery.

2.8 Conclusion

This comprehensive literature review was carried out to critically evaluate the findings of this study. Indeed, it offered a thorough exploration of historical contexts and decision-making models within the healthcare landscape, highlighting the evolving significance of intuition in shaping clinical decision-making processes. This review also delved into the intricate interplay between rational and intuitive cognitive processes, laying bare the multidimensional nature of intuition and its changing role in healthcare decision-making. While evidence-based practice continues to stand as a pillar in healthcare decision-making, there is growing recognition among healthcare professionals of the complementary value of intuition in clinical decision-making and patient care (Greenhalgh, 2002).

Drawing from unconscious knowledge and experiential insights that may elude explicit articulation, intuition holds a distinct position in decision-making processes. It is evident that when harnessed by expertise, tacit knowledge, and pattern recognition, intuition plays an indispensable role in swiftly deciphering intricate information and guiding decision-making within healthcare contexts (Hermann et al., 2017). However, the utilisation of intuition in decision-making necessitates thoughtful consideration, as it can be susceptible to inherent limitations and biases, potentially impacting the quality and objectivity of clinical judgements. Therefore, healthcare professionals must approach intuitive decision-making cautiously, ensuring that it complements, rather than replaces, evidence-based practice.

To explore these dynamics further, the research methodology used for this study will follow this chapter. It must effectively capture the nuanced interplay between analytical and intuitive processes among healthcare professionals. A robust framework is essential for translating findings into practical strategies that enhance clinical decision-making. Therefore, a scoping review was selected to address the three key research questions (RQ) of this project:

RQ1. What is currently known about the role of intuition in clinical decision-making within acute healthcare settings?

RQ2. What factors influence the development and utilisation of intuition among healthcare professionals in acute care?

RQ3. Is there an interaction between intuition and evidence-based practice in clinical decision-making?

These questions were formulated to guide a deeper investigation into intuition's complex yet essential role in modern healthcare.

Chapter 3 Methodology

Chapter 3 Methodology

This chapter describes in detail the methodology adopted for this study, outlining the conceptual framework, including the scoping review based on the Cochrane framework. The scoping review methodology allowed the researcher to systematically explore the existing literature on the topic, identify patterns and gaps in knowledge, and pave the way for further investigation into the role of intuition in shaping clinical practices and patient outcomes. The PRISMA-ScR checklist was used as the backbone for the development of this scoping review, clarifying the data extraction, analysis, and presentation processes (Pollock et al., 2023; Appendix 1).

In this chapter, the author also explains how the research questions presented in the literature review were addressed. The researcher also discusses the search strategies employed, the criteria used for including and excluding studies, how the results were presented and analysed, and the challenges and limitations faced.

3.1 Exploring Intuition in Clinical Decision-making

Scoping reviews are systematic assessments that aim to map the existing literature on a specific topic or research question (Peters et al., 2015). The methodology involves iterative processes of literature searching, data extraction, and synthesis of findings, fostering a clearer understanding of the topic's landscape and facilitating the identification of areas requiring further investigation (Campbell et al., 2015).

A scoping review on intuition in clinical decision-making in healthcare was conducted with the aim of comprehensively mapping out and exploring the existing literature in this area. By delineating the existing body of knowledge and identifying key concepts, sources, and knowledge gaps related to the role of intuition in clinical decision-making, this scoping review aimed to provide a broad understanding of how intuition influences decision-making processes in healthcare. Additionally, this review sought to establish the various models, definitions, and factors associated with intuition while scrutinising its potential impact on healthcare outcomes. The overarching goal was to offer a comprehensive overview of the conceptual framework surrounding intuition and its integration into clinical decision-making in acute healthcare, providing insights for future research, practice, and policy development in this field.

3.2 Defining the population, interventions, outcomes, and time frame

Defining the targeted population, interventions, outcomes, and time frame is crucial for ensuring that the scoping review remains focused on the specific group of interest while helping the researcher identify the right studies (Peters et al., 2015). Clear criteria also ensure consistency and reproducibility in data extraction and results.

- Population: Healthcare professionals working in acute healthcare settings.
- Intervention: The utilisation of intuition in the clinical decision-making process.
- Outcome: The impact of intuition on clinical decision-making, patients' outcomes, and overall healthcare delivery.
- Time frame: Studies from the last 20 years (from 1st January 2004 till 1st June 2024) to assess the evolution of research on intuition in clinical decision-making.

3.3 Selecting relevant sources

The search strategy employed in scoping reviews is critical, as the thoroughness and representativeness of the identified studies significantly affect the quality of the conclusions drawn from the review (Harari et al., 2020). The following subsections present the search strategy used, evaluating the utilised inclusion and exclusion criteria, keywords, Boolean operators, and electronic databases. A professional librarian was also consulted to enhance the quality and thoroughness of the data collection.

3.3.1 Identifying Keywords

Keywords play a crucial role in developing an effective search strategy for scoping reviews, enabling researchers to comprehensively map the existing literature on a specific topic. Thus, relevant terms and keywords were identified before starting the literature search. Following the guidance offered by Peters et al. (2015), a literature review was conducted to understand intuition's conceptual domain in clinical decision-making. The central components of the research area were then broken down. The common elements identified include "intuition", "clinical decision-making", "acute healthcare", "decision-making", and related terms such as "acute setting", "judgement", "clinical reasoning", "intensive care", "emergency", "critical care", "medical", "surgical", and "intuitive". The alternative keywords were used to ensure more exhaustive research.

3.3.2 Search Operators and Tools

Boolean operators ("AND" and "OR") were used to help refine the search strategy by combining keywords and specifying relationships between concepts. Medical Subject

Headings (MeSH) headings were also utilised to broaden the search by including variations of a keyword. Filters like “language” and “publication date” were incorporated into the search to eliminate articles that did not fall under the inclusion criteria. These filters were used for all electronic searches.

3.3.3 The Search Strategy

To review a body of literature, it is essential to identify relevant studies for inclusion through a systematic and reproducible strategy. As noted in Table 2, studies from the past 20 years on intuition in clinical decision-making within an acute healthcare setting were included in the review. Meanwhile, studies not written in English, theoretical articles, studies not involving healthcare providers working in acute settings, and studies set in psychiatric care were excluded. This scoping review also omitted books, editorials, and opinion pieces.

TABLE 2

LIST OF INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria	Exclusion Criteria	Rationale
Articles published in English	Articles not published in English	To ensure a comprehensive understanding of the study in a language in which the researcher is proficient
Articles published between 2004 and 1st June 2024	Articles published before 2004	Healthcare is continuously changing, and this 20-year scope was considered sufficient to provide the researcher with the latest research available.
Peer-reviewed articles	Non-peer reviewed articles	To yield high-quality scientific material
Studies set within an acute healthcare setting	Studies set within any other healthcare setting	Healthcare is very dynamic; thus, the review aimed to focus on one particular setting.
Primary research studies, randomised control trials, systematic reviews and meta-analyses, quasi-experimental studies, and prospective and retrospective cohort studies	Opinion pieces, ebooks and books, editorials, and theoretical articles	To ensure the utilisation of high-quality evidence that is both reliable and scientifically robust

In addition to identifying keywords, selecting appropriate electronic databases is crucial, as this significantly impacts the breadth of the search (Harari et al., 2020). Utilising multiple databases allows for the inclusion of a wider range of studies, encompassing varied methodologies, populations, and settings, which enhances the overall richness and specific insights of the search results. The electronic databases used (see Table 3) were accessed

through the University of Malta's online library, as it gives access to a vast selection of peer-reviewed journals while ensuring that the searches are reproducible. Comprehensively searching the electronic databases led to the retrieval of relevant peer-reviewed articles, reviews, and meta-analyses.

TABLE 3

LIST OF DATABASES USED AND THE JUSTIFICATION

Database	Reason for Inclusion
PubMed	PubMed is a comprehensive database housing medical and biological resources, granting users access to a plethora of life science journals and online books.
EBSCOhost	This database offers a diverse array of individual databases spanning various disciplines, including applied science, humanities, sociology, and business. It boasts a wide selection of peer-reviewed and reliable sources.
SCOPUS	SCOPUS stands out as a database encompassing international research across fields such as science, technology, medicine, social sciences, arts, and humanities. Equipped with sophisticated tools, it allows users to track, analyse, and visualise research data. Additionally, it employs the h-index to rank journals and authors based on the frequency of citations.
Web of Science	Also referred to as Web of Knowledge, this multidisciplinary resource enables simultaneous cross-searching across a range of citation indexes and databases. It provides resources for the science, social science, and humanities disciplines.

The initial online search yielded 1240 results, among these 229 were identified as duplicates. The primary researcher conducted a Level One screening of the titles and abstracts

of the remaining 1,011 studies. Subsequently, both the primary and a secondary researcher undertook the full-text screening of the 141 studies that passed the initial screening, resulting in the exclusion of 120 studies. Relying solely on electronic database searches can limit the comprehensiveness of a review, as this method would only capture studies that are indexed, published in the included journals, or contain the specific search terms used by the researcher (Harari et al., 2020). Thus, complementary strategies were implemented for the Level Two screening: A backward search was done by screening all the references of the selected studies, and an intensive manual search was carried out to ensure that no important studies had been left out. Consequently, these efforts resulted in the addition of seven additional studies to the data collection.

3.4 Synthesising the results

3.4.1 Data Charting

The selected studies were primarily charted and presented in a Microsoft Excel sheet (Appendix 2). The studies that met the eligibility criteria were appraised and plotted in a standardised table with the following extracted fields:

- Author/s
- Title
- Year of publication
- Study population and sample size
- Methodology
- Aim of the study

- Findings of the study
- Study location
- Quality of the study.

The above data extraction format was piloted while preparing the proposal for this scoping review. The fields were created using a deductive approach, respecting the research questions. Following the pilot test, the “study population” field was added.

3.4.2 Critical Appraisal Tool

The methodological quality of the selected studies was systematically evaluated using user-friendly critical appraisal tools from the Joanna Briggs Institute (JBI). Critical appraisal tools are not one-size-fits-all; thus, different JBI checklists were used, depending on the methodology of the reviewed study. Each checklist asks several questions to assess the rigour of a study. An explanation of each question is provided with every checklist. The studies that were retained following the appraisal were plotted as described in Subsection 3.4.1. This ensured that the researcher had synthesised the evidence systematically and that reliability and validity had been established (Buccheri & Sharifi, 2017).

3.4.3 Classifying the Results

The key findings were organised thematically in line with the research questions of this scoping review. As advised by Peters et al. (2015), the extracted results were presented in chart form using the JBI PRISMA flow diagram. Many of the perspectives presented in the literature on the use of intuition within acute healthcare settings were compared and discussed in depth

in a descriptive format. Gaps in knowledge were identified, and areas for future research were highlighted to further enhance the understanding of intuition in clinical decision-making.

3.5 Challenges and Limitations

The methodology is robust and systematic, guided by the Cochrane framework for scoping reviews and PRISMA-ScR methodology. Despite the structured approach, several limitations and challenges are inherent in this methodology. Firstly, defining the scope of this review and identifying relevant studies proved complex, given the broad nature of scoping reviews and the potential variability in terminology and research focus within the field of intuition in clinical decision-making. Secondly, while efforts were made to ensure a comprehensive search strategy, there was a risk that relevant studies might be omitted, particularly those published in languages other than English or located in sources not captured by the selected databases. Additionally, the reliance on peer-reviewed articles may introduce publication bias, omitting valuable insights from grey literature or non-traditional sources.

Furthermore, despite utilising critical appraisal tools like the JBI checklists, assessing the methodological quality of diverse study designs in a scoping review context can be challenging, potentially affecting the overall reliability of the synthesised evidence. Finally, the interpretation of results and synthesis of findings from heterogeneous studies may pose difficulties in drawing coherent and conclusive insights, considering the diverse perspectives and methodologies encompassed within the review. These challenges and limitations underscore the complexity of conducting a scoping review on a multifaceted topic like intuition in healthcare decision-making and emphasise the need for transparency, rigour, and critical

reflection throughout the research process to effectively navigate and mitigate these inherent constraints.

3.6 Conclusion

In conclusion, the methodology employed for this scoping review on the role of intuition in clinical decision-making within acute healthcare settings was structured and guided by adopting the Cochrane framework for scoping reviews and utilising the PRISMA-ScR methodology. This scoping review aimed to systematically explore existing literature; delineate various models, definitions, and factors associated with intuition; and identify patterns and gaps in knowledge concerning its role in shaping clinical practices and patient outcomes, ultimately evaluating its impact on healthcare. Clearly describing the research questions as well as the adopted inclusion and exclusion criteria, the utilised literature search strategy and data synthesis methods highlighted the robust foundation laid out for conducting this review.

Implementing a systematic search strategy, creating a set of inclusion and exclusion criteria, and utilising multiple databases ensured that only truly relevant studies were examined, enhancing the quality and reliability of the review's results.

Meanwhile, using the JBI tools for data charting and critical appraisal facilitated the systematic evaluation of the selected studies, enhancing the validity and reliability of the synthesised evidence. Additionally, thematically organising the review's key findings and identifying gaps in the literature provided valuable insights for future research, practice, and policy development, laying a solid groundwork for advancing understanding in the field of

intuition in clinical decision-making. The next chapter discusses the results of the systematic search described in this chapter.

Chapter 4 Results

Chapter 4 Results

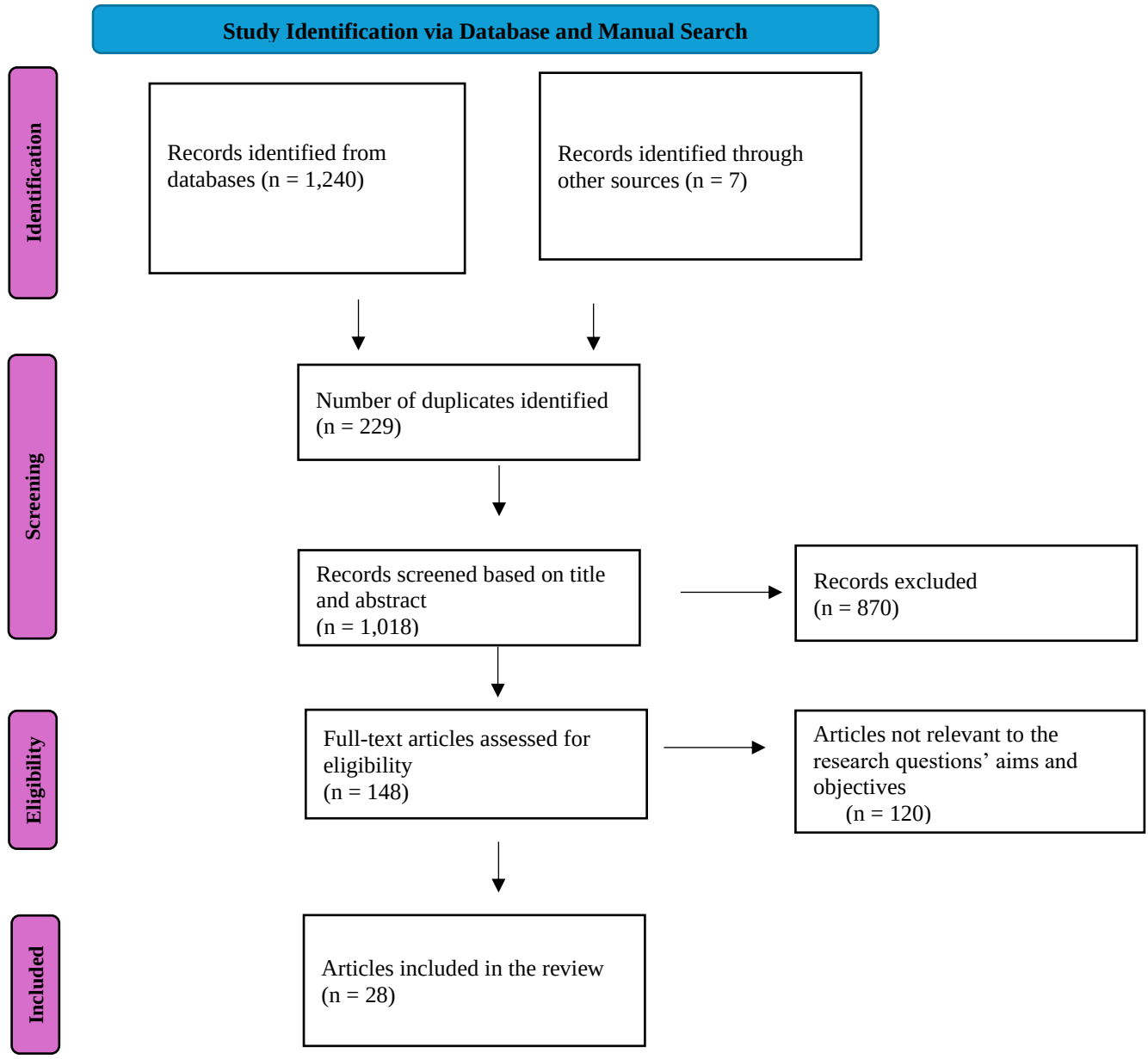
This chapter presents the findings obtained from this review, which systematically explored the existing literature to map out the current knowledge landscape surrounding intuition within the context of clinical decision-making. As described in the methodology, a comprehensive search strategy was carried out utilising electronic databases such as PubMed, EBSCOhost, Web of Science, and SCOPUS supplemented by manual searches. A total of 28 relevant articles were identified for inclusion in the review.

The chapter starts off with a descriptive summary of the results, including the characteristics of the selected studies and the samples analysed. It then presents the themes identified during the data analysis process.

4.1 Descriptive summary

The primary search results yielded a large number of hits, with 1,240 studies identified from the aforementioned electronic databases and another 7 studies located through a manual search (see Figure 1). The results were screened, and 229 duplicates were filtered out. The remaining records were revised based on their titles and abstracts. This resulted in the exclusion of another 870 studies for various reasons, including inappropriate population, not being set in acute healthcare, and not investigating intuition. The full text of the remaining 148 studies was analysed to verify their relevance to the research questions' aims and objectives. In the end, 120 studies were eliminated, and the remaining 28 studies were included in the scoping review.

FIGURE 1
PRISMA FLOW DIAGRAM



As presented in Table 4, these studies investigated a diverse range of healthcare professionals, with the majority involving nurses (n=17) and physicians (n=8), although a small number included a mix of healthcare professionals (n=3). No other healthcare professionals categories

were featured in the studies reviewed. Various data collection methods were used in the reviewed studies; however, qualitative approaches were predominant (n=15), with studies featuring techniques such as interviews (n=9), focus group discussions (n=2), case series (n=1), interviews combined with observation (n=2), and focus group discussions combined with observation (n=1). Meanwhile, quantitative methods were employed in 13 studies, including cross-sectional designs (n=9), systematic reviews (n=2), mix study reviews (n=1), and experimental designs (n=1). The studies were geographically distributed across various regions, with prominent locations including Iran (n=7), the European Union (n=6), Canada (n=3), and the USA (n=4), along with three multinational studies and representation from Australia, Saudi Arabia, China, and South Korea. Upon assessment, 15 studies were rated as high quality, 11 studies were considered to be of high to medium quality, and two were classified as medium quality. The range of publication years spanned from 2004 to 2023, with multiple studies published in the later years, particularly in 2018 and 2019.

TABLE 4

THE CHARACTERISTICS OF THE IDENTIFIED STUDIES

The Characteristics of the Identified Studies (n = 28)	
Subjects (n = 28)	
Nurses/Midwives	17
Physicians	8
Mix	3
Data collection method (n = 28)	
Qualitative (n = 15)	
Interviews	9
Focus group discussions	2
Case Series	1
Interviews plus observation	2
Focus group discussions plus observation	1
Quantitative (n = 13)	
Cross-sectional design	9
Experimental design	1
Systematic reviews	2
Mix studies review	1
Location of study (n = 28)	
Iran	7
EU	6
USA	4
Canada	3
Multinational	3
Australia	2
Saudi Arabia	1
China	1
South Korea	1
Study quality (n = 28)	
High Quality	15
High to Medium Quality	11
Medium Quality	2
Year of publication (n = 28)	
2004–2008	3
2009–2013	2
2014–2018	12
2019–2024	11

4.2 Thematic Analysis

The 28 studies included in this scoping review were systematically appraised, and key information was charted (see Appendix 2). A thematic analysis was then conducted, revealing several prominent themes and insights regarding the use of intuition in clinical decision-making across various healthcare professionals. These themes were organised according to this study's three primary research questions. Table 5 provides an overview of the authors and the specific themes they explored. A short descriptive summary of each theme is presented in the following subsections; however, these are examined in greater detail in the Discussion chapter. It is important to note that some themes received more attention in the literature than others.

TABLE 5

THEMATIC ANALYSIS TABLE

Themes	Authors
RQ1	**What is currently known about the role of intuition in clinical decision-making within acute healthcare settings?**
Types of intuition	Vanstone et al., 2019; Lyneham et al., 2008
Integration with rational processes	Vanstone et al., 2019; Van Den Brink et al., 2019; Salloch et al., 2018; Lambrechts et al., 2021; Miller & Hill, 2018
Development with knowledge, experience, and pattern recognition	Price et al., 2016; Melin-Johansson et al., 2017; Azizi et al., 2023; Lyneham et al., 2008; Ramezani-Badr et al., 2011; Wu et al., 2013; Patel et al., 2008; Sharma et al., 2016; Aghajani et al., 2022; Hassani et al., 2016b; Cork 2014
Benefits in diagnosis and complex presentation	Vanstone et al., 2019; Price et al., 2016; Hassani et al., 2017; Ramezani-Badr et al., 2009; Wu et al., 2013; Lambrechts et al., 2021; Aliakbari et al., 2022; Cork, 2014; Holm & Severinsson, 2016
Defining intuition	Hassani et al., 2016; Ramezani-Badr et al., 2009; Ruzsa et al., 2020; Aghajani et al., 2022; Hassani et al., 2016b; Holm & Severisson, 2016
The limitations of intuition	Melin-Johansson et al., 2017; Azizi et al., 2023; Manias et al., 2004; Park et al., 2021; Van Der Brink et al., 2019; Salloch et al., 2018; Wu et al., 2013; Ronnberg et al., 2021; Lambrechts et al., 2021; Ronnberg et al., 2019
RQ2	**What factors influence the development and utilisation of intuition among healthcare professionals in acute care?**
The influence of knowledge and experience	Melin-Johansson et al., 2017; Azizi et al., 2023; Lyneham et al., 2008; Hassani et al., 2016; Van Der Brink et al., 2019; Ramezani-Badr et al., 2009; Patel et al., 2008; Aldamiri et al., 2018; Sharma et al., 2016; Ronnberg et al., 2021; Cork, 2016; Holm & Severisson, 2016

Contextual and organisational factors	Price et al., 2016; Azizi et al., 2023; Wu et al., 2013; Park et al., 2021; Ruzsa et al., 2020; Miller & Hill, 2018; Holm & Severinsson, 2016
Confidence and autonomy in applying intuition	Melin-Johansson et al., 2017; Lyneham et al., 2008; Manias et al., 2004; Hassani et al., 2016; Patel et al., 2008
The emotional and cognitive aspects of intuition	Vanstone et al., 2019; Aghajani et al., 2022; Ronnberg et al., 2019; Holm & Severinsson, 2016
RQ3	**Is there an interaction between intuition and evidence-based practice in clinical decision-making?**
Relationship with clinical competence	Price et al., 2016; Lyneham et al., 2008; Hassani et al., 2017; Cork, 2014
Decision-making ability in complex cases	Park et al., 2021; Ramezani-Badr et al., 2009; Salloch et al., 2018
Integration with analytic systemic methods	Vanstone et al., 2019; Aldamiri et al., 2018; Ronnberg et al., 2021; Ronnberg et al., 2019; Cork, 2014; Holm & Severinsson, 2016
The impact on clinical decisions and patient outcomes	Hassani et al., 2016; Van Der Brink et al., 2019; Calder et al., 2012; Hassani et al., 2016b
Value in specific specialities	Azizi et al., 2023; Wu et al., 2013; Ruzsa et al., 2020; Sharma et al., 2016; Lambrechts et al., 2021; Aliakbari et al., 2022; Calder et al., 2012

4.2.1 RQ1. What is currently known about the role of intuition in clinical decision-making within acute healthcare settings?

4.2.1.1 Types of Intuition

While investigating diagnostic intuition, Vanstone et al. (2019) identified four types of intuition: sick/not sick, something not right, frameshifting, and abduction. These types demonstrate the nuanced nature of intuition in clinical reasoning, emphasising its multifaceted role in diagnosis and decision-making. Meanwhile, Lyneham et al. (2008) explored intuition in emergency nursing within the context of Benner's "expert practitioner" stage. They identified three types of intuition: cognitive intuition, transitional intuition, and embodied intuition.

4.2.1.2 Integration with Rational Processes

Several studies (Salloch et al., 2018; Vanstone et al., 2019) have discussed the integration of intuition with rational processes, emphasising the interwoven nature of analytical and non-analytic reasoning. Vanstone et al. (2019) recognised that intuition could detect errors and correct the outcome of analytical reasoning, contributing to more effective decision-making. Additionally, most of the specialists who took part in the study by Van Den Brink et al. (2019) agreed that intuition should be used as a guide and followed by analytical reasoning. In studies involving midwives and nurses, intuition is also advocated as a precursor for analytical reasoning (Lambrechts et al., 2001; Miller & Hill, 2018). This highlights the complex relationship between intuitive and analytical decision-making in clinical practice.

4.2.1.3 Development with Knowledge, Experience, and Pattern Recognition

Melin-Johansson et al. (2017), Lyneham et al. (2008), Ramezani-Badr et al. (2009), Aghajani et al. (2022), Hassani et al. (2016), Cork (2014), and Azizi et al. (2023) provide insights into how intuition develops over time, explaining that it is based on knowledge, experience, and contextual factors. It must be noted that in four of the selected studies (Cork, 2016; Patel et al., 2008; Sharma et al., 2016; Wu et al., 2013), experience is considered the main building block of intuition. Similarly, Price et al. (2016) found that intuition is more effectively used in familiar problems and that its value relies on cue acquisition. The gradual development of intuition and its reliance on pattern recognition are crucial aspects for understanding the role of intuition in clinical decision-making.

4.2.1.4 Benefits in Diagnosis and Complex Presentations

Vanstone et al. (2019) and Ramezani-Badr et al. (2009) shed light on the benefits of intuition in recognising atypical clinical presentations, making complex diagnoses, and reaching accurate decisions quickly, underscoring its importance in addressing challenging clinical scenarios. Similarly, according to the midwives who participated in the study by Lambrechts et al. (2021), intuition is activated in complex situations or when things are not taking the routine path. The Iranian nurses involved in the study by Aliakbari et al. (2022), in fact, claimed that they use intuitive decision-making during disasters. Meanwhile, Price et al. (2016), Cork (2014), and Wu et al. (2013) associate intuition with enhanced decision-making accuracy. On the contrary, in a study examining the role of intuition among critical care nurses,

Hassani et al. (2017) reported that they did not find a significant relationship between the use of intuition and clinical competence which is essential in complex presentations.

4.2.1.5 Defining Intuition

A number of studies show that intuition is understood as an amalgamation of feelings, thoughts, and perceived signs that guide clinicians' decisions (Hassani et al., 2016; Holm & Severinsson, 2016). Likewise, the critical care nurses who participated in the study by Aghajani et al. (2022) defined intuition as an inner revolution, holistic awareness, and clinical wisdom. On the same note, Hassani et al. (2016b) identified proficiency, connection, and benevolence as the three main features of an intuitive nurse. Intuition is also defined by Ramezani-Badr et al. (2009) as unconscious reasoning bolstered by knowledge and experience, while Ruzsa et al. (2020) offer a similar definition.

4.2.1.6 The Limitations of Intuition

Scepticism and critique regarding the legitimacy and application of intuition are widespread, particularly among scientists and colleagues within the healthcare field (Melin-Johansson et al., 2017; Van Der Brink et al., 2019). Criticisms include concerns about the inexplicable nature of intuition, the limitations of using intuition independently, and the potential biases it may introduce to decision-making processes (Azizi et al., 2023; Manias et al., 2004; Salloch et al., 2008). Several authors, in fact, argue that intuition should be followed by more rational and analytical reasoning (Azizi et al., 2023; Lambrechts et al., 2021; Park et al., 2021; Ronnberg et al., 2019; Ronnberg et al., 2021; Wu et al., 2013).

4.2.2 RQ2. What factors influence the development and utilisation of intuition among healthcare professionals in acute care?

4.2.2.1 The Influence of Knowledge and Experience

Several studies (Aghajani et al., 2022; Aldamiri et al., 2018; Azizi et al., 2023; Cork, 2014; Douw et al., 2015; Hassani et al., 2016a; Hassani et al., 2016b; Holm & Severinsson, 2016; Lambrechts et al., 2021; Melin-Johansson et al., 2017; Ramezani-Badr et al., 2009; Ronnberg et al., 2021; Van Den Brink et al., 2019; Wu et al., 2013) emphasise that intuition grows with experience and knowledge. This argument highlights the importance of experiential learning, contextual understanding, and organisational factors like organisational culture in shaping the development and utilisation of intuition among healthcare professionals. Similarly, Lyneham et al. (2008) as well as Patel et al., (2008) and Sharma et al., (2016) describe intuition as a developmental aspect of clinical practice, arguing that its usage increases with years of experience.

4.2.2.2 Contextual and Organisational Factors

Azizi et al. (2023) provide insights into how contextual and organisational factors can influence the formation and implementation of intuition, shedding light on limitations and barriers that may impact the effective use of intuition in clinical practice. Nurses and physicians were found to rely on intuition when it complements clinical reasoning and expertise, especially in familiar or complex scenarios (Holm & Severinsson, 2016; Price et al., 2016; Ruzsa et al., 2020; Wu et al., 2013). Meanwhile, Miller and Hill (2018) conducted a comparison of three categories of nurses practising within the same healthcare institution and found no

significant differences in their utilisation of intuition. In contrast, contextual factors emerged in the study of South Korean nurses, who reported a lack of confidence in using their intuition and expressed a preference for relying on physicians for decision-making. This highlights how organisational and contextual influences can shape nurses' approaches to intuitive decision-making (Park et al., 2021).

4.2.2.3 Confidence and Autonomy in Applying Intuition

Melin-Johansson et al. (2017) found that experienced nurses exhibit greater confidence in utilising intuition in their clinical decision-making processes. This finding underscores the significance of both professional confidence and autonomy in influencing decision-making outcomes and highlights the evolving role of intuition as a critical component in the development of nursing practice. Similarly, Lyneham et al. (2008) found that nurses' intuition improves as they become experts in their fields, at which point they have complete confidence in their intuition. On this note, through their qualitative study, Patel et al. (2018) observed paediatric emergency nurses' confidence in their intuition. They found that clinical guidelines become internalised with experience, and decision-making becomes more intuitive. Meanwhile, Hassani et al. (2016) found that the Iranian critical care nurses who took part in their study understood and trusted intuition; however, they were not comfortable relying on it. In addition, all the graduate nurses who took part in the study by Manias et al. (2004) preferred to rely on hypo-deductive reasoning.

4.2.2.4 The Emotional and Cognitive Aspects of Intuition

The emotional and cognitive aspects of intuition play a critical role in clinical decision-making, particularly when integrated with clinical knowledge, expertise, and a nuanced understanding of patients' conditions. Vanstone et al. (2019), Holm and Severisson (2016), and Aghajani et al. (2022) highlight how these dimensions are interrelated in the practice of nursing. Ronnberg et al. (2019) further elucidate this dynamic by noting that while nurses frequently depend on their intuitive judgment in clinical settings, they often feel a heightened sense of security when their intuitive decisions can be affirmed by objective data. This reliance on validation underscores the interplay between intuition and evidence.

4.2.2 RQ3. Is there an interaction between intuition and evidence-based practice in clinical decision-making?

4.2.3.1Relationship with Clinical Competence

Hassani et al. (2017) found no correlation between the use of intuition and clinical competence among critical care nurses. This insight raises questions about the relationship between intuitive decision-making and clinical competency, suggesting that competency may not necessarily be linked to the reliance on intuition in practice. Yet, whilst studying novice nurses, Price et al. (2016) found that when dealing with familiar cases, intuition led to more accurate decision-making. Additionally, both Australian and American emergency nurses reported that their intuitive judgments are deeply rooted in their accumulated knowledge and experience, suggesting that as nurses advance in their careers and gain expertise, their intuitive capacities evolve, thereby contributing to their clinical competence (Cork, 2014; Lyneham et al., 2008).

4.2.3.2 Decision-making Ability in Complex Cases

The critical care nurses who took part in the study by Ramezani-Badr et al. (2009) considered intuition as one of the three main reasoning strategies used. Oncologists, too, indicated that they found intuition particularly useful, especially in cases where solid data were missing (Salloch et al. 2018). Meanwhile, Park et al. (2021) found that while intuition is indeed present among nurses and is associated with both expertise and critical thinking, effective decision-making in complex cases necessitates an analytic-systemic approach. This suggests that although intuitive insights can inform immediate judgments, particularly for experienced practitioners, the multifaceted nature of complex clinical scenarios requires a structured analytical framework to ensure comprehensive evaluation and optimal outcomes

4.2.3.3 Integration with Analytic Systemic Methods

Through their qualitative study, Ronnberg et al. (2019) discovered that nurse anaesthetists rely a lot on intuition during the process of extubation. Their reliance on intuition is complemented by a structured approach involving data analysis and strategic decision-making, thus integrating intuitive responses with analytical methods. On this note, Vanstone et al. (2019) concluded that when intuition is interwoven with analytic reasoning, it can also detect analytical errors. Similarly, while investigating Saudi physicians, Aldamiri et al. (2018) found that both intuitive and analytical reasoning are important and that no approach is considered more valuable than another. Analogous results were obtained through a qualitative study involving anaesthesiologists (Ronnberg et al., 2021).

4.2.3.4 The Impact on Clinical Decisions and Patient Outcomes

Calder et al. (2012) found that although participating emergency physicians employed intuition in their decision-making processes, it was not their preferred approach, reflecting a broader tendency to favor rational decision-making. This finding prompts further exploration of how the integration of intuition with evidence-based practice may influence clinical decisions and ultimately affect patient outcomes. Similarly, Hassani et al. (2016b) employed semi-structured questionnaires to assess Iranian critical care nurses, revealing that those who relied on their intuition demonstrated proficiency in knowledge, skill, and experience. In contrast, another group of Iranian critical care nurses expressed discomfort using intuition, despite their understanding and trust in its validity (Hassani et al., 2016). These insights are echoed in the study by Van Der Brink et al. (2019), where specialist doctors recognized the role of intuition but reported that they consistently complemented their intuitive judgments with analytic reasoning. Collectively, these studies underscore the nuanced role of intuition in clinical decision-making, suggesting that while intuition can enhance decision quality when combined with analytic approaches, not all practitioners feel equally comfortable integrating these modalities, which may have implications for patient outcomes.

4.2.3.5 Value in Specific Specialities

Lambrechts et al. (2021) and Azizi et al. (2023) focused on the role of intuition in obstetrics and midwifery as well as paediatric nurses' decision-making. Their participants acknowledged the presence of intuition but emphasised the importance of following it with analytic reasoning. Meanwhile, Chinese surgeons' intuition was found to be a good predictor of operative mortality for aortic dissection (Wu et al., 2013). Similar findings were found by Sharma et al. (2016), who investigated the decision-making of a renal surgeon. Additionally,

Ruzsa et al. (2020) found that healthcare professionals working in specialities of high complexity and emergency have a higher propensity for intuitive decisions. Indeed, intuitive decision-making was the most dominant approach used by Iranian nurses in disaster response competencies (Aliakbari et al., 2022). In contrast, Calder et al. (2012) found that although Canadian emergency physicians use intuition, it is not their preferred form of decision-making. This theme underscores the context-specific nature of intuition in different healthcare specialities and the necessity of integrating intuitive insights with evidence-based approaches for optimal patient care.

4.3 Conclusion

The thematic analysis presented in this chapter underscores the complex interplay between intuition and analytical reasoning in clinical decision-making. It highlights the importance of experience, confidence, and contextual understanding in the development and application of intuition while also acknowledging the critiques and limitations associated with its use. Overall, the findings suggest that while intuition serves as a valuable aspect of decision-making, its integration with evidence-based and analytical practices is crucial for effective and holistic patient care. The themes discussed in this chapter also highlight the complexities of intuition in healthcare decision-making, shedding light on its developmental nature, diverse interpretations, and multifaceted utilisation across different healthcare settings.

These themes are comprehensively explored in the next chapter not only to deepen the understanding of the current state of knowledge surrounding intuition and clinical decision-making but also to identify potential avenues for further research, practice, and policy development in the realm of healthcare decision-making.

Chapter 5 Discussion

Chapter 5 Discussion

This chapter discusses and critically analyses the findings derived from the reviewed studies, focusing on answering the research questions and offering recommendations for future research and practice. This study has synthesised a broad range of literature and empirical studies, bringing to light the pivotal role that intuition plays in healthcare, particularly in acute settings where rapid decisions are often required (Calabretta et al., 2017; Dane & Pratt, 2007). The findings are thematically analyzed and categorized according to the relevant research questions, allowing for a structured exploration of how intuition influences clinical decisions.

By examining these themes, the chapter aims to provide a comprehensive understanding of the interplay between intuition and evidence-based practice, highlighting the implications for healthcare professionals. Additionally, discussions will encompass the potential benefits and limitations of relying on intuitive judgments in clinical practice. The insights gained will inform recommendations for enhancing clinical training and decision-making protocols, ultimately aiming to improve patient outcomes in high-pressure environments.

5.1 RQ1: What is currently known about the role of intuition in clinical decision-making within acute healthcare settings?

5.1.1 Types of Intuition

Intuition plays a crucial role in clinical decision-making and can be classified into various types, each making a unique contribution to healthcare practice. These forms of

intuition include cognitive, transitional, embodied, emotional, and spiritual intuition (Dörfler & Ackermann, 2012; Vanstone et al., 2019; Ruzsa et al., 2020; Lyneham et al.,2008) .

Cognitive intuition relies on subconscious pattern recognition and experience-based knowledge (Dörfler & Ackermann, 2012). It is the first type of intuition identified by Lyneham et al. (2008), who studied intuition in emergency nursing. They interviewed 14 expert emergency nurses who described intuition as a developmental aspect of clinical practice. Meanwhile, transitional intuition is characterised by heightened awareness of physical sensations and behaviours, while embodied intuition means having complete trust in one's intuition (Lyneham et al., 2008). On the other hand, emotional intuition refers to the clinician's gut feelings and emotional understanding of a situation (Vanstone et al., 2019). Meanwhile, spiritual intuition, while less frequently discussed, encompasses a holistic awareness that integrates a clinician's values and beliefs (Ruzsa et al., 2020). These diverse types of intuition collectively enhance healthcare professionals' ability to make prompt decisions in high-pressure situations.

Vanstone et al. (2019) conducted semi-structured interviews to delve into the distinct types of diagnostic intuition identified and how experienced physicians utilise them. Through their investigation, they inductively identified four types of intuition: sick/not sick, something not right, frame-shifting, and abduction. These types of intuition arise during different diagnostic instances.

The first type, 'sick/not sick', typically occurs instantaneously and is not linked to a specific diagnosis. Physicians can confidently categorise a patient as either well or unwell. The second type, 'something not right', occurs when the physician has a feeling that something is

wrong, often in the presence of a discrepancy between subjective and objective data. This feeling is not specific to a diagnosis.

As the diagnosis progresses, ‘frame-shifting’ occurs when new insights arise and change the physician’s frame of mind. This type of intuition involves the correction of previous errors in reasoning. Finally, ‘abduction’ can occur throughout the diagnostic process and is related to a specific diagnosis. According to Vanstone et al. (2019), this type of intuition is a cognitive feat and is not related to visceral feelings or emotions. It can lead to rare occurrences of “Eureka” moments, where the physician arrives at a diagnosis while bypassing a significant number of logical steps (p.264). The participating interviewees emphasised that intuition should complement rational processes. Interestingly, however, this study includes no reports of instances where intuition led to an incorrect diagnosis, despite the researchers’ primary intention to investigate such occurrences.

5.1.2 Integration with Rational Processes

Intuition is not an isolated cognitive process but rather an integral component that interacts dynamically with rational decision-making models. The dual-process theory, which posits the existence of both intuitive and analytical systems of thinking, underscores this integration (Tversky & Kahneman, 1974). Indeed, integrating rational and intuitive processes allows for a more comprehensive approach to patient care, combining the speed of intuition with the thoroughness of analytical reasoning (Salas et al., 2010). In clinical settings, intuition can serve as a preliminary guide, providing initial direction or hypotheses that are then validated or refined through evidence-based analysis and rational deliberation (Miller & Hill, 2018).

The oncologists interviewed by Salloch et al. (2018) refer to intuition when solid data are missing or in complex clinical situations. Meanwhile, the specialists who took part in the study by Van Den Brink et al. (2019) insisted that intuition should be treated as a guide in the diagnostic process or as a trigger for further investigation. Similar findings were found by Lambrechts et al. (2021) while investigating Belgian midwives; while the latter viewed both intuition and analytic reasoning as important, they relied more on analytic reasoning during decision-making. Aldamiri et al. (2018) obtained comparable results through their cross-sectional study on Saudi emergency physicians, although their reliance on intuition increased proportionally with experience.

5.1.3 Development with Knowledge, Experience, and Pattern Recognition

The development of intuition is deeply rooted in the accumulation of knowledge and experience, which underpin the ability to recognise patterns swiftly and accurately (Dörfler & Ackermann, 2012). More than a third (n = 12) of the studies analysed for this scoping review emphasised the importance of knowledge and experience as building blocks for intuition. As healthcare professionals encounter a broad array of clinical scenarios, they build a reservoir of experiential learning that informs their intuitive judgements (Cork, 2014; Nibbelink & Brewer, 2018).

This was evident in the mixed-studies review done by Melin-Johansson et al. (2017). They found that as experience increased, nurses became more confident in relying on intuition. The relationship between intuition and knowledge and experience was also proven by Azizi et al. (2023), who studied intuition as practised by paediatric nurses in Iran, and by Aghajani et al.

(2021), Hassani et al. (2016a), Lyneham et al. (2008), and Patel et al. (2008), who investigated intuition as used by emergency and critical care nurses from different parts of the world. These researchers all conducted interviews to study and thoroughly comprehend the nature of intuition in nurses working in different acute healthcare settings. Although qualitative research is often critiqued for its subjectivity and limited generalisability, it is important to recognise and appreciate the consistency of the findings across all the aforementioned studies.

As illustrated in Klein's RPD model, experience also leads to pattern recognition, a cornerstone of intuitive expertise, enabling clinicians to detect subtle cues and anomalies that may not be immediately apparent through conscious analysis alone (Woolley & Kostopoulou, 2013). Ramezani-Badr et al. (2009) used semi-structured interviews to explore the reasoning strategies of critical care nurses, and pattern recognition was one of the main themes identified. That said, the participants did not consider pattern recognition as simply intuition; they argued that most of the time, pattern recognition is a deliberate process. Such experiential learning is crucial, especially in environments characterised by complexity and uncertainty. Indeed, Cork (2014) found that intuition has a significant role in the decision-making processes of emergency charge nurses. In addition, when Price et al. (2017) assessed novice nurses' reliance on intuitive and analytic processes, they found that they effectively used intuition in familiar situations by picking up the right cues in the scenarios presented.

5.1.4 Benefits in Diagnosis and Complex Presentations

The diagnostic process benefits significantly from intuition, particularly in complex cases where analytical data may be incomplete or ambiguous. Healthcare professionals often leverage intuitive insights to make initial diagnostic interpretations quickly, facilitating timely

interventions (Cork, 2014; Vanstone et al., 2019). In fact, the physicians who participated in the study by Vanstone et al. (2019) referred to this rapid and unconscious insight as 'eureka,' describing it as an extreme and rare type of diagnostic intuition. When this phenomenon occurs, the physician arrives at a specific diagnosis swiftly and instinctively, often unable to rationalize the underlying thought processes.

Studies consistently highlight that intuition supports more accurate decision-making in challenging scenarios, enabling clinicians to navigate atypical presentations and anticipate potential complications effectively (Lambrechts et al., 2021; Price et al., 2016). On this note, a prospective study by Wu et al. (2023) explored whether a surgeon's intuition is a valid predictor of operative mortality in acute aortic dissection. They examined 161 cases by comparing the surgeon's intuition with the traditional scoring system. The surgeon's intuition resulted in a good mortality predictor. However, since only one surgeon was involved, its results cannot be generalised.

Meanwhile, a midwife who took part in the qualitative study by Lambrechts et al. (2021) claimed that her gut feeling is activated in difficult situations or when things are not going smoothly. Similarly, a descriptive-analytical study conducted on 300 Iranian nurses revealed that the latter predominantly employed the intuitive decision-making style (Aliakbari et al., 2022). The researchers also found that as the nurses' experience increased, their disaster competencies improved. The ability to 'sense' the correct approach can prevent unnecessary delays in critical care situations, potentially improving patient outcomes. In contrast, Hassani et al. (2017), who quantitatively investigated the relationship between intuition and clinical competence in another group of Iranian nurses, found no relationship between the two. That said, most of their participants were junior nurses.

5.1.5 Defining Intuition

Intuition in clinical decision-making has been conceptualised through various lenses across the literature, reflecting its multifaceted nature and significant role in healthcare. The reviewed studies highlight intuition as a non-analytic cognitive process that facilitates rapid decision-making without explicit reliance on logical reasoning or probabilistic calculations (Adam & Dempsey, 2020; Aghajani et al., 2022; Epstein, 2010; Hassani et al., 2016b; Holm and Severinsson, 2016; Ramezani-Badr et al., 2009; Ruzsa et al. 2020). It is commonly described as a 'gut feeling' or immediate understanding that emerges from the subconscious synthesis of a clinician's knowledge and experiences. Indeed, Hassani et al. (2016b) found that Iranian critical care nurses understood intuition as "a feeling", "thought", "sign", and "alarm" (p.37). They all agreed that intuition is unconscious and automatic.

Similarly, Tversky and Kahneman's definition (1974) underscores intuition as decision-making that occurs "without the use of analytical methods or deliberate calculation", highlighting the speed and efficiency with which intuitive judgements can be made (p.1130). This perspective resonates with the practical utility of intuition in acute care settings, where clinicians must often rely on rapid assessments amidst uncertainty (Hassani et al., 2016a).

Similar findings were obtained through the online survey targeting physicians and nurses distributed by Ruzsa et al. (2020). While they did refer to the aforementioned features of intuition, the survey participants also defined this phenomenon as a strong reliance on experience-based knowledge built through emotional attunement to the patient. Meanwhile, Holm and Severinsson (2016), who appraised eight studies in their systematic review, describe intuition as a form of non-analytical knowledge that emerges from subconscious processing, emotional awareness, and deep-seated personal and clinical experiences. They contrast

intuition with insight, highlighting that intuition does not involve conscious awareness but guides nurses in decision-making through a rapid, holistic understanding of patient situations.

On the other hand, Epstein (2010) clarifies that while intuition is often categorised as non-linear thinking, it should be distinguished from irrational beliefs or superstitions. Indeed, intuition is informed by tacit knowledge and expertise rather than arbitrary or mystical insights (Ramezani-Badr et al., 2009). On this note, Aghajani et al. (2022), who conducted semi-structured interviews to explore what critical care nurses understand by intuition, concluded that intuition encompasses cognitive awareness, unconscious evaluation, justification through reflective thinking, and the integration of sensory experiences and behaviours into self-awareness.

Intuition can also be viewed through the lens of skill acquisition models, such as those proposed by Dreyfus and Dreyfus (1980), which suggest that intuitive decision-making evolves as healthcare practitioners gain expertise. Benner expanded on this by demonstrating how nurses transition from relying primarily on analytical methods to integrating intuition as their experience increases (Benner, 2001). This model suggests that intuition becomes increasingly reliable as practitioners develop the ability to recognise patterns and integrate complex information seamlessly.

Overall, the literature presents intuition as a critical element of clinical judgement, characterised by its immediacy, connection to experience, and capacity to enhance decision-making quality in the face of limited information. Understanding these definitions helps elucidate intuition's pivotal role in delivering effective, patient-centered care.

5.1.6 The Limitations of Intuition

Despite its recognised value in clinical decision-making, intuition is subject to several limitations that can impact its reliability and application in healthcare settings. The reviewed studies identify several key concerns, primarily related to the inherent subjectivity and potential for cognitive biases that accompany intuitive judgements.

The susceptibility of intuition to cognitive biases can lead to errors in decision-making. Tversky and Kahneman (1974) highlight how heuristics can lead to biases such as overconfidence, anchoring, and availability heuristics, thus distorting intuitive judgements and potentially resulting in inaccurate assessments or inappropriate interventions. These biases underscore the need for careful consideration while balancing intuitive insights with empirical data to mitigate the risks of error.

As noted by Klein (1998), the variability and subjectivity of intuition are also significant concerns. Intuition is heavily dependent on the individual clinician's experiences, emotional state, and cognitive processes, leading to potential inconsistencies in decision-making across practitioners. This subjectivity limits the generalisability of intuitive decisions and raises questions about their reproducibility and reliability in different contexts (Melin-Johansson et al., 2017).

The literature also discusses the challenge of verifying and validating intuitive insights in the absence of empirical evidence. While intuition can guide quick decisions, its lack of transparency and the difficulty in articulating its rationale can hinder its integration into evidence-based practice (Rönnberg et al., 2022). This presents a barrier to teaching and transferring intuitive skills among healthcare professionals, emphasising the need for

structured reflection and feedback mechanisms to enhance trust and credibility in intuitive decision-making (Holm & Severinsson, 2016).

Finally, organisational culture and systemic constraints can either inhibit or improperly elevate the role of intuition, influencing its efficacy. In rigid or hierarchical settings, the reluctance to deviate from established protocols can stifle intuitive practices, while environments that rely too much on intuition without sufficient evidence can risk patient safety (Price et al., 2016).

Overall, while intuition plays an essential role in clinical settings, addressing these limitations is critical for optimising its utility and ensuring high-quality patient care. Integrating structured reflective practices and strengthening the synergy between intuition and empirical analysis can help overcome these challenges, promoting more balanced and effective clinical decision-making.

5.2 RQ2: What factors influence the development and utilisation of intuition among healthcare professionals in acute care?

5.2.1 The Influence of Knowledge and Experience

Knowledge and experience are critical components that significantly influence the development and utilisation of intuition among healthcare professionals (Cork, 2014; Holm & Severinsson, 2016; Melin-Johansson et al., 2017). The relationship between these elements and intuition is well-documented in the literature, highlighting how they contribute to more effective and efficient clinical decision-making (Azizi et al., 2023; Hassani et al., 2016a;

Lambrechts et al., 2021; Lyneham et al., 2008; Ramezani-Badr et al., 2009; Rönnberg et al., 2022; Sharma et al., 2016).

Experiential learning plays a pivotal role in developing intuitive decision-making capabilities. As demonstrated by Cork (2014), as healthcare professionals accumulate hands-on experience, they build a repository of encounters and scenarios that enhance their ability to recognise patterns and make rapid decisions without deliberate, analytical thought. Likewise, Lyneham et al. (2008) highlight the development of intuitive skills as practitioners advance from novice to expert. They emphasize that expert nurses frequently depend on their intuitive capacities to navigate complex clinical situations with confidence and efficiency. This stands in with Benner's model, which frames the progression from beginner to expert more broadly by illustrating how nurses transition through five stages of clinical competence, gradually increasing their reliance on intuition as their tacit knowledge deepens.

The concept of tacit knowledge or knowledge gained through personal experience that is difficult to articulate also significantly contributes to intuitive decision-making (Eraut, 2000). Holm and Severinsson (2016) affirm that years of hands-on patient care contribute to a rich knowledge repository and situational awareness, facilitating intuitive decision-making. Patel et al (2008) argue that this transition is substantiated by Klein's RPD model, highlighting the evolution from predominantly analytical to increasingly intuitive cognitive processes with the accumulation of experience.

As indicated, experienced clinicians are better equipped to use intuition because they can quickly process and integrate complex empirical information. The mixed-studies review by Melin-Johansson et al. (2017) reveals that experienced practitioners demonstrate increased

speed and accuracy in decision-making by integrating intuitive insights with empirical data. Such abilities are precious in high-pressure environments where rapid judgements are necessary, highlighting intuition's role as a complement to evidence-based practice.

The development of intuition through experience has significant implications for education and training programmes in healthcare. Strategies such as simulation-based learning, reflective practice, and mentorship are vital to expose practitioners to diverse clinical scenarios. These approaches foster experiential learning, which is necessary for intuitive development (Miller & Hill, 2018; Price et al., 2017). They help bridge the gap between theoretical knowledge and practical application, reinforcing the synthesis of intuition with formal clinical guidelines.

5.2.2 Contextual and Organisational Factors

The environment in which healthcare professionals operate significantly impacts their ability to utilise intuition effectively. Supportive organisational cultures that encourage reflective practice and learning are pivotal in nurturing intuitive skills (Adler, 2022). In settings where clinical decision-making is valued and supported, practitioners are more likely to rely on their intuitive judgements (Greenhalgh, 2002). Melin-Johansson et al. (2017), in fact, highlight that healthcare environments that encourage autonomy, critical thinking, and reflective practice provide a fertile ground for intuition to flourish.

Conversely, hierarchical or rigid environments may stifle intuitive practice, as seen in cultures where protocol adherence is prioritised over personal judgement (Price et al., 2017). Organisations with rigid hierarchies and strict adherence to protocols may suppress intuitive

insights, as clinicians may feel constrained by their fear of deviating from standardised procedures. Meanwhile, a culture that values both analytical and intuitive decision-making can empower practitioners to leverage their experience and insights to complement evidence-based practice.

The presence of interdisciplinary collaboration within healthcare teams can also enhance the utilisation of intuition. Working alongside diverse professionals allows for the exchange of insights and experiences, which can refine intuitive skills (Siedlecki, 2020). Such a collaborative environment encourages open communication and shared decision-making, wherein intuitive judgements are discussed and validated against empirical evidence, thus allowing for a healthier integration of intuition into clinical practice.

Healthcare settings characterised by high complexity and time pressure, such as emergency departments, particularly rely on intuitive decision-making (Hassani et al., 2016b). In these environments, the ability to make rapid decisions is critical. The paediatric emergency nurses who participated in the study by Patel et al. (2008) stated that they often rely on non-analytic reasoning during triage. Cork (2014) reported similar findings while investigating emergency charge nurses.

Likewise, Vanstone et al. (2019) argue that the demand for quick, adaptive responses often necessitates the use of intuition, which thrives in dynamic and uncertain conditions. However, the pressure to make quick decisions can sometimes lead to reliance on intuition at the expense of a thorough analytical approach, reinforcing the need for supportive systems that provide adequate resources and time for reflective practice (Calabretta et al., 2017). Indeed, the availability of resources and continued professional development also influence the

development of intuition. Organisations that prioritise training that integrates both analytical skills and intuitive judgement equip healthcare professionals to adapt to various clinical scenarios effectively (Benner, 1982).

In conclusion, contextual and organisational factors play a crucial role in shaping the development and utilisation of intuition among healthcare professionals. A supportive culture that encourages interdisciplinary collaboration, provides adequate resources, and accommodates the rapid nature of healthcare environments is essential for optimising intuitive decision-making. By recognising and addressing these factors, healthcare organisations can enhance the integration of intuition into clinical practice, ultimately leading to better patient outcomes.

5.2.3 Confidence and Autonomy in Applying Intuition

Confidence and autonomy are crucial factors impacting the application of intuition in clinical settings. Healthcare professionals who feel confident in their skills are more likely to trust and act on intuitive judgements, which play a significant role in their decision-making processes (Cork, 2014; Patel et al., 2008).

Confidence in intuitive decision-making predominantly stems from accumulated clinical experience. As healthcare professionals gain experience, they develop a stronger trust in their intuitive capabilities, allowing them to make rapid decisions in complex and uncertain situations (Benner, 1984). Cork (2014) and Lyneham et al. (2008) suggest that experienced nurses exhibit heightened confidence in their intuitive judgements, often viewing intuition as

an extension of their experiential knowledge. This trust empowers them to act on their intuitive insights, enhancing their responsiveness and effectiveness in patient care.

Autonomy in clinical practice also plays a crucial role in the application of intuition. When healthcare professionals are granted the freedom to make independent judgements, they are more likely to rely on their intuition (Hassani et al., 2016a). Thus, aligning autonomy and intuition facilitates faster decision-making by eliminating the constraints of hierarchical oversight. Additionally, autonomy fosters an environment where clinicians feel empowered to integrate intuitive judgements with analytical reasoning, leading to more holistic and patient-centred care (Melin-Johansson et al., 2017).

The degree of confidence and autonomy experienced by healthcare professionals is intricately linked to organisational culture. As explained, in supportive environments that encourage innovation and acknowledge intuitive insights, clinicians are more willing to embrace intuition as part of their decision-making repertoire (Price et al., 2017). Conversely, in organisational settings where strict adherence to protocols is emphasised, clinicians may hesitate to exercise autonomy or rely on intuition, potentially stifling their intuitive development (Adler, 2022). It was, in fact, evident in several studies involving nurses that even though they understood and trusted intuition, they did not feel comfortable using it, often resorting to analytic decision-making (Azizi et al., 2023; Hassani et al., 2016b; Park et al., 2023).

Structured training programmes that emphasise experiential learning and reflective practice can significantly bolster confidence and autonomy in intuitive decision-making (Holm & Severinsson, 2016). Institutions that integrate such training approaches into their

professional development initiatives support clinicians in becoming more confident and autonomous, thereby enhancing the overall quality of care (Woolley & Kostopoulou, 2013).

In conclusion, confidence and autonomy are integral to the effective development and utilisation of intuition among healthcare professionals. By fostering an organisational culture that values experiential learning and empowers practitioners with autonomy, healthcare systems can ensure that intuition is optimally integrated into clinical decision-making, ultimately improving patient outcomes.

5.2.4 The Emotional and Cognitive Aspects of Intuition

Intuition in clinical decision-making involves both emotional and cognitive dimensions, which influence its use. These dimensions contribute to the complexity and depth of intuitive decision-making.

Emotional intuition involves the intuitive feelings or gut reactions that arise in clinical interactions and can play a crucial role in decision-making. According to Vanstone et al. (2019), the emotional dimension of intuition helps clinicians quickly assess patient needs by detecting non-verbal cues, emotional states, and subtle changes in condition that may not be immediately apparent through analytical methods. These emotional insights complement cognitive processing and often guide initial clinical judgements, particularly in patient-centred care environments where empathy and understanding are critical (Aghajani et al., 2022; Holm & Severinsson, 2016).

On the cognitive side, intuition is underpinned by subconscious processing and pattern recognition developed over years of experience. This aspect of intuition allows healthcare professionals to integrate vast amounts of tacit knowledge and experiential learning, facilitating rapid and effective decision-making even in complex or ambiguous situations (Dörfler & Ackermann, 2012). Rönnberg et al. (2019) describe how cognitive intuition helps clinicians recognise familiar patterns and anomalies, thus enabling them to arrive at accurate assessments and interventions without the need for exhaustive analytical processes.

In conclusion, the emotional and cognitive dimensions of intuition are integral to its development and utilisation in clinical decision-making. The interplay between the emotional and cognitive aspects of intuition enhances clinicians' ability to make holistic and informed decisions. Emotional instincts can alert clinicians to issues needing further exploration, while cognitive intuition provides a framework for addressing these concerns through informed pattern recognition and expertise. This dynamic interaction enables healthcare professionals to deliver empathetic, efficient, and expert care, making it essential in fast-paced environments, such as emergency departments, where decisions must be made swiftly but accurately (Patel et al., 2008).

5.3 RQ3: Is there an interaction between intuition and evidence-based practice in clinical decision-making?

5.3.1 Relationship with Clinical Competence

The interaction between intuition and evidence-based practice is complex and nuanced, particularly when considering clinical competence. Although intuition is often seen as separate

from evidence-based methods, it plays a substantial role in enhancing clinical competence by allowing healthcare professionals to draw on experiential knowledge and rapidly recognise patterns (Epstein, 2010). However, as noted in the study by Hassani et al. (2017), there is a debate about whether reliance on intuition correlates with higher clinical competence.

Clinical competence is closely linked with the ability to effectively utilise intuition. As clinicians gain experience and expertise, their reliance on intuition typically increases, reflecting their capacity to draw on a vast reservoir of tacit knowledge and past clinical experiences (Cork, 2014). Several authors (Cork, 2014; Melin-Johansson et al., 2017; Ramezani-Badr et al., 2009; Sharma et al., 2016; Vanstone et al., 2019) highlight how experienced healthcare professionals frequently employ intuitive judgements to navigate complex patient scenarios, suggesting that intuition serves as a hallmark of advanced clinical competence.

Intuition enhances decision-making accuracy by allowing clinicians to recognise patterns and make informed decisions swiftly, especially in high-pressure or uncertain situations. Rönnberg et al. (2019), in fact, assert that intuition facilitates rapid assessments and interventions in contexts where analytical reasoning may be too slow or cumbersome. As a component of clinical competence, intuition allows professionals to integrate subtle cues and contextual information that might be overlooked in a purely analytical approach, thus enriching the decision-making process.

While intuition is a valuable component of clinical competence, its effectiveness is maximised when balanced with evidence-based practice. Healthcare professionals who effectively integrate intuitive insights with empirical data demonstrate higher clinical

competence, as they can adapt flexibly to a wide range of clinical situations (Greenhalgh, 2002). Similarly, according to Price et al. (2017), competent clinicians are those who can judiciously employ intuition in conjunction with evidence, ensuring that their decisions are both contextually relevant and scientifically sound.

While some studies suggest that intuition can supplement gaps in evidence-based practice, others argue that it should be cautiously balanced with empirical data to ensure robust decision-making (Hassani et al., 2016b). Intuition is not infallible and can be susceptible to cognitive biases; therefore, it's important to engage in reflective practice, through which clinicians critically evaluate their intuitive judgements and refine their decision-making processes (Tversky & Kahneman, 1974).

In conclusion, the relationship between intuition and clinical competence is characterised by the ability to leverage intuitive judgements effectively in clinical decision-making. Healthcare professionals can enhance their competence by ensuring that intuition serves as an integral and reliable component of patient care by combining it with empirical data and engaging in reflective practice.

5.3.2 Decision-Making Ability in Complex Cases

In complex clinical cases, where uncertainty and high-stakes decisions are prevalent, the interaction between intuition and evidence-based practice becomes crucial for effective decision-making (Croskerry, 2017). These cases often demand rapid, intuitive judgements and careful analytical processing that relies on empirical evidence.

Healthcare professionals frequently encounter situations where evidence is ambiguous or incomplete, necessitating decisions that go beyond the available data. Indeed, the oncologists from different hospitals who took part in the study by Salloch et al. (2018) stressed that intuition is especially useful in difficult situations or when solid data are missing, as evidence-based guidelines are not comprehensive enough. Furthermore, intuition allows clinicians to integrate experiential knowledge and recognise patterns that might not yet be supported by robust evidence (Croskerry, 2005). This ability to address the uncertainties using intuition is particularly valuable in complex cases, as it provides a preliminary framework that can guide further investigation and intervention (Dane & Pratt, 2007).

The inherent flexibility provided by intuition allows healthcare professionals to adapt to the unique challenges posed by each complex case. According to Ruzsa et al. (2020), intuitive skills enable practitioners to navigate the subtleties of patient presentations and make swift decisions that might save time in critical situations. As proven by Patel et al. (2008), this is particularly relevant in emergency settings, where the pace and pressure necessitate a rapid response that cannot always wait for comprehensive evidence gathering.

While intuition contributes to initial assessments, integrating analytical reasoning through evidence-based practice ensures that decisions are grounded in scientific rigour (Greenhalgh, 2002). The dual-process theory posits that there are two cognitive systems: intuitive and analytical. They work most effectively when they complement each other. As articulated by Miller and Hill (2018), intuition provides a quick, initial assessment, while subsequent analytical evaluation through evidence-based practice refines and validates these early impressions.

The interaction between intuition and evidence-based practice, when effectively balanced, leads to improved decision-making outcomes in complex cases. The ability to make nuanced, context-aware decisions results in more personalised patient care, tailoring interventions to individual patient needs while still adhering to clinical guidelines (Rönnberg et al., 2019).

In conclusion, intuition and evidence-based practice frequently interact in complex cases where standard protocols may not suffice. While evidence-based practice offers a structured approach, intuition allows clinicians to navigate uncertainty by integrating past experiences and tacit knowledge (Price et al., 2017). By leveraging intuition for rapid insights and validating these insights with empirical evidence, healthcare professionals can optimise their decision-making processes, thereby enhancing patient outcomes in challenging situations.

5.3.3 Integration with Analytic Systemic Methods

Integrating analytic systematic methods with intuition represents a profound intersection of cognitive processes and evidence-based practice, thus enhancing clinical decision-making (Traynor et al., 2010). As argued in previous sections, this interaction is pivotal in refining healthcare delivery and optimising patient outcomes, particularly in complex clinical scenarios.

Systematic analytic methods within evidence-based practice provide a structured framework that helps clinicians make decisions grounded in empirical evidence (Buckingham & Adams, 2000). These methods involve using standardised protocols, clinical guidelines, and rigorous data evaluation to ensure decisions are scientifically sound and reproducible

(Greenhalgh, 2002). When these analytical processes are combined with intuition, healthcare professionals gain the ability to quickly assess and respond to clinical situations with both depth and efficiency. This synergy becomes particularly evident in the findings of the cross-sectional study by Aldamiri et al. (2018), where Saudi physicians noted that as their experience deepens, they tend to rely more on intuition; however, they emphasized that both intuitive and analytical decision-making models are essential for optimal patient care.

In clinical settings, intuition and analytical systematic methods play complementary roles (Cork, 2014; Holm & Severinsson, 2016). Analytical methods serve to validate and refine initial intuitive judgements with evidence-based rigour, ensuring accuracy and consistency (Croskerry, 2005). This harmonious integration is supported by Rönnberg et al. (2019) and Rönnberg et al. (2022). They worked with Swedish anaesthesiologists and nurses separately, with both professions claiming that they combined objective data with experiential intuition to decide when to extubate a patient. Both studies' participants supported a balanced approach where the thoroughness of systematic analysis matches the speed of intuitive judgements.

Expert intuition involves recognising patterns and making judgements based on experience and tacit understanding, which can be particularly valuable when evidence is limited or ambiguous (Dreyfus & Dreyfus, 1980). Healthcare practitioners who can effectively integrate their intuitive insights with analytical evidence are better positioned to navigate complex cases where standard protocols may not provide clear answers (Dane & Pratt, 2007). As noted by Melin-Johansson et al. (2017), the synergy between these elements enables clinicians to tailor their interventions to the nuanced needs of patients, enhancing the quality of care.

That said, the integration of intuition with systematic methods can present challenges, particularly in ensuring that intuitive insights are not overshadowed by rigid adherence to protocols. Meanwhile, Tversky and Kahneman (1974) caution against the cognitive biases that can affect intuitive decisions, adding that reflective practice is necessary to critically assess and align intuition with analytical findings. Creating a supportive environment that values both intuition and evidence-based practice is crucial for overcoming these challenges and fostering a culture of continual learning and adaptation (Adler, 2022).

In conclusion, integrating analytical systematic methods with intuition within the framework of evidence-based practice enhances clinical decision-making by combining the strengths of rapid, experience-based insights with rigorous empirical analysis (Katsikopoulos et al., 2022). This synergistic effect supports personalised and effective patient care, particularly in complex and dynamic healthcare environments.

5.3.4 The Impact on Clinical Decisions and Patient Outcomes

The integration of intuition with evidence-based practice enriches clinical decision-making by allowing healthcare professionals to draw on both experiential knowledge and empirical data. Intuition facilitates rapid assessments and immediate decision-making, which are crucial in time-sensitive situations (Gosar & Solomon, 2019). In contrast, evidence-based practice ensures that these decisions are supported by scientific data, enhancing their reliability and validity (Croskerry, 2005). Together, these approaches create a balanced framework where intuition fills gaps in existing evidence while evidence-based practice validates intuitive judgements.

The combined use of intuition and evidence-based practice positively impacts patient outcomes by enabling more personalised and context-specific care. When clinicians can leverage their intuition alongside systematic evidence, they can tailor their interventions to the unique needs and preferences of each patient (Greenhalgh, 2002). Lambrechts et al. (2021) highlight that such integrative approaches lead to more accurate diagnoses and effective treatment plans, ultimately improving patient satisfaction and health outcomes.

In situations where clinical evidence may be incomplete or inconclusive, intuition serves as an essential tool for reducing uncertainty and guiding decisions. Intuitive insights allow clinicians to make informed choices based on pattern recognition and past experiences, which can be especially critical in ambiguous scenarios (Dane & Pratt, 2007). By incorporating intuition into evidence-based frameworks, healthcare professionals can navigate uncertainties more effectively, making proactive decisions that prioritise patient safety and well-being (Rönnberg et al., 2022).

In a study conducted by Hassani et al. (2016a), twelve Iranian critical care nurses were interviewed to explore the characteristics of intuitive nurses. The researchers discovered that these nurses exhibit high levels of knowledge, skill, and experience, enabling them to establish strong connections with their patients. This solid foundation of expertise not only enhances their intuitive capabilities but also positively influences their clinical decision-making and patient outcomes. However, despite the clear benefits of intuition, healthcare professionals may hesitate to rely on their intuitive judgments, even while acknowledging and trusting its validity (Hassani et al., 2016b; Van Den Brink et al., 2019). This reluctance may diminish the potential advantages that intuition could bring to patient care, highlighting the need for strategies that encourage its use in conjunction with evidence-based practice.

In conclusion, integrating intuition with evidence-based practice significantly enhances clinical decisions and patient outcomes by combining rapid, experience-based insights with empirical evidence. Overall, the interplay between the two fosters a holistic approach to care that accommodates both the art and science of medicine, allowing healthcare professionals to deliver comprehensive care that is responsive to the dynamic and multifaceted nature of every patient's needs (Adler, 2022). This approach also ensures that the care offered is both effective and adaptable to the complexities of modern healthcare environments.

5.3.5 Value in Specific Specialities

Across specialities, the value of integrating intuition with evidence-based practice lies in the ability to enhance clinical decision-making and patient outcomes. This interplay supports a flexible and responsive approach to healthcare, enabling practitioners to effectively address the complexities and nuances of their respective fields (Adler, 2022). Indeed, by fostering a balanced integration of intuitive expertise and empirical evidence, medical specialities can continue to advance patient care delivery.

In fields like emergency medicine, critical care, obstetrics, and paediatrics, where rapid decision-making is crucial, intuition plays a vital role alongside standard protocols (Lyneham et al., 2008). In these areas, the ability to quickly assess situations and anticipate complications through intuitive judgements complements evidence-based strategies, enhancing the overall quality of care (Wu et al., 2023). This combination allows practitioners to tailor interventions to specific contexts and patient needs effectively.

In the field of emergency medicine, the ability to make swift decisions is crucial, given the high-stakes, fast-paced nature of the work. Intuition enables emergency physicians to promptly identify life-threatening conditions and commence treatment, even in scenarios where complete information is unavailable (Croskerry, 2005). Lyneham et al. (2008), in fact, report that the emergency nurses who participated in their study regarded intuition as a developmental aspect of clinical practice while also acknowledging the value of other forms of practice. In turn, as indicated in the qualitative study by Calder et al. (2012), evidence-based practice complements intuition by offering structured protocols and guidelines, ensuring that intuitive decisions are informed by scientific rigour.

Critical care practitioners, in particular, develop intuitive skills through extensive experience and exposure to a wide range of critical scenarios. This intuition enables them to recognise patterns and anomalies that might not be immediately apparent, facilitating timely interventions that can significantly impact patient outcomes (Croskerry, 2005; Melin-Johansson et al., 2017). For example, an experienced nurse might intuitively sense that a patient is deteriorating before clear evidence appears on monitoring equipment, prompting early and potentially life-saving interventions. Several researchers (Aghajani et al., 2021; Hassani et al., 2016a, 2016b, 2017; Ramezani-Badr et al., 2009) have studied intuition in critical care nurses, and most participants described it as unconscious reasoning. They generally agreed that intuition is built with knowledge and experience and that it gives the nurse particularly advantageous cognitive awareness and clinical wisdom.

As revealed by Azizi et al. (2023) and Lambrechts et al. (2021), the field of obstetrics and gynaecology also benefits significantly from the integration of intuition with evidence-based practices. Participants stated that they often rely on intuition to interpret subtle cues about

a mother and baby's well-being during labour and delivery. However, they still emphasised the importance of confirming these cues with analytic reasoning. Meanwhile, Patel et al. (2008) interviewed paediatric nurses, who also professed the importance of intuition in decision-making, especially in emergencies. Overall, intuition helps in anticipating complications and responding promptly, while evidence-based practice ensures that interventions are consistent with the latest research and clinical guidelines.

In summary, the synergy between intuition and evidence-based practice optimises clinical decision-making and patient outcomes. This integration allows healthcare practitioners to navigate complex and fast-paced environments effectively, providing care that is both responsive and grounded in empirical evidence.

5.4 Limitations

While this scoping review offers valuable insights into the interaction between intuition and evidence-based practice in clinical decision-making, several limitations must be acknowledged.

One significant limitation of this review is the scope and breadth of the included studies. Although an effort was made to cover a wide range of healthcare specialities, the variability in study designs, populations, and settings may affect the generalisability of the findings. Furthermore, while searching for relevant studies, it was noted that only studies involving nurses, midwives and doctors were found. No studies focusing on other healthcare professionals, such as allied health workers or healthcare assistants, were identified. This could introduce a bias in understanding the full spectrum of intuition's role across all healthcare

professions. However, this limitation was somewhat compensated by choosing comprehensive online search engines and including studies from various global regions to ensure the representation of diverse cultures and healthcare systems.

Additionally, this review faced challenges related to the variability in definitions and conceptualisations of intuition across the selected studies. Intuition is described and applied differently across various contexts, which may lead to inconsistencies in understanding its role and impact on clinical practice (Benner, 1984; Dörfler & Ackermann, 2012). The lack of a unified framework for defining and measuring intuition limits the ability to compare results directly across different studies and specialities. Nevertheless, as demonstrated in this scoping review, most definitions share common antecedents and characteristics of intuition.

The methodological quality of the included studies also varied, with differences in research design, sample sizes, and analytical approaches potentially influencing the robustness of the findings. Moreover, some studies may have relied heavily on qualitative data, introducing subjective interpretations that could bias the outcomes. Additionally, the absence of longitudinal studies limited insights into how intuition develops over time and its long-term impact on clinical practice. This limitation was controlled by appraising all included studies using the provided JBI checklists. Studies with poor or medium-to-poor methodology were thereby rejected.

The presence of common authors across multiple included studies within the scoping review introduces another potential limitation due to the risk of overlapping information and the likelihood of undue emphasis on specific perspectives or findings. This situation may compromise the diverse and comprehensive nature of the scoping review's overarching

synthesis of the literature. To address this limitation, a rigorous approach was undertaken, including the critical evaluation of each study's quality using the JBI checklists. Furthermore, a predetermined set of standard inclusion and exclusion criteria was established before initiating the search for relevant studies, ensuring a systematic and transparent approach. Moreover, the methodological process was meticulously documented and clearly reported to further enhance the reliability and transparency of the scoping review.

There is also a possibility of publication bias, as studies demonstrating positive interactions between intuition and evidence-based practice are more likely to be published than those with negative or inconclusive findings. This bias could skew the overall understanding of the topic and should be considered when interpreting the results. This limitation is weakened by the fact that the majority of the researchers found similar results.

In conclusion, while this scoping review provides a foundation for understanding the role and impact of intuition in clinical decision-making, these limitations indicate the need for further research. Future studies should aim to standardise definitions, employ rigorous methodologies, and explore diverse contexts to advance the field's knowledge and application.

5.5 Conclusion

This exploration of intuition in clinical decision-making across various healthcare specialities highlights its invaluable role when integrated with evidence-based practice. Intuition, characterized by rapid, non-analytical cognition, stems from the accumulation of tacit knowledge and experiential learning, making it particularly essential in complex clinical environments where timely decisions are critical. This intuitive capability considerably

enhances clinical competence, empowering practitioners to swiftly recognize patterns, assess dynamic situations, and respond effectively, thereby enriching the overall decision-making process.

Furthermore, the interaction between intuition and evidence-based practice reveals a complementary relationship that balances immediate, intuitive judgments with rigorous analytical reasoning. This dual approach ensures that clinical decisions are not only responsive to patient needs but also grounded in scientific evidence. Such synergy is particularly beneficial in high-stakes specialties, such as emergency medicine, obstetrics, pediatrics, and critical care, where the ability to adapt rapidly to changing patient conditions is paramount.

Additionally, organizational and contextual factors significantly influence the development and application of intuitive skills. Supportive environments that promote autonomy, reflective practice, and interdisciplinary collaboration are vital for nurturing these competencies. The confidence healthcare professionals gain from such environments enables them to trust their intuitive insights, while structured training and reflective exercises further bolster these abilities, enhancing their clinical effectiveness and improving patient outcomes. While the advantages of intuition are clear, it is essential to remain mindful of its limitations, including susceptibility to cognitive biases and variability in application.

In summary, the integration of intuition with systematic analytical methods presents a holistic framework for enhancing clinical decision-making. This collaborative approach allows healthcare professionals to provide comprehensive and adaptive care that effectively addresses the complexities of patient needs. As healthcare systems continue to evolve, recognizing and

harnessing the interplay between intuitive and analytical processes will be crucial in advancing patient care and improving outcomes across diverse clinical settings.

As we transition to the concluding chapter of this dissertation, we will synthesize the key insights and themes discussed throughout the study, offering a final reflection on their implications for clinical practice and potential avenues for future research.

Chapter 6 Conclusion

Chapter 6 Conclusion

This scoping review has delved into the dynamic interplay between intuition and evidence-based practice in clinical decision-making, uncovering their synergistic potential across a variety of healthcare specialities. Central to this exploration is the concept of intuition, which is defined as rapid, non-analytical cognition, is rooted in a clinician's accrued experience and tacit knowledge developed over time (Benner, 1982; Dorfler & Ackermann, 2012). It allows healthcare professionals to swiftly recognise patterns and respond to clinical situations where quick judgement is crucial, often in settings characterised by uncertainty and high stakes.

6.1 Overview of the Study

The methodological approach of this scoping review was meticulously designed to offer a comprehensive synthesis of the literature on intuition in clinical decision-making within acute healthcare settings. The structure of this review was based on Cochrane's framework and the PRISMA-ScR guidelines, ensuring a rigorous and transparent process (Tricco et al., 2018). This method allowed for an extensive exploration of the current knowledge, focusing on the historical evolution of intuition, its cognitive underpinnings, and its practical implications in clinical settings.

The inclusion criteria specified that the review should consider studies from the past 20 years (2004–2024), enabling a thorough assessment of recent research on intuition across a significant time span. Moreover, the population under study included healthcare professionals working in acute healthcare environments, where decision-making requires rapid and effective responses due to the often high-pressure nature of such settings. This is why healthcare

professionals working in acute healthcare environments proved to be the ideal candidates for studying intuition vs evidence-based practices and the integration of the two.

The results of this scoping review were organised according to key themes representing the research questions. This thematic organisation allowed for a holistic understanding of the role of intuition in clinical decision-making while identifying gaps in the literature and areas necessitating further investigation (Peters et al., 2015).

6.2 Findings of the Study

Intuition in clinical decision-making is increasingly recognised as a vital cognitive process that complements analytical reasoning in healthcare settings. Historically, intuition was regarded as an enigmatic or mystical component of decision-making, but it has since evolved into a critical element supported by cognitive science research (Cioffi, 1997). Particularly in high-pressure environments like emergency rooms, intuition allows healthcare providers to integrate vast amounts of information quickly, which is crucial for patient care when time is of the essence (Miller & Hill, 2018). This rapid decision-making capability stems from the clinician's accumulated experience, enabling them to recognise familiar patterns and respond to cues that might not be immediately apparent through analytical methods alone (Vanstone et al., 2019).

The development and utilisation of intuition among healthcare professionals are influenced by several factors, including experience, confidence, organisational culture, and continued professional development. Experience is perhaps the most significant factor, as it provides the foundation upon which intuitive skills are built. As healthcare professionals gain

experience, they develop a repository of knowledge that contributes to their intuitive decision-making ability (Benner, 1982; Patel et al., 2008). Confidence in one's clinical skills also plays a crucial role; professionals who trust their capabilities are more likely to rely on intuitive judgements (Cork, 2014). Moreover, a supportive organisational culture that prioritises interdisciplinary collaboration and provides adequate training resources enhances the development of intuition. Indeed, training programmes that integrate both analytical skills and intuitive judgement enable healthcare professionals to adapt effectively to various clinical scenarios (Calabretta et al., 2017). Thus, environments that value and support experiential learning and reflective practice can significantly foster intuitive decision-making abilities (Benner, 1982).

There is a dynamic interaction between intuition and evidence-based practice in clinical decision-making, with both approaches often complementing each other to optimise patient outcomes. Evidence-based practice relies on systematic data analysis and the application of clinical guidelines, providing a robust framework for decision-making. In turn, intuition supplements this framework by allowing clinicians to navigate uncertainties and make quick decisions in situations where empirical data might be insufficient or unavailable (Anderson et al., 2019; Gosar & Solomon, 2019). Indeed, intuition enables healthcare professionals to integrate past experiences and tacit knowledge with current evidence, creating a more holistic approach to patient care (Chilcote, 2017). This complementary interaction is particularly beneficial in acute settings, where time-sensitive decisions are crucial. The integration of intuitive and analytical processes allows for a more flexible and adaptive decision-making model, ensuring that both the empirical rigour of evidence-based practice and the experiential insights offered by intuition are utilised effectively (Lamond & Thompson, 2000).

6.3 Limitations and Recommendations for Future Research

The review highlights several limitations, including the variability in definitions and methodological approaches across studies, which can affect the consistency and comparability of the findings obtained (Melin-Johansson et al., 2017). Moving forward, future research should focus on standardising the definitions of intuition, employing rigorous methodologies, and exploring diverse contexts to strengthen the understanding of the role of intuition in clinical decision-making. ~~By advancing these areas, healthcare professionals can harness the full potential of intuition alongside evidence-based practice, ultimately enhancing the quality and outcomes of patient care across various specialities.~~

Implementing longitudinal studies would be particularly valuable in understanding the development of intuition over time and its validity across different clinical scenarios. Such studies could include career progression tracking of newly qualified healthcare professionals and examining the evolution of their intuitive capabilities alongside analytical skills. Multi-centre cohort studies would be particularly valuable in comparing intuition development across different institutional contexts and healthcare systems, while speciality-specific studies could illuminate how intuitive decision-making varies across clinical domains such as emergency care or intensive care units. Educational intervention studies could evaluate the effectiveness of specific training programs designed to enhance intuitive capabilities, with patient outcome tracking providing crucial data on the relationship between intuitive decision-making and clinical outcomes. These longitudinal approaches would address current methodological limitations by providing systematic documentation of intuition development, establishing clearer links between experience and intuitive accuracy, and contributing to standardised definitions and measurements of clinical intuition.

In conclusion, b~~B~~y advancing these areas, healthcare professionals can harness the full potential of intuition alongside evidence-based practice, ultimately enhancing the quality and outcomes of patient care across various specialities. ~~integrating intuition with evidence-based practice provides a comprehensive framework for clinical decision-making that leverages both rapid experiential insights and empirical validation.~~ This approach fosters a holistic model of care that is adaptive to the multifaceted and dynamic nature of modern healthcare, improving clinical efficacy and patient satisfaction.

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Appendices

Appendix 1

Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	iii
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	iii
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	4
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	NA
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	52
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	53
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	50
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	53
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	54
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	NA
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	55

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	55
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	60
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	62
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Appendix 2
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	64
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	64
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Appendix 2 and p77
Limitations	20	Discuss the limitations of the scoping review process.	103
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	109
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	112

Appendix 2

Author	Title	Year of Publication	Study population and Sample size	Methodology	Aim of study	Findings	Location	Quality of Study
Aghajani, Taghadosi & Ajorpaz	Intuitive decision-making by Iranian nurses of patients with COVID-19: a qualitative study	2022	16 critical care nurses	A qualitative study using semi-structured interviews	The aim of this study is to explore critical acre nurses' experience of intuitive decision-making in patients diagnosed with COVID-19.	Clinical decision making was divided in 3 categories. Inner revolution, holistic awareness and clinical wisdom. The first 2 are more part and parcel with intuition. Inner revolution: making decisions based on their inner sense. Not always compatible with the pt's objective data. this has 3 subcategories: inner perception, internal prediction and integration of inner and outer senses. Holistic awareness: physical, psychological and situational awareness directed them to use intuition. thus was developed immediately and holistically. 3 subcategories are: physical awareness, psychological awareness and	Iran	High quality

						situational awareness. Their sense of responsibility and consciousness towards their profession. Clinical wisdom: the knowledge and skills help the nurse feel confident in using intuition. 3 subcategories are: clinical experience, clinical proficiency and clinical confidence. They need these to build strong intuition. Intuition was used in such a novel case (COVID-19) to improve clinical decision making. Experience, expertise, integration of inner and outer senses, and holistic awareness toward pts are all effective factors for intuitive decision making.		

Aldamiri, Alhusain, Alshehri & Al Jerian	Clinical decision-making among emergency physicians: experiential or rational?	2018	107 emergency physicians	A cross-sectional study	The aim of this study was to analyse the thinking processes of Saudi emergency physicians at nine hospitals in Riyadh.	With a 53% response rate they had 107 participants. Both experiential and rational reasoning were carried out but overall they preferred rational. Fast intuitive automatic thinking was scored higher with consultant emergency physicians. This was consistent with the assertion the intuitive decision-making improves with knowledge.	Saudi Arabia	High to medium quality
Aliakbari, Ghaedamini, Deris & Masoudi	Relationship between nurses' decision-making style and their disaster response competencies	2022	300 Iranian nurses	An analytical cross-sectional design	The aim of this study was to determine the relationship between decision-making style and nurses' disaster response competencies.	Most nurses used the intuitive decision-making style. There was a significant relationship between age and work experience with competence but not with the dominant decision-making style. As intuitive decision-making style scores increased, so did the scores of disaster response competencies	Iran	High quality

Azizi, Fakhr-Movahedi & Ebrahimian	The contextual factors influencing intuition formation in paediatric nursing setting: A qualitative content analysis.	2023	16 nurses and 2 paediatricians	Qualitative content analysis using semi-structured interviews.	Aim of the study was to explore paediatric nurses' experiences of contextual factors influencing intuition formation in paediatric nursing.	Main theme identified was: Competence in the shadow of limitation and uncertainty". Nurses were able to intuitively understand the kids' condition but were unable to demonstrate and implement their intuitive decisions. Categories include: The limited scope and inexplicability of intuitive actions (as a limitation to use intuition); Rational mastery (these nurses were able to have a broader view of the kids' condition).	Iran	High quality
Calder et al	Experiential and rational decision-making: a survey to determine how emergency physicians make clinical decisions.	2012	434 physicians	A quantitative study using a cross-sectional design	To determine whether emergency physicians perceived their clinical decisions in general to be more experiential or rational and how this compared with other physicians.	Results showed that overall physicians preferred rational decision making. Female emergency physicians still favoured rational but they had higher experiential scores than male physicians. Results were also compared to the scores of cardiologists from New Zealand and	Canada	High quality

						results were similar. Though most respondents still admitted to use intuitive decision-making.		
Cork Lora	Nursing intuition as an assessment tool in predicting severity of injury in trauma patients.	2014	Phase one: 8 charge nurses. Phase two: review of 360 trauma records	Phase one: a descriptive cross-sectional approach. Phase two: descriptive, retrospective review.	The aim of the study was to explore the validity of nurses' use of intuition in patients to predict the severity of their injuries, and whether it impacts their choice to institute a trauma code.	The findings suggest that nursing intuition in the emergency department setting is a valid and effective assessment tool. The study advocates for pairing novice nurses with experienced counterparts to improve decision-making skills through observational learning and mentorship, thereby enhancing patient care.	USA	High to medium quality
Douw et al	Nurses' worry or concern and early recognition of deteriorating patients on general wards in acute care hospitals: a systematic review.	2015	Nurses	A systematic review	The aim of this study is to identify the signs and symptoms that trigger nurses' worry or concern about a patient's condition.	10 general indicators of pt deteriorating were identified. The 2 most common indicators were: subjective nurses observation and knowing without a	International	High to medium quality

						rationale. Found in 11 out if 18 studies.		
Hassani, Abdi, Jalali & Salari	Relationship between the use of intuition in clinical practice and the clinical competence of critical care nurses.	2017	88 critical care nurses	A quantitative study using a correlational approach	The aim of this study was to assess the relationship between the use of intuition in clinical practice and the clinical competence of critical care nurses.	The researchers found no correlation between the use of intuition and clinical competence. They found no significant relationship between intuition and the various demographic variables.	Iran	High to medium quality
Hassani, Abdi, Jalali & Salari	The perception of intuition in clinical practice by Iranian nurses: a phenomenological study	2016	12 critical care nurses	A qualitative study using semi-structured interviews	This study aimed to explore Iranian critical care nurses' understanding of intuition in clinical practice.	Main themes included: 'understanding intuition as a feeling', 'understanding intuition as a thought', 'understanding intuition as receiving signs' and 'understanding intuition as an alarm'. 11 subthemes were identified. Participants had a strong confidence in their intuition but they were reluctant	Iran	High quality

						to use it, however, following the perception of intuition they paid more attention to the patient's parameters.		
Hassani, Abdi, Jalali & Salari	The intuitive nurse in critical care practice: a phenomenological study	2016	12 critical care nurses	A qualitative study using semi-structured interviews	The aim of this study was to explore the features of the intuitive nurse in critical care practice.	3 main themes with 10 subthemes were identified. Proficiency: clinical knowledge, clinical skill and clinical experience. Connection: communication, sympathy, commitment, spirituality and serenity. Benevolence: willing to help and conscientious. The intuitive nurses have better relationships and more connections with patients and spiritual entities.	Iran	High to medium quality

Holm & Severinsson	A systematic review of intuition - A way of knowing in clinical nursing?	2016	8 quantitative studies included	A systematic review	The aim was to illuminate intuition in clinical nursing.	The main theme identified was: Sensing an unconscious and conscious state of mind. This was divided into: a sudden emotional awareness and reflection; and arousal od conscious thought processes. The study found that experienced nurses rely more on their intuition compared to novices. Personal experiences, including situations outside the clinical setting, contribute to the development of intuitive skills. Integrating training on intuitive skills within nursing curricula and promoting a supportive work environment can enhance the utilization of intuition.	Multinational	High to medium quality

Lambrechts, Mees & Jacquemyn	Gut feelings in obstetrics and midwifery: the role of intuition in deciding when to perform caesarean section during labour.	2021	Midwives and gynaecologists for the focus groups and observation of 50 deliveries.	Non-participant observation of 50 deliveries and focus groups with midwives and gynaecologists.	This study aimed to determine whether intuition plays a relevant role in deciding when caesarean section is performed in the course of labour.	1. Analytic reasoning is the most important contributor in decision making and is based on acquired knowledge, theories learned and EB date. 2. Intuition is imp too. It intensified follow-up. "I think you cannot negate your gut feeling in the delivery ward". " If you just come from school you have some clinical luggage but you just miss the experience to dare to wait". Gut feeling is activated in complex situations or when things are not taking the routine path. " you always have the rational analysing afterwards". Different professionals may have different kind of intuition. Intuition fails when fear takes over.	Belgium	Medium quality

Lyneham, Camillus & Denholm	Explicating Benner's concept of expert practice: intuition in emergency nursing.	2008	14 expert emergency nurses	A phenomenological design using interviews	The aim of this study is to explore the experience of intuition in emergency nursing in relation to Benner's fifth stage of practice development, 'the expert practitioner.'	Intuition is a developmental aspect of clinical practice. Use of intuition does not exclude other forms of practice, but it is a concurrent aspect of practice. 3 phases of expert practice were identified. Cognitive intuition: the consequence of a relationship between knowledge and experience and occurs in situations where action appears to precede assessment. Transitional intuition: a transitional phase where intuition is often denied or fought. One questions their actions. Embodied intuition: there is complete trust in the experience of knowing and serves to build confidence on one's expert status.	Australia	High quality

Manias, Aitken & Dunning	Decision-making models used by 'graduate nurses' managing patients' medications.	2004	12 graduate nurses	A qualitative approach based on participant observation and semi-structured interviews.	The aim of this study is to answer the following questions: What are the barriers that impede graduate nurses' clinical judgment in their medication management activities? How do contextual issues impact on graduate nurses' medication management activities?	All nurses used hypothetico-deductive reasoning. 7 of them used pattern recognition. Mostly with medication characteristics. Only 2 nurses used intuition. However, nurses who did were able to accurately interpret pt situations and to bring about effective care.	Australia	High quality
Melin-Johansson, Palmqvist & Ronnberg	Clinical intuition in the nursing process and decision-making- A mixed-studies review	2017	a review of 16 studies involving nurses	A mixed-studies review	The review aimed to answer the following question: What does the qualitative and quantitative evidence tells us about nurses' intuition in the clinical setting, in relationships and in the nursing process?	Intuition application: it develops over time and is based on knowledge and experience. Intuition is used alone or in combination depending on the complexity of the task and level of experience and skills. Assertiveness: nurses are becoming more autonomous and able to decide when to use intuition. Though they rarely rely only on intuition. Experience: a determining factor for the level of reliance on intuition.	International	High quality

						Nurses use intuition in all steps of the nursing process but mainly in the assessment and implementation processes. Intuitive nurses are emotionally accessible, open and vulnerable. Scepticism among scientists and colleagues concerning intuition still exists.		
Miller & Hill	Intuition in clinical decision-making. Differences among practicing nurses.	2018	99 nurses divided in 3 groups: medical/surgical nurses; step-down/progressive care nurses; and critical care nurses.	A descriptive cross-sectional study	The aim of this study was to examine the relationships and differences in the use of intuition among categories of practicing nurses from different clinical units at a medical centre in the Midwest.	There was a positive relationship between self-reported levels of nurse proficiency and the use of intuition and reported years of clinical experience and the use of intuition to make clinical judgments. No significant difference in the use of intuition was found among the three categories of nurses. The inexperienced nurse should not be taught	USA	High to medium quality

						to make clinical decisions based on intuition but to use that intuitive feeling to further assess the situation.		
Park, Gu & Sok	Path model on decision-making ability of clinical nurses	2021	274 clinical nurses	A quantitative study using a cross-sectional design	To identify and examine the relationship between the factors influencing the decision-making ability of clinical nurses in hospitals in South Korea, and to establish a model to verify the fit and effect.	Clinical decision-making in these South Korean nurses was most done using an analytic-systematic decision-making style. Expertise, knowledge-sharing behaviour and intuition had an indirect effect but not significant. Korean nurses depend on the doctor for decision-making. Their self-confidence was low and their independence and autonomy in nursing practice was poor.	South Korea	High quality

Patel, Gutnik, Karlin & Pusic	Calibrating urgency: triage decision-making in a paediatric emergency department.	2008	4 triage nurses were part of the observation, and 5 triage nurses took part in the interviews	A qualitative study using observations and semi-structured interviews.	The aim of this study was to investigate the process of triage; the factors that influence triage decision-making, and how the guidelines are used in the process.	Triage decisions were often non-analytic especially with experienced nurses; explicit guideline information becomes internalized and implicitly used in emergency triage practice as nurses gain experience.	Canada	High to medium quality
Price, Zulkosky, White & Pretz	Accuracy of intuition in clinical decision-making among novice nurses.	2016	126 4th year pre-licensure nursing students.	They utilized an experimental design with clinical complication and decision phase as within-subjects' factors and simulation role as the between-subjects' factor.	The aim of the study was to examine the degree to which novice nurses relied on intuition and analysis during CDM in a realistic clinical simulation scenario and assess how reliance on these strategies is associated with decision-making accuracy.	participants relied more heavily on analysis; however, the use of intuition was associated with more accurate decision-making when dealing with familiar complications. In familiar cases reliance on intuition was related to cue acquisition. In novel complications intuition was negatively correlated with CDM.	USA	Moderate quality

Ramezani-Badr, Nikbakt Nasrabadi & Parsa Yekta	Strategies and criteria for clinical decision making in critical care nurses: A qualitative study.	2009	14 critical care nurses	A qualitative study using semi-structured interviews	Aim of the study was to explore the reasoning strategies and criteria for clinical decision making used by Iranian critical acre nurses.	3 main themes concerning reasoning strategies were identified: intuition, recognising similar situations and hypothesis testing. Intuition is unconscious reasoning whilst the others are not. 3 other themes regarding the decision-making criteria were also identified: risk-benefit, organisational necessities and complementary sources of information.	Iran	High quality
Ronnberg, Nilsson, Hellzen & Melin-Johansson	Beyond the monitors: Anaesthesiologists' experiences of the process of extubation.	2021	17 anaesthesiologists	A qualitative study using semi-structured interviews	To describe Swedish anaesthesiologists' experience of the extubation process in the anaesthesia setting.	The decision to extubate depends on 2 aspects. First on the data, the anaesthesiologist has to be focused, be prepared and strategic. Second, he/she will be receptive to inputs guided by emotions and experiences.	Sweden	High quality

Ronnberg, Nilsson, Hellzen & Melin-Johansson	The art is to extubate, not to intubate- Swedish registered nurse anaesthetists' experiences of the process of extubation after general anaesthesia	2019	20 registered nurse anaesthetists	A qualitative study using focus groups	The aim of this study was to describe registered nurse anaesthetists' experiences of the process of extubation of the endotracheal tube in patients undergoing general anaesthesia.	4 categories and 8 subcategories were identified. 1. to be a step ahead. 2. To be on my toes. 3. To use situation awareness. 4.To be alone in a critical moment. Clinical decision-making often relies on intuition. The RNAs validate their intuitive feelings with concrete objective data such as vital signs. To apply intuition in depth knowledge and critical thinking is essential. The RNAs trust their gut feelings based previous experiences	Sweden	High quality

Ruzsa, Szeverenyi & Varga	Person and job-specific factors of intuitive decision-making in clinical practice: results of a sample survey among Hungarian physicians and nurses	2020	First survey involved 460 physicians and nurses. Second survey involved 104 physicians	A cross-sectional study	To assess the prevalence of intuitive decision-making among health care practitioners and explore its person and job-specific factors.	40% of participants rely on intuition (physicians more than nurses). Propensity for intuition increases with experience. Growth is more gradual and earlier in their career for nurses. Intuition among physicians was greater in specialities of high complexity or of high likelihood of emergency (not measured for nurses). Intuition was higher for female participants than male regardless of occupation. 10% of physicians covered intuition in their training and they were ore likely to exhibit certain cognitive and behavioral tendencies indicatve of better quality of intuitive decisions. Nurses who used intuition deviated more from protocols. Atributes of intuition were: unconscious/	Hungary	High to medium quality

						automatic (64%), use of affect as information (39%), gaining intuitive insight through emotional attunement to the pt (28%) and strong reliance on experience-base knowledge (32%). Some saw intuition as a sense of alarm and other reassurance. 17% looked at it as a disposition for empathy and emotional attunement to the pt. The most imp factor when using intuition is to rely on and try to integrate multiple pieces of diagnostic and prognostic information.		

Salloch, Otte, Reinacher-Schick & Vomann	What does physicians' clinical expertise contribute to oncologic decision-making? A qualitative interview study.	2018	14 oncologists	A qualitative study using semi-structured interviews	The aim of this study was to explore oncologists' views on the interplay between their own clinical expertise and the external evidence incorporated in clinical guidelines.	3 main themes influence the oncologists' decision-making: experience, professional development and intuition. Regarding intuition it gives insight in the most difficult cases. It serves as a final impulse. It was identified that there is a danger of acting in a paternalistic way, thus discuss with the patient.	Germany	High quality
Sharma, McCormick, Zargar-Shoshtari & Sexton	Is surgeon intuition equivalent to models of operative complexity in determining the surgical approach for nephron sparing surgery?	2016	119 renal masses removed by a single surgeon	Case series retrospective analysis	The study aimed to determine if surgeon intuition was equivalent to markers of operative complexity, such as RENAL nephrectomy and Mayo adhesive probability score, in determining the surgical approach for partial nephrectomy.	Although the RENAL nephrectomy and MAP score are useful tools in quantifying renal tumour complexity in pts undergoing PN, their clinical utility in an experienced surgeon's practice may be limited.	USA	High quality

Van den Brink, Holbrechts, Brand, Stolper & Van Royen	Role of intuitive knowledge in the diagnostic reasoning of hospital specialists: a focus group study.	2019	28 hospital specialists (doctors)	A qualitative study using focus groups	This study aimed to explore the diagnostic reasoning of hospital specialists, how they value, experience and use intuition.	All participants are aware that intuition is part of their diagnostic reasoning process. Some strongly trust intuition whereas others mistrust it. Some argued that intuition can by coloured by prejudice. All agreed that intuition is present with the first contact with the patient. All agreed that intuitive feelings should be followed by analytic reasoning. Intuition is built with knowledge and experience "on-the-job'. Empathy was viewed as a prerequisite for intuition. Society will not accept diagnosis purely on intuition. Trainees should be made aware of their gut feelings and teach them how to look at triggering cues.	Netherlands and Belgium	High to medium quality

Vanstone et al	Experienced physician descriptions of intuition in clinical reasoning: a typology	2019	30 physicians chosen purposefully	Interviews to examine retrospective stories	Authors aimed to empirically investigate clinical intuition by examining retrospective stories of how experienced physicians make diagnostic decisions in a clinical setting.	78 stories were analysed, and 4 types of intuition were identified: sick/not sick; something not right; frame shifting and; abduction. There were overlaps between the categories. Sick/not sick improves with time. This is especially important for emergency physicians. you immediately known if the person in front of you is well or not. A preliminary intuition. Something not right usually emerges once some information starts coming in. An unspecific intuition that something is not right or does not fit/match. A cognitive worry or discomfort. a mismatch between the subjective and objective data. Frame shifting is related to pattern recognition. A rapid insight of knowing when to shift and to	Canada	High quality

						what pattern you should shift to. It demonstrates the interwoven nature of non-analytic and analytic reasoning. Abduction is when there is a logical leap. physical made a leap to a diagnosis without having available all the necessary info. Cognitive feats related to experience or clinical acumen. Eureka is an extreme form of abduction.		

Wu, Chen, Du, Chen, Sun & Yu	The role of surgeon's intuition for acute type A aortic dissection in era of evidence-based medicine: a prospective cohort study	2023	161 ATAAD patients	A prospective cohort study	The aim was to explore whether surgeons' intuition is valid in predicting the operative mortality of acute type A aortic dissection.	Surgeon's intuition was found to be a good predictor for operative mortality of ATAAD. Surgeon's intuition enhances the accuracy of the traditional scoring system. The surgeon's intuition is a kind of data interpretation, except that it becomes so rapid with the accumulation of experience that it seems the thinking process is not involved. Surgeons can assess the patient in a more comprehensive manner. The surgeon's intuition and the scoring system complement each other.	China	High to medium quality