Decision-making theories and their usefulness to the midwifery profession both in terms of midwifery practice and the education of midwives

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Introduction
A review of existing decision-making theories is necessary to explore their usefulness to the midwifery profession both in terms of midwifery practice and the education of midwives.

In midwifery, clinical decision-making is seen, philosophically, as holistic and women-centred. Midwifery clinical decision-making requires intrapersonal negotiation, sensitivity, awareness and consideration for the environment and the people within it (1). The midwife/woman partnership model of care is woman-centred and therein lies midwives’ accountability; i.e. to the woman (2). In summary, as a discipline midwifery is based on a philosophy of primary health care and partnership with the woman (3-5)

There is some confusion in the literature about the meaning of commonly used concepts related to decision-making: ‘clinical reasoning’, ‘clinical judgment’, ‘clinical inference’, and ‘critical thinking’. Clinical reasoning is a form of the hypothetico-deductive approach. It is a way of trying to ensure that diagnostic and treatment decisions are based on logical thinking; not a rule of thumb or simple pattern recognition. Hypothetico-deductive reasoning focuses on ‘the supposed biophysical facts’ such as: those which can be defined, measured and consensually agreed. For the purpose of this paper we will sometimes use the term ‘clinical judgement’. We define clinical judgement to mean “a judgement that is used as a guide to action that is taken by a health professional in a clinical situation. A clinical judgement may or may not be based on relevant clinical features and, may or may not be based on a systematic reasoning process”.

Theory is defined as “… a systematic view of phenomena by specifying the interrelationships between concepts using definitions and propositions with the purpose of description, explanation and prediction about a phenomena in the world (6-7). For the purpose of this review, the word ‘theory’ encompasses related terms including ‘philosophy’, ‘model’ and ‘framework’. The purpose for writing a theory may vary. Some theory is written with the aim of describing a phenomenon by creating new concepts (descriptive theory). Other theory may describe and explain a phenomenon in the word by linking concepts together in propositional statements that have the form if x condition is present then y condition is also found to occur (explanatory theory). Other theory may aim to describe,
explain and predict a phenomenon of interest (predictive theory; sometimes called ‘situation producing theory’).

This paper begins by describing the major theoretical approaches to clinical decision-making in health: Hypothetico-Deductive Theory, from which medical clinical reasoning is based; Intuitive decision-making in nursing; Dual Processing Theory; The International Confederation of Midwives Clinical Decision-Making Framework; and the Australian Nursing and Midwifery Council Midwifery Practice Decisions Flowchart and Midwifery Practice. Each of these theories/models are compared and contrasted in relation to how well they provide a teachable framework for midwifery clinical reasoning that is consistent with midwifery philosophy. The guiding question for this review is:

*What are the strengths and limitations of existing decision-making theories as a basis for guiding best practice clinical decision-making within a framework of midwifery philosophy?*

**Hypothetico-Deductive Theory**

Hypothetico-Deductive Theory is the dominant approach to clinical decision-making within the health sciences: indeed it is central to Western Science, which arguably began with Descartes the 17th Century French philosopher. Western Science (in its dominant form) is sometimes termed ‘Logico-Empiricism’. This term makes explicit the foundations of Western science which is the combination of the philosophical schools of ‘rationalism’ (trust in the logical processes of the mind) and ‘empiricism’ (trust in the five senses) (8). Hypothetico-Deductive Theory is defined as:

“The standard research method of empirical science in, which hypotheses are formulated and tested by deducing predictions from them and then testing the predictions through controlled experiments, hypotheses that are falsified being rejected and replaced by new ones” (9).

Using the scientific approach to decision-making is one of the key pillars upon which medicine claims to be a science (10-11). Scientific reasoning depends upon testing of logically developed theoretical knowledge against empirical data in the material world and vice versa (9, 12). Hypothetico-deductive reasoning when applied in health care practice is a method of deciding the best alternative from those available based upon rationality and empirical precision (13-15).
Information Processing Theory is the seminal work behind Hypothetical-Deductive Theory (13). According to this theory, humans store objective data within memory, where it is coded as symbols. Symbols are grouped into patterns in the brain: thus memory is stored in ‘chunks’. These patterned groups of symbols are associated with external stimuli. These ‘chunks’ of symbols and past experiences are stored in long-term memory awaiting retrieval when needed (13). People recognise patterns when similar stimuli re-occur that seems to fit the person’s experience. This can result in repeating/avoiding a past action (decision-making). To make a good decision and take appropriate actions is dependent upon the individual’s ability to assimilate, interpret and analyse information and learn from past experience or the learning provided by others (13, 16).

Medical Clinical Reasoning

Medical clinical reasoning is a prime example of hypothetico-deductive reasoning. Clinical reasoning involves a number of steps and although the names of the steps vary from author to author the phases below are consistent with a large number of influential theorists in the field (17-21).

<table>
<thead>
<tr>
<th>Table 1: The Steps in a Clinical Reasoning Model</th>
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<tbody>
<tr>
<td>Cue acquisition</td>
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By applying the stages of clinical reasoning to patients, medicine seeks to rationally link clinical features with diseases and diseases with treatments/interventions. The hypotheses generation and cue interpretation stages of Hypothetico-Deductive Theory are vital when dealing with complex data like patient symptoms (18). Hypothesis generation
means holding, as tentative, one’s first ‘guess’ based on pattern recognition and past experience and then submitting it to empirical testing. Empirical testing provides evidence to support or undermine the provisional diagnosis and/or differential diagnoses (14-15, 22). The use of a clinical reasoning model aims to ensure patients should receive the most appropriate treatment in the shortest period of time and with the least amount of unwanted effects (23).

**Intuitive-Humanistic Theory**

Intuitive-Humanistic Theory is primarily associated with nursing (24). There is no consensus in the literature about the role or meaning intuition takes within decision-making. Definitions of intuition range from: “understanding without rationale” (25); to “act on a sudden awareness of knowledge that is related to previous experience, perceived as a whole, and difficult to articulate” (26). Benner (24) linked the process of decision-making to five ‘levels’ of experience and practice: novice, advanced beginner, competent, proficient and expert. Benner’s (24) research findings were that, clinical decisions by less experienced nurses were strongly based on hypothetico-deductive reasoning, whilst expert nurses used intuition. An expert nurse automatically undertakes a quick classification and intuitively screens available options, eliminating options not perceived as relevant to make a judgement and/or a decision (24, 27). The resultant perceptions are of an intuitive decision-making expert nurse, who appears quick and spontaneous while operating with profound understanding, without necessarily being able to articulate that understanding (28). Benner (24) argues intuition is a valuable part of nurses’ clinical practice. Other researchers go further claiming, other health professionals benefit from drawing on intuition in clinical practice (26, 29-32). Mok and Stevens (29) claim midwives use intuition to aid rapid subliminal judgements but do not differentiate between novice and expert midwives.

Dreyfus and Dreyfus (28) noted intuition contains patterns and similarity recognition, common sense, sense of salience and deliberate rationality. For expert practitioners, knowing what to do in a particular situation usually depends on intuitive pattern matching. Pattern matching is defined by Mok & Stevens (29) as a “process of making a judgement on the basis of a few critical pieces of information” (p 59). The Intuitive-Humanistic approach to best practice for clinical decision-making is based on the assumption that this process is necessary and sufficient for nursing and other health disciplines.
**Dual Processing Theory**

The theorists working on Dual Processing Theory aim to ‘describe’ how humans actually make decisions in the real world; not how one ‘should’ make decisions as hypothetico-deductive reasoning theory does. The Dual Processing Theory serves as a model within which different modes of cognitive processes or systems occur. ‘Intuition’, also called, System 1 is one process, ‘analysis’, also called System 2 is a second process (33). The Dual Processing Theory argues that all clinical reasoning processes commence when the decision-maker undertakes cue acquisition and cue interpretation (11). System 1 (intuition) is used by the clinical decision-maker if cue acquisition and cue interpretation match ‘stored’ patterns of knowledge of diseases clinical features (34). However, if cue acquisition and cue interpretation does not pattern match existing stored memory then the clinical decision maker is said to use System 2 (analysis). Once System 2 (analysis) is chosen the decision-maker can opt to use various reasoning approaches such as: hypothetico-deductive, Bayesian or algorithmic (11). In summary, System 1 decision-making is quick and spontaneous whilst System 2 decision-making is slow and disciplined.

Dual Processing Theory, by focussing on how clinicians actually make decision and does not offer a solution to how to ensure that clinical practitioners can move appropriately between intuitive and analytical modes to reach a good clinical judgement.

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**The International Confederation of Midwives (ICM) Framework for Decision-Making in Midwifery Care**

The ICM’s five-step framework for decision-making for midwifery is an adaptation of hypothetico-deductive reasoning. The five steps are noted below:

**ICM Framework for Decision-Making in Midwifery Care – Steps**

1. Collect information from the woman, from the woman's and the infant's records and from any laboratory tests in a systematic way for a complete assessment;

2. Identify actual or potential problems based on the correct interpretation of the information gathered in Step 1;

3. Develop a comprehensive plan of care with the woman and her family based on the woman's or infant's needs and supported by the data collected;

4. Carry out and continually update the plan of care within an appropriate time frame, and
5. Evaluate the effectiveness of care given with the woman and her family, consider alternatives if unsuccessful, returning to Step 1 to collect more data and/or develop a new plan (2).

The first two steps of the ICM (2) decision-making framework are based upon the medical clinical reasoning process. Explicit linear cognitive rationality is used to obtain observable, empirical and measurable data (12, 35). The third and fifth step of the ICM decision-making framework involves the woman in care planning and evaluation.

**The Australian Nursing and Midwifery Council (ANMC) Midwifery Practice Decisions Flowchart and Midwifery Practice Decisions Summary Guide**

The Australian Nursing and Midwifery Council (ANMC) Midwifery Practice Decisions Flowchart (36) and Midwifery Practice Decisions Summary Guide (37) set forth a number of issues that midwives should consider before making decisions. The purpose of the framework is “identifying the agreed foundation principles for decision-making tools implemented by” regulatory authorities in Australia (36). In summary the flow chart says that the midwife:

1. Identifies the health needs and benefits for the woman and baby;
2. Reflects on her own scope of practice;
3. Considers the organisational context before, and
4. Finally selects the most appropriate and competent person to perform the activity (37).

This model focuses on deciding which clinical activities are within an individual’s scope of practice and within the scope of practice of a midwife in Australia. It does not give guidance or purport to be a model of clinical decision-making which includes cognitive reasoning by the midwife and decision-making by the woman. Rather the Flowchart is a set of principles which may be useful for basing future development of decision-making models.

**Discussion**

Scientific reasoning, as exemplified in Hypothetico-Deductive Theory, is the dominant paradigm within which clinical decision-making models are developed for use within the health science disciplines, including midwifery. The explicit steps used in
diagnostic reasoning provide a systematic approach to making a diagnosis and prescribing treatment. It is a strength that the steps can be taught and tested (17-21, 38). Having a clear and agreed decision-making process promotes transparency and allows for consensual checking of knowledge and reasoning. Likewise a consensual decision can be made and justified against the data (12, 17-19, 38-40). The emphasis on rationality and empirical data is a strength but it is a limitation if rationality and objectivity are used to rule out any data that is emotional or contextual (41-42).

Rationality and analysis is reliant on several factors: the decision-maker being emotionally calm; knowledge is organised within an individual’s idiosyncratic memory structure (43); ability to access and withdraw knowledge and experiences; flexibility of assimilated knowledge permitting reinterpretation and application to new situations (44). Memories, however, are limited and imperfect so successful knowledge recall may not be possible or efficient (45-46).

The emotions of the doctor and the thoughts or feelings of the patient are excluded within the medical clinical reasoning process. The exclusion of any information, other than empirical objective data, is a limitation because it leaves out factors that may produce a better decision. Emotions, as Benner points out, can be a way of ‘intuitive’ knowing (24, 47). We are arguing that the emotions of the woman and her partner are relevant and should be included in midwifery decision-making. The person’s phenomenological experience is not available for consensual validation: doctors exclude it from decision-making whereas midwives and women want to make the woman’s experience central to midwifery decision-making (48-49). Further, emotions can warn us when we may be making a mistake that we do not recognise ‘rationally’. Consequently these limitations contribute to clinical decision-making that is poor and can ultimately lead to clinical errors (33, 50).

Thompson and Dowie (51) claim that the medical clinical reasoning steps are part of nursing and midwifery clinical reasoning processes. It is true that the broad scientific method of hypothetico-deductive reasoning is contained within the ICM Framework of Decision-Making in Midwifery Care (2) framework (see table below).

<table>
<thead>
<tr>
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<td>Step</td>
<td>Description</td>
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<td>4.</td>
<td>Cue interpretation</td>
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As the table above demonstrates, the detailed and specific steps in medical clinical reasoning are not explicit in current midwifery decision-making theories. Midwifery uses different terminology for similar intellectual processes. Medical reasoning excludes the person (patient) whereas midwifery and nursing makes some acknowledgement of the person and their situation. Midwifery applications of clinical reasoning are less specific and prescriptive. This is because this framework subsumes several steps of medical clinical reasoning into broader and less specific categories. It is clear that some steps in midwifery decision-making processes become opaque when several steps are subsumed into one. This lack of clarity means that midwifery decision-making decisions based on this model would be less easy to consensually validate with fellow clinicians. Further, teaching and learning decision-making would be much less effective due to lack of clear and specific steps. Consequently midwives who have not learned the details of clinical reasoning have a potential or actual deficit which affects their decision-making negatively (44). Hammond (52) claims that inadequate education and practice in detailed step-by-step decision-making induces ‘average’ decision-making by which he means that the average practitioner makes decisions rapidly by combining that ‘average’ knowledge with guess work.

The fundamental foundation of Dual Processing Theory is that pattern recognition can lead to good clinical decisions but it requires accurate knowledge and sufficient
experience to have a good store of previous patterns of clinical cues (11, 53-54). A problem, however, is that experience and knowledge are prerequisites for safe decision-making based on pattern recognition and this can mean that clinical errors are made which may have catastrophic consequences for the patient. Further, good clinical decisions, based on pattern recognition and heuristics, can be undermined by multiple sources of cognitive biases (46). Cognitive biases limit the decision-maker to their original ‘snap judgement’ based on faulty pattern recognition and therefore fails to look for confirmatory or contradictory evidence and possible alternative actions. Dual Processing Theory highlights the potential of the decision-maker to be able to move between the two modes of cognition: analysis and intuition. We accept that using intuition is reasonable and at times necessary to aid decision-making in a timely manner. However, for the sake of quality and patient safety, intuition must be able to be explained and rationalised in terms of available evidence and clinical features.

Benner’s (24) Intuitive-Humanistic theory has some positive elements for nursing and midwifery as it acknowledges the role of emotions and involvement with patients and their families. Nurses who used intuition in Benner’s study were not able to articulate their reasoning processes. ‘Holistic intuition’ therefore (24), can neither be explained nor taught. To claim, as Benner has, that intuitive decision-making is a hallmark of expert nursing practice is potentially dangerous (24). If nurses and midwives see intuitive decision-making as somehow ideal it suggests that being slow and deliberate when making decisions is evidence of being inexperienced and ‘not advanced’ in practice.

The effect of the context and the person’s wishes for their health care is not well addressed in any of the existing theories. Most importantly, none of the existing theories place the woman at the centre of decision-making.

Midwifery, as a woman-centred discipline, needs more than cognitive clinical reasoning to reach best-practice clinical decisions. Based on our reading and practice we believe that best-practice clinical judgement in second stage midwifery should have the following characteristics:

1. Places the woman as a partner in all aspects of decision-making;
2. Considers both the woman and the baby; not as separate entities but as an indivisible whole
3. Uses specific clinical reasoning steps OR decisions can be justified from a clinical reasoning perspective;
4. The woman is provided with up to date accurate knowledge/evidence in a timely manner;
5. The midwife takes appropriate action in a timely manner (including consultation and referral);
6. Ensures the woman is the final decision-maker in her own care (even if the woman’s decision is not consistent with dominant views of what is the ‘best-evidence’ in a particular situation), and
7. In an emergency, the midwife can make a decision that is clinically and ethically defensible and later explained to the woman (which should be a rarity).

**Conclusion**

This review has been guided by the question:

What are the strengths and limitations of existing decision-making theories as a basis for guiding best practice clinical decision-making within a framework of midwifery philosophy?

A major finding from this review is that a detailed model of clinical reasoning has much to offer a midwifery theory of clinical decision-making. Although clinical reasoning is necessary for good midwifery decision-making it is not sufficient to guide best midwifery practice for three main reasons. Firstly, midwives are working with healthy woman who are to be accorded decision-autonomy about their maternity care. The midwife, therefore, makes decisions in partnership with the woman. Secondly, unlike medical clinical reasoning, midwifery decision-making should incorporate both objective and subjective elements including the context of decision-making and the emotions and intuitions of both the woman and the midwife. Thirdly, unlike any decision-making theory reviewed here the midwife usually has to consider both the woman and the baby; not as separate entities but as an indivisible whole.

A midwifery specific decision-making model needs to be developed that gives guidance to midwives about their scope of practice, the factors to consider when making decisions; how to use clinical reasoning; the way to make decisions in partnership with the
woman and; finally how to conceptualise and include the interests of the woman/baby in midwifery decision-making.