Midwives’ clinical reasoning during second stage labour: report on an interpretive study

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Midwives’ Clinical Reasoning during 2nd Stage labour: Report on an Interpretive Study

Abstract:

Background: Clinical reasoning was once thought to be the exclusive domain of medicine – setting it apart from ‘non-scientific’ occupations like midwifery. Poor assessment, clinical reasoning and decision-making skills are well known contributors to adverse outcomes in maternity care. Midwifery decision-making models share a common deficit: they are insufficiently detailed to guide reasoning processes for midwives in practice. For these reasons we wanted to explore if midwives actively engaged in clinical reasoning processes within their clinical practice and if so to what extent’. The study was conducted using post structural, feminist methodology.

Question: To what extent do midwives engage in clinical reasoning processes when making decisions in the second stage labour?

Methods: Twenty-six practising midwives were interviewed. Feminist interpretive analysis was conducted by two researchers guided by the steps of a model of clinical reasoning process. Six narratives were excluded from analysis because they did not sufficiently address the research question. The midwives narratives were prepared via data reduction. A theoretically informed analysis and interpretation was conducted.

Results: Using a feminist, interpretive approach we created a model of midwifery clinical reasoning grounded in the literature and consistent with the data. Thirteen of the 20 participant narratives demonstrate analytical clinical reasoning abilities but only 9 completed the process and implemented the decision. Seven midwives used non-analytical decision-making without adequately checking against assessment data.

Conclusion: Over half of the participants demonstrated the ability to use clinical reasoning skills. Less than half of the midwives demonstrated clinical reasoning as their way of making decisions. The new model of Midwifery Clinical Reasoning includes ‘intuition’ as a valued way of knowing. Using intuition, however, should not replace clinical reasoning which promotes through decision-making that can be made transparent and be consensually validated.

Keywords: clinical reasoning, decision-making, midwifery, second-stage labour, intuition
This paper reports on a qualitative study about practising midwives and the processes they use to make decisions during the 2nd stage of labour. Key Terms are presented in Table 1.

**Problem**

Poor clinical reasoning and decision-making are well known contributors to adverse outcomes in maternity care (Centre for Maternal and Child Enquiries, 2011). In Australia, the setting for this study, medical dominance of the maternity services may be an important factor in undermining midwives’ use of clinical reasoning (Tracy et al., 2014). Midwifery decision-making models share a common deficit: they are insufficiently detailed to guide reasoning processes for midwives in practice (Jefford et al., 2011). In the midwifery regulatory literature there is no discussion, let alone agreement, that clinical reasoning is important in midwifery: this may be attributed to midwives embracing emotional and intuitive ways of knowing whilst potentially undervaluing one important way of knowing; i.e. analytic reasoning.

**Background**

Daniel Kahneman (2011) won a Nobel Prize for his work on how humans make decisions. Essentially there are two ways: Analytical (slow thinking) and Non-Analytical (fast thinking). By far the most common way of making a decision is non-analytical, which is based on pattern matching (Eva, 2005, Kahneman, 2011). People engage in pattern matching whenever they encounter a situation that requires a decision where the situation is similar to one they have previously encountered, e.g. the spontaneous decision that this woman’s severe breathlessness is caused by acute asthma is pattern-matching. To make a decision more slowly (analytically) may lead to a better decision i.e. even though asthma is a very common cause of breathlessness, this particular woman has no recent
history of asthma, the onset of breathlessness was sudden, no wheezing is evident; therefore this may be a pulmonary embolism or it may be an amniotic embolus – consequently further assessment is required before making a decision and taking action.

Clinical reasoning is the term used when clinicians use analytical ways to make decisions. Clinical reasoning is part of the broader philosophical field of Hypothetico-Deductive Theory, which forms the foundations of empirical science (Colman, 2006, Lawson, 2000). Clinical reasoning was once thought to be the exclusive domain of medicine – setting it apart from ‘non-scientific’ occupations like midwifery (Turner, 1996, Cohen, 1995, Willis, 1989, Foucault, 1980, Foucault, 1972). The learning of clinical reasoning is deeply embedded in medical education where it is often enshrined in Problem Based Learning (Neville, 2009). Feminists highlight the idea that socio-political factors such as medicines’ appropriation (Willis, 1983) of analytical reasoning as their exclusive domain has been disempowering for midwives.

The Nursing and Midwifery Board of Australia (NMBA) now requires that all midwives meet competency standards related to decision-making (Nursing and Midwifery Board of Australia, 2006). These competency standards refer to midwives providing advice, which is to facilitate decision-making by the woman, and/or involving the woman in decision-making (Nursing and Midwifery Board of Australia, 2006). ‘Decision-making’, however, has not been explicitly defined and the word ‘reasoning’ is absent from all NMBA midwifery regulatory documents. This absence can be expected to be reflected in an absence in Midwifery curricula. Our critique of midwifery models of decision-making has been reported previously (Jefford et al., 2011).

A hallmark of clinical reasoning is that the thinking process can be made transparent
therefore can be consensually validated or falsified which is a characteristic of
profession based in science. Midwifery, being both a science and an art, needs to be
able to justify certain types of clinical decision-making processes that are sufficiently
robust to distinguish midwifery from a pseudoscience.

Research Question

‘To what extent do midwives engage in a clinical reasoning process during 2nd
stage labour?’

Due to the lack of explicit clinical reasoning within the NMBA documents we felt it was
important to explore if midwives used analytical clinical reasoning processes in clinical
practice and; if so, to what extent. We chose 2nd stage labour as the focus for this study
because there are some decisions that cannot be negotiated with the woman in the 2nd
stage of labour moment or are less likely to be collaboratively decided. Examples of
decisions where the treatment provided is not decided collaboratively include:
responding to intrapartum haemorrhage, a tight nuchal cord and managing shoulder
dystocia.

Literature Review

The clinical reasoning process is well documented, with slight changes in wording and
emphasis (Elstein et al., 1978, Thompson, 1999, Mong-Chue, 2000). The clinical
reasoning model that we have developed is grounded in the work of these authors. We
have validated and adapted our model of clinical reasoning for midwifery practice, which
includes both analytical and non-analytical ways of knowing (See table 2). In summary
the process begins with assessment of the person with the clinical condition to identify
cues i.e. signs and symptoms (*cue acquisition*). The process then proceeds by clustering and interpreting cues that seem to be related to each other (e.g. abdominal pain and bright bleeding during 2nd stage labour). Next one or more hypotheses are formulated (this might be a 2nd stage show or it might an intrapartum haemorrhage, it might even be uterine rupture). The clinician, then, tests each hypothesis by gathering further assessment data (*focused cue acquisition*) (e.g. abdominal tenderness, signs of fetal distress, maternal BP and HR). Hypotheses that are not supported from the assessment data are rejected and the one hypothesis which best matches all assessment data is either made the diagnosis or the provisional diagnosis (e.g. there is abdominal tenderness, the heart rate is 95 beats per minute and there is fetal distress, the woman has no existing uterine scar therefore intrapartum hemorrhage is most likely).

The clinical reasoning process ultimately leads to a clinical decision being made; in this case to consult and refer to obstetric care immediately whilst continuing midwifery care (Australian College of Midwives, 2015).

On the basis of a systematic search of the research literature (using the key words: birth, labour, 2nd stage, midwifery, clinical reasoning and decision-making) we concluded there have been no studies which answer the guiding question. Five studies, which were somewhat relevant, were reviewed. Reviewed research was conducted from 2001-2011 in the UK (4 studies) and Sweden (1 study). Three of the studies were qualitative (Cheyne et al., 2006, Danerek and Dykes, 2001, Lankshear et al., 2005) and two were quantitative (Cioffi et al., 2005, Styles et al., 2011). The full review of related research is available (Jefford et al., 2010). None of these studies actually focused on clinical reasoning processes. Thus, there is a gap in the literature because no previous study has systematically explored the processes midwives undertake in order to reach a clinical decision in 2nd stage labour; thus justifying the present study.
Ethics

The University granted ethical approval; particular care was taken with anonymity of all involved, which included changes of some potentially identifying details that were not crucial to the midwife’s narrative.

Participants

The population, from which we recruited, was currently practising Australian midwives who were involved in care during labour and birth. Advertisement was disseminated using print and social media. Purposive, theoretical sampling was used to recruit participants (Bowling, 2006, Burns and Kitzinger, 2005). An information sheet and a demographic questionnaire were sent to the 70 potential participants who responded. We asked for demographic data so we could select participants ensuring diversity in geographical location, length of qualification, type of qualification, type of maternity care services, age and gender (Richardson-Tench et al., 2011). A total of 26 participants were selected. Analysis showed this number was adequate to achieve data saturation; another hallmark of qualitative rigor (Jirojwong and Pepper, 2011). Table 3 provides a summary of the demographic characteristics of the participants. Please note that some midwife participants practiced in more than one model of care; thus the numbers under models exceeds the number of participants.

Methodology

The methodology and methods for this study have been reported previously (Jefford and Sundin, 2013) and are summarised below. Feminism is a form of social justice with the interests of women, being the focus (Kagen et al., 2014). Feminist research involves “identifying, understanding and changing the intrapersonal and social factors that sustain
women’s disempowerment” (Fahy and Harrison, 2005). At the beginning of this study we held a shared belief that midwives were not adequately prepared or supported to use clinical reasoning skills; this belief was based on the literature review and our own experiences as practising midwives. As feminists we argue that if midwives lack skills in clinical reasoning then that is one factor that contributes to sustaining midwifery disempowerment as an autonomous health profession. Lack of good clinical reasoning also has the effect that childbearing woman may receive sub-standard midwifery care (Jefford, 2014).

Methods for Data Collection

We developed an interview schedule based on the literature review with a focus on eliciting narratives about clinical reasoning processes and decision-making in 2nd stage labour. Following Wengraf (Wengraf, 2006), we used a single main question aimed at eliciting a narrative followed by probing open-ended questions intended to gain deeper understanding. The interview schedule was pilot tested by the first researcher, on two practising midwives; minor modifications were subsequently made. Participants were given a copy of the interview schedule prior to being interviewed by the first researcher. All interviews (which lasted 30-40 minutes each) were conducted by the first researcher, in a private setting of the participant’s choosing. Interviewees were invited to tell two narratives as examples of their clinical reasoning and subsequent actions. We asked for two examples; one they thought of as a positive example and the other as a negative example of decision-making. We used this positive and negative approach to narrative telling to make it easier for the midwives to tell narratives where they were proud about their clinical reasoning as well as those they were not. Twenty six midwives provided 52 narratives via interview: these were digitally recorded and individual participants subsequently validated their transcripts.
Methods for Data Analysis

Transcribed interview scripts were returned to the participants for validation. The first researcher began by reading the details of the midwives' narratives. A total of 52 clinical decision-making narratives were read (i.e. two narratives per midwife: n = 26). Narratives were excluded where insufficient data was provided or if a medical practitioner was the decision-maker. In this way 20/52 narratives were excluded. Data analysis began with organising the flow of each story to follow a temporal order. Consistent with the qualitative data analysis principle of data reduction (Richardson-Tench et al., 2011), extraneous data was removed. The outcome of initial analysis was a set of 32 narratives from 20 midwives.

The narratives were then analysed and interpreted in the light of extant literature and our midwifery experience viewed through a feminist lens. The research question was used to guide this interpretive process using Table 2: ‘Steps in the Clinical Reasoning Process’. This approach uses by induction (from the data) and deduction (from the literature) (Boyatzis, 1998, Hayes, 1997). Our approach is different from the purely inductive process used in phenomenological type interpretation (Frith and Gleeson, 2004). We chose to use the extant literature in addition to the experiences of participants to guide analysis and interpretation. In this way we were able to synthesis both experiential and theoretical knowledge, which. In turn, strengthened the foundations of the model proposed in this paper.

As a quality control check the second researcher separately analysed three narratives. A comparison between the two researchers' analysis occurred and differences in interpretation were resolved by discussion. The outcomes of analysis were sent to a sub-group of eight participants n=8 to seek their input and/or validation (Denzin, 1989,
Gerrish and Lacey, 2010). The eight participants agreed with the analysis; no changes were requested. After completing this validation process six times, we believe data saturation had been completed (Given, 2008). Data reduction was achieved by summarizing/paraphrasing the midwife’s introductory comments which set the scene for the focus on analyzing the decision-making process.

Findings

Both researchers agreed on the categories below and the classification of particular narratives under each category. The three categories were; 1) analytical decision making 2) partial analytical decision making but failure to act and 3) non-analytical decision-making. We used critical conversations, between the researchers, to decide which narratives would best exemplify the types of decision-making that participants described. In the narratives, below, if we have summarised or paraphrased the font is in italics. The participant’s words are indented. Within each narrative, our analytic comments are included in [bold italics brackets]. Interpretive comments are kept to a minimum but where they appear they are in simple brackets.

Exemplar: Analytical Decision-Making Using Clinical Reasoning

Nine of the 20 midwives demonstrated good clinical reasoning (i.e. the midwife’s thinking processes largely matched the clinical reasoning process noted in Table 2). Nicoli’s narrative is the selected example:

Nicoli has been a midwife for 10 years. He works in a consultant-led public hospital in a city. On the day of this scenario, Nicoli was working with a senior student midwife Mandy, (an RN) Nicoli and Mandy had been caring for Jane (a multigravida woman) who
had been labouring for about six hours. At the time that this scenario starts the change of shift is in progress. Nicoli left the student midwife and Jane in the birthing room to give handover. Jane was now in late 1st stage labour with a CTG attached. When, approximately 15 mins later, he returned to the room, Nicoli discovered the midwifery student had consulted a doctor because she interpreted the CTG printout to be showing early decelerations, which she believed suggested the baby was experiencing some distress. The doctor had subsequently taken a fetal scalp blood sample. Nicoli takes up the story….

I finished the handover and went straight back to the birthing room. The doctor decided he wanted to do a vacuum extraction. A second doctor came into the birthing room seeking clarification of what was happening. The second doctor was junior to the first doctor, so once the situation had been explained, the junior doctor deferred to the senior doctor’s decision. When I heard the first doctor repeat that he was going to do a vacuum extraction I asked him if Jane’s cervix was fully dilated [cue acquisition]. He said, “Yes.”

Jane had only been in 2nd stage for no more than 20 minutes at this point [cue clustering]. I was thinking several things: the CTG I had looked at before I left the birthing room (15 minutes ago) wasn’t that bad [cue interpretation] there had been early decelerations from a baseline of around 140bpm to 115bpm lasting around 15-30 seconds [ruling out significant fetal distress]; the fetal blood sampling test had shown the baby was coping as the pH was within normal limits (result was 7.35) [ruling out fetal distress] the fetal head was low [cue acquisition]; Jane did not have an epidural and had birthed vaginally before [cue clustering] so I could see no reason why she could not push this baby out vaginally [evaluation of treatment options]. I made the decision Jane did not
need a vacuum extraction and that she could have a vaginal birth [**diagnosis**].

[ ] I turned to Jane and, ignoring the junior doctor, said, "We (emphasis) need to push this baby out now [ ]. The two doctors just looked at me but kept silent. I was forceful in encouraging Jane to push [**implement treatment plan**]. [ ] The two doctors stayed in Jane’s birthing room to watch. During pushing fetal decelerations persisted [**focused cue acquisition**], although they had changed to late decelerations [**ruling in fetal distress**]. The baby was born spontaneously and was fine at birth with good Apgar’s [**evaluation of treatment outcomes**].

**Exemplar: Partial Analytical Decision Making and Failure to act**

Four midwives partially used clinical reasoning but gave up trying to make a decision and/or failed to implement their decision. Maggie’s narrative is the selected example.

Maggie has been a midwife for 28 years; she told me this story as an example of good decision-making. She works within a group midwifery practice as part of a birth centre, attached to a major maternity unit. She was the primary midwife for an Afghani woman Raja, a primigravida. Raja and Mohammed, her partner, speak quite good English. Raja and Mohammed deferred to Zita: Raja’s, non-English speaking, Mother-in-law who accompanied them to the birth centre. (This is crucial to what unfolds). Maggie was informed early in the ante-natal period within the Afghan culture women believe the birthing stool is a good place to labour. Maggie now takes up the story…

Raja found the birthing stool a very comfortable position to be in and to cope with labour and pushing. She was pushing for quite a long time i.e. over four hours [**cue acquisition but no clear diagnosis**]. I felt unhappy with Raja being on the birthing stool for so long because research has shown in 2nd stage you
really shouldn’t sit on a birth stool for a very long time [cue interpretation] because of the risk of perineal oedema and that’s what I’ve found in practice [good knowledge base about perineal trauma]. I could see in the mirror under the birthing stool Raja’s perineum was becoming quite oedematous [focused cue acquisition]. I tried to encourage Raja to come off the birth stool and go forward and kneel [evaluation of treatment options], but she didn’t want to move [may be because the woman didn’t have enough information]. There was much discussion between Raja, Mohammed and Zita. Mohammed told me his Mother said “Raja needs to stay on the birthing stool because the baby needs to come”. Zita was continuously touching Raja encouraging her to stay on the birth stool [cultural and knowledge gap between family and Maggie].

It was very difficult for me. I felt challenged and questioned in my practice and my knowledge and my decision-making but I didn’t want to be disrespectful towards Zita because the dynamics in the room were that Zita was very much managing the labour. [Maggie is focused on the interpersonal and cultural aspect of care. She has stopped thinking about the clinical decision; Maggie is not using either pattern-matching or clinical reasoning]. To me culture is very important, especially as Raja has only Mohammed’s family in Australia and Raja has to go home with that family. For me to cause Zita to lose face in front of her family was not something I was prepared to do so I left Raja on the birth stool. [Maggie is more concerned about Zita feeling OK than she is about the risk of perineal trauma due to oedema for the woman. This a failure to make and act on a decision]. Outcome: The baby was born on the birth stool and fourth degree tear had to be repaired under anesthetic in the operating room.
Exemplar: Non-Analytical Decision making

Seven midwives used non-analytical ways of decision-making. Another narrative told by Maggie (above) was selected because she gave such a detailed example of non-analytical decision-making.

This story is from the same midwife, Maggie. In this case she was the primary midwife for Carla, a multigravida who is herself a midwife and Maggie’s personal friend. Alison, Carla’s support person is also a midwife and a friend of both Maggie and Carla. Maggie had been a clinical mentor to be Carla and Alison during their midwifery training. Maggie told me that Carla had doubted her body’s ability to give birth throughout first stage labour. Maggie now takes up the story…

I just ‘knew’ [intuition] Carla had gone through the transition stage because she’d been really distressed and very unsure of herself, and I could hear she was occasionally grunting at the height of her contractions [cue clustering]. Carla became agitated and was thinking she wasn’t in 2nd stage or ready to birth and she asked if I would [vaginally] examine her to see where she was [woman asking for evidence].

My first thought was: I normally trust a woman’s judgment and when the woman says to me “I’m concerned, I don’t think it’s time”, I normally trust them and often they are right. But in my experience, particularly with midwives in labour, they often second-guess themselves and often misread their body signs [pattern-matching; intuition]. I wasn’t looking closely at Carla so I don’t know whether there were any other physical signs of 2nd stage to be seen such as: fetal descent or perineal bulging and/or anal pouting [failure to acquire cues by assessment]. To me it was very obvious Carla was in 2nd stage [pattern matching] I expected her to birth
well because she had birthed well twice before [cure clustering].

My dilemma was: should I examine Carla to check if she was in 2\textsuperscript{nd} stage or not? [evaluation of treatment options] I was aware that Carla, herself, would have performed a vaginal examination on a woman to establish 2\textsuperscript{nd} stage. So I was questioning myself whether I needed to act, as she would have done. I was the senior midwife (in the room) so I felt there was more pressure to get it (the diagnosis) right (emphasis). I suppose I didn’t want to make a mistake so, I guess I was questioning my thinking carefully and looking at what decisions I was making (even though Maggie did not engage in systematic cue acquisition). I started to ask myself, is the baby in a mal-presentation? Is the cervix not fully dilated? Do I need to diagnose there is something holding the birth of the baby up? Can I wait a little while longer as Carla has only [potentially] been in 2\textsuperscript{nd} stage 15-20 minutes [ruling in normal progression of 2\textsuperscript{nd} stage labour]? I knew there was no reason to suspect these problems as I had done a palpation at the beginning of labour; I had seen the (emotional) signs of 2\textsuperscript{nd} stage [failing to collect focused cues by doing another palpation and looking for external signs of descent]. Maybe if I could get Carla to relax enough the [fetal] head would come down deep enough, the baby would rotate and the cervix would fully dilate around the head naturally and birth would happen [again failing to collect cues to rule out failure to progress; diagnosis seems to be woman’s tension is slowing labour progress]. It should be easy, especially in a woman who has had two children before. I knew I didn’t need to examine her; I felt (emphasis) [intuition] she was ready to birth [Maggie has not engaged in non-invasive ways of collecting assessment data therefore her knowing is not fully supported from clinical evidence]. I told Carla I didn’t need to and would not examine her. As I know Carla very well, I just held her close to me, telling her to trust her body, to let go of
negative thoughts, feel the baby coming down and just let the birth happen. Carla birthed her baby very shortly after. [This outcome is excellent but the process for deciding was non-analytical. A good clinical outcome and a good clinical decision-making process are not, necessarily, equivalent].

Discussion

The main finding of this study is that only 13/20 participants demonstrated some analytical clinical reasoning abilities. Only 9/20 completed the whole clinical reasoning process. Four midwives did use good clinical reasoning but did not actually implement the decision like, for example Maggie’s failure to act (above). Seven midwives gave examples of non-analytical decisions-making; essentially they relied solely upon pattern-matching. As discussed in the literature review pattern-matching is intuitive, fast and easy (Kahneman, 2011, Eva, 2005). A major problem with intuitive, pattern-matching decision making is that it cannot be explained or consensually validated (Thompson et al., 2013, Croskerry, 2003, Hammond and Hamm, 1983). Intuition and/or pattern-matching are useful aids to good clinical reasoning but only when used as prompts to engage in analytical reasoning (Ruth-Sahd, 2014).

Pattern-matching is essentially guessing and hoping, exposing the midwife’s thinking to several sources of error (Thompson et al., 2013). Birth is a normal process and most outcomes will be good. The very reason that midwives conduct assessments is to identify and act upon abnormal findings and not just hope everything will be well as Maggie did. Failure to assess, interpret or act on abnormal findings is a major cause of adverse events in maternity care (Fox et al., 2014). A good clinical outcome can never be used to justify poor clinical reasoning. Further, as an art and a science, the discipline of midwifery needs to use clinical decision-making processes that are sufficiently robust
to distinguish midwifery from a pseudoscience such as foot reflexology or Reiki.

From a feminist perspective, a midwife is disempowered if she does not, or cannot, use clinical reasoning for decision-making. The key social factors that sustain midwives' professional disempowerment include medical surveillance and control of decisions in maternity care and the undervaluing of clinical reasoning in by the midwifery profession. Midwives may have unconsciously brought into a gendered stereotype of decision making; masculine being seen as rational/analytical and feminine being seen as emotional/intuitive. The poststructural approach that we take means that such binaries are eliminated: we want midwives to be both rational and emotional; both analytical and intuitive.

The strengths of this study are that experienced midwives, who worked in diverse contexts and models of care across Australia, were interviewed about their decision-making processes in second stage labour. Data saturation occurred. Validation of interview transcripts was sought from each participant prior to analysis and all participants replied. Validity of analysis was sought from a sample of participants and all eight responded. Both emic and etic perspectives were included in the presentation of data: the midwives provided narratives gave the emic perspective on what they considered to be good decision-making. A theoretically informed interpretation by the researchers provided the etic perspective on what constitutes good decision-making. We argue that good decision-making in the second stage of labour uses both analytical and non-analytical processes.

Potential weaknesses of this study include that midwives may have not been frank in their recollections. The interviews may not have been probing enough because we
allowed midwives to tell their stories as they chose; perhaps with more prompts more
details of analytical reasoning may be emerged. The childbearing women’s perspectives
were not included in this study and neither was direct observation. A triangulated study
would now be a good follow up to further strengthen the trustworthiness of these
findings. Any midwife seeking to transfer the findings of this study to another context
needs to carefully consider the similarities and differences between this study’s
participants and their own context.

Conclusion

This paper has answered the research question: ‘To what extent do midwives engage in
a clinical reasoning process during 2nd stage labour?’ Our study indicates that over half
of the participants do have the ability to use clinical reasoning skills well but less than
half followed the process through to the end. The model of Midwifery Clinical Reasoning
(Table 2) includes ‘intuition’ as a valued part of midwifery assessment/awareness but
that does not obviate the need to engage in clinical reasoning as well.

The lack of clinical decision-making that was evident in over half the narratives may
mean that the safety and effectiveness of midwifery practice is less than ideal. Equally,
using non-analytical ways of making decisions, where reasons for actions cannot be
consensually validated, may undermine the claim that midwives have the right to be
professionally autonomous.

Based on our findings we recommend that the Midwifery regulatory authorities consider
revising their professional decision-making frameworks to more explicitly reflect
analytical clinical-reasoning. Likewise, to the bodies that regulate midwifery education
may wish to consider mandating that midwifery curricula specifically teach and assess
clinical reasoning. Maternity services should consider conducting staff training to teach
and assess clinical reasoning for registered midwives.


NEVILLE, A. 2009. Problem-Based Learning and Medical Education Forty Years On: A Review of Its Effects on Knowledge and Clinical Performance Medical Principles and Practice, 18, 1-9.


<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Analytical thinking</td>
<td>“...allocates attention to the effortful mental activities that demands it.....the conscious reasoning self that has beliefs, makes choices and decides what to think about and what to do...” (Kahneman, 2011p 21)</td>
</tr>
<tr>
<td>Clinical Reasoning</td>
<td>Clinical reasoning is part of the broader philosophical field of Hypothetico-Deductive Theory, which forms the foundations of empirical science (Colman, 2006). The clinical reasoning process assumes a knowledge base where the clinician is aware of the potential diagnoses, their signs and symptoms.</td>
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<tr>
<td>Decision-Making</td>
<td>Act or process of choosing a preferred option or course of action from a set of alternatives. It precedes and underpins almost all deliberate or voluntary behaviour (2002)</td>
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<td>Emic</td>
<td>An entirely emic perspective in research means that the perspective of the research participants are presented as ‘truth’ or ‘true for them’. The researchers own perspective is not visible in the research report e.g. phenomenology. (Darvill, 2008)</td>
</tr>
<tr>
<td>Etic</td>
<td>An etic perspective in research means that the researcher interprets or re-frames that data from their own perspective e.g. Margaret Mead. Post structural researchers often present both the emic and etic perspective in their research report. (Darvill, 2008)</td>
</tr>
<tr>
<td>Feminism</td>
<td>Feminism is the theory, research and practice of “identifying, understanding and changing the intrapersonal and social factors that sustain women’s disempowerment” (Fahy &amp; Harrison, 2005)</td>
</tr>
<tr>
<td>Hypothetico-Deductive Theory</td>
<td>“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” (Colman, 2006).</td>
</tr>
<tr>
<td>Intuition</td>
<td>‘...Judgement is a product of interaction between an individual and environment and cannot be understood by studying either in isolation (Standing, 2010 #1253@229)</td>
</tr>
<tr>
<td>Post-structural</td>
<td>Post structuralism has been considered in two main ways: one concerns the subject and power, for example, in the work of Michael Foucault. The other main way is post structuralism as exemplified in the work of Jacques Derrida, which is a direct criticism of structuralism. Linguistic poststructuralists have shown that the meanings (truths) cannot be fixed. This is because of the supposedly foundational terms upon which the meanings depend are equally contingent and unstable (Calhoun, 2002). In the view of poststructuralists ‘truth’ is, therefore, contingent so that what comes to be accepted as ‘truth’ is a product of relations of power (Foucault, 1980).</td>
</tr>
<tr>
<td>Pseudoscience</td>
<td>is a practice or a knowledge claim that cannot be tested or falsified. Pseudoscience distinguished from science by the use of vague, exaggerated and untestable claims (Pigliucci &amp; Maarteen, 2103)</td>
</tr>
<tr>
<td>Non-analytical thinking</td>
<td>“…operates automatically and quickly with little or no effort and no sense of voluntary control...” (Kahneman, 2011p 20)</td>
</tr>
<tr>
<td>The Step</td>
<td>The explanation or example</td>
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<tr>
<td>----------------------------------------------</td>
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<tr>
<td>Cue acquisition</td>
<td>Sensory data that is collected via physical assessment and monitoring</td>
</tr>
<tr>
<td>Cue clustering</td>
<td>Cues that are possibly related are considered together i.e. pulse and respiration with blood pressure</td>
</tr>
<tr>
<td>Cue interpretation to generate multiple hypotheses</td>
<td>The cause of the clinical feature of acute breathlessness could be: asthma, heart failure, pulmonary embolus, amniotic fluid embolus ....</td>
</tr>
<tr>
<td>Focused cue acquisition</td>
<td>Collect new information in the light of the hypotheses under consideration e.g. check patient history, conduct investigations e.g. chest X ray, lung scan, blood test etc</td>
</tr>
<tr>
<td>Ruling in and Ruling out hypotheses</td>
<td>Use all of the available cues and knowledge of the potential diagnoses to rule in and rule out possible causes of breathlessness</td>
</tr>
<tr>
<td>Making a diagnosis</td>
<td>The diagnosis that is consistent with the clinical features and results of investigations is the one that is decided upon as the most likely cause of the breathlessness</td>
</tr>
<tr>
<td>Evaluate treatment options relevant to the diagnosis;</td>
<td>If diagnosis is asthma then salbutamol considered noting that uterine relaxation can occur.</td>
</tr>
<tr>
<td>Prescribe and/or Implement treatment plan, and</td>
<td>Implement the treatment and observe for side effects</td>
</tr>
<tr>
<td>Evaluate treatment outcomes</td>
<td>To monitor effectiveness and side effects; if effective then the diagnosis is likely to be confirmed. If not effective then the process continues with other hypothesis being pursued.</td>
</tr>
<tr>
<td>Uses intuition to aid decision-making</td>
<td></td>
</tr>
<tr>
<td>Links intuition to cues and reasoning</td>
<td></td>
</tr>
</tbody>
</table>

(Benner, 1984; A. Elstein, Shulman, & Sprafka, 1978; A. S. Elstein & Bordage, 1988; Mong-Chue, 2000; Offredy, 2002; C Thompson, 1999)
Table 3: Demographic characteristics of the participants

<table>
<thead>
<tr>
<th>Years as RM</th>
<th>State Distribution</th>
<th>Maternity Unit Location</th>
<th>Models of Maternity Care</th>
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<tbody>
<tr>
<td></td>
<td>n</td>
<td>City</td>
<td>Regional</td>
</tr>
<tr>
<td>&lt;5</td>
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<td>NSW</td>
<td>6</td>
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<tr>
<td>6-10</td>
<td>4</td>
<td>VIC</td>
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<td>0</td>
<td>QLD</td>
<td>5</td>
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<td>3</td>
<td>WA</td>
<td>2</td>
</tr>
<tr>
<td>21-25</td>
<td>5</td>
<td>ACT</td>
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</tr>
<tr>
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<td>SA</td>
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<tr>
<td>31-40</td>
<td>7</td>
<td>NT</td>
<td>2</td>
</tr>
</tbody>
</table>


