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CUE ACQUISITION: A FEATURE OF MALAWIAN MIDWIVES DECISION MAKING PROCESS TO SUPPORT NORMALITY DURING THE FIRST STAGE OF LABOUR

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## CUE ACQUISITION: A FEATURE OF MALAWIAN MIDWIVES DECISION MAKING PROCESS TO SUPPORT NORMALITY DURING THE FIRST STAGE OF LABOUR

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### ABSTRACT

*Objective:* To explore Malawian midwives decision making when caring for women during the first stage of labour in the hospital setting.

*Design and methods:* This focused ethnographic study examined the decision making process of 9 nurse-midwives with varying years of clinical experience in the real world setting of an urban and semi urban hospital from October 2013 to May 2014. This was done using 27 participant observations and 27 post-observation in-depth interviews over a period of six months. Qualitative data analysis software, NVivo 10, was used to assist with data management for the analysis. All data was analysed using the principle of theme and category formation.

*Findings:*

Analysis revealed a six-stage process of decision making that include a baseline for labour, deciding to admit a woman to labour ward, ascertaining the normal physiological progress of labour, supporting the normal physiological progress of labour, embracing uncertainty: the midwives' construction of unusual labour as normal, dealing with uncertainty and deciding to intervene in unusual labour. This six-stage process of decision making is conceptualised as the 'role of cue acquisition', illustrating the ways in which midwives utilise their assessment of labouring women to reason and make decisions on how to care for them in labour. Cue acquisition involved the midwives piecing together segments of information they obtained from the women to formulate an understanding of the woman's birthing progress and inform the midwives decision making process. This understanding of cue acquisition by midwives is significant for supporting safe care in the labour setting. When there was uncertainty in a woman's progress of labour, midwives used deductive reasoning, for example, by cross-checking and analysing the information obtained during the span of labour. Supporting normal labour physiological processes was identified as an underlying principle that shaped the midwives clinical judgement and decision making when they cared for women in labour.

*Key conclusions and implications for practice:*

The significance of this study is in the new understanding and insight into the process of midwifery decision making. Whilst the approach to decision making by the midwives requires further testing and refinement in order to explore implications for practice, the findings here provide new conceptual and practical clarity of midwifery decision making. The work contributes to the identified lack of knowledge of how midwives working clinically, in the 'real world setting. These findings therefore, contribute to this body of knowledge with regards to our understanding of decision making of midwives.

**Keywords:**

Decision making

Decision making theories

First stage of labour

Labour assessment

Midwifery practice

Obstructed labour

## **Introduction**

Decision making is an everyday human activity. For midwives working in labour and delivery settings, decision making includes accurate identification of cues indicating deviation of labour progress from the norm and ability to manage labour. “Cue acquisition”, alongside correct cue interpretation, is closely associated with diagnostic accuracy (Elstein et al., 1978). Early diagnosis and appropriate treatment of slow labour progress are the strategies to prevent prolonged/obstructed labour and its sequelae and achievement of satisfactory foetal and maternal outcomes (WHO, 2006; Orhue, 2012). The significance of this study is the illumination into the process of midwifery decision making in the ‘real world’ of health care. The study provides conceptual and practical clarity of midwifery decision making elaborating on how midwives working clinically in a ‘real world’ setting employ the midwifery model of care that promotes desirable outcomes. This paper reports on the identified stages midwives followed to make decisions during the care of women in the first stage of labour in an urban and semi urban hospital setting in Malawi. The study findings are relevant to the Malawian and international midwifery community. The challenges of maternal and neonatal morbidity and mortality are identified global challenges (UN, 2015).

### *The burden of obstructed and prolonged labour*

While the risk of dying during pregnancy, labour and birth is now very rare in economically more developed countries (EMDCs), women in economically less developed countries (ELDCs), such as Malawi, are still experiencing deaths due to childbirth-related complications (Ratsma et al., 2005, UN, 2015). Most EMDCs have considerably reduced maternal deaths related to childbirth complications. However, there are other international challenges that reflect the occurrence of serious incidents in maternity services provided, including deaths of mothers and babies. In the United Kingdom for instance, maternal deaths are also a concern as evidenced by the case reported by Kirkup (2015). Kirkup (2015) reported findings from an investigation into the University Hospitals of Morecambe Bay NHS Foundation Trust highlighting factors which led to unnecessary deaths of mothers and babies. These factors

included substandard clinical competence, deficient skills and knowledge and poor working relationships between different staff groups.

Prolonged and obstructed labour remains a significant childbirth complication causing maternal mortality and morbidity in ELDCs (Fenton et al., 2003, Mathai, 2009). In 2013, approximately five percent of obstructed labour occurred worldwide (Kassebaum et al., 2014). In Africa and Asia, obstructed labour affects between two and five percent of deliveries (*Usha and Krishna, 2004*). Obstructed labour was responsible for 22% of all maternal deaths due to direct causes in Uganda (Mbonye et al., 2006). Similarly, 19% of 350 deaths related to obstructed labour were identified in a prospective study in Guinea-Bissau (Høj et al., 1999). In Malawi, these complications accounted for four percent of maternal deaths (Ministry of Health (MoH), 2010). In addition, 63% and 45% of indications for caesarean delivery in 2003 and 2010 respectively were obstructed/prolonged labour (Fenton et al., 2003, MoH, 2010).

These figures are said to be an underestimation of the problem; majority of maternal deaths due to obstructed labour as primary cause of death are rarely documented. Instead, documentation pertaining to the terminal cause of death are classified as sepsis, ruptured uterus or haemorrhage rather than the underlying cause (WHO, 2008). Furthermore, for those women who survive prolonged/obstructed labour, the sequelae of difficult labour (anaemia, infertility and obstetric fistula) may be devastating (Fenton et al., 2003; WHO, 2006; Mathai, 2009). Nonetheless, various reports (Sullivan, 2000; Raynor and Bluff, 2005; WHO, 2006; Hussein et al., 2007; Orhue et al., 2012) suggest that efficient and effective clinical decision making regarding progress of labour during first stage of labour is key to prevention and treatment of prolonged and obstructed labour and other complications caused by long labour. The decision making process therefore is a significant aspect to consider when looking at how midwives care for women during first stage of labour. However, decision making is also a complex and contextual phenomena. A range of decision making approaches that clearly illustrate different ways in which clinical decisions can be made exist and are reviewed here.

## **Decision making theories**

### *Information processing theory*

Clinical decision-making is conceptualised in different ways with various models and theories illustrating how decisions can be made. One such theory, the information processing theory, suggests a four-staged linear, logical and rational process. This involves cue acquisition, hypothesis generation, data interpretation, and hypothesis testing (Jefford et al., 2011). The theory provides explicit and systematic approaches to decision making. In addition, the steps can be tested, taught and provide a consensual decision to be made that is justified by data (Standing, 2010; Jefford et al., 2011). However, these linear steps may not reflect the iterative nature of the processes that midwives use during decision making in the 'real world' setting.

### *Intuition*

In contrast, the notion of intuition is primarily linked with nursing and notably attributed to the work of Benner (1984) in her study investigating decision-making approaches by novices and experts in clinical settings. The main thrust of intuition is that decision making is based on an almost unconscious level of judgment and that practical wisdom and intuitive thinking, obtained through experience, play an important role in decision making (Benner, 1984; Thompson, 1999; Traynor et al., 2010). Intuition is viewed as an important element of midwifery knowledge and has been given legitimacy as a sound approach to decision making (Orme and Maggs, 1993; Davis-Floyd and Davis, 1996; Mok and Stevens, 2005; Walsh, 2010; Jefford and Fahy, 2015). However, it is argued that using intuition, where reasons for action cannot be consensually validated, could undermine the status of midwifery as a profession (Jefford and Fahy, 2015). Therefore, questions remain unanswered concerning how intuition is used in midwifery practice and how midwives can develop and improve its use in care of women in labour.

### *Cognitive continuum theory*

Alternatively, the cognitive continuum theory includes both analytic and intuitive cognition along a continuum (Hamm, 1988). The model specifies both surface and depth task characteristics that are likely to induce cognitive modes at different points along the continuum (Hamm, 1988; Standing, 2010). However, the theory provides a general framework and not specific instructions. It does not give instructions on how to make sure that practitioners can navigate appropriately between intuition and analysis modes of thinking to accomplish precise

clinical decisions (Hamm, 1988). The review of the most commonly cited theories from the literature can contribute to current thinking of the significant features of clinical decision making. Nevertheless, these theories are inadequate in themselves if we wish to elucidate the broad range of thought processes required in midwifery practice settings.

### **Decision making in Midwifery**

Decision making in midwifery has been studied less extensively and the way in which midwives make decisions during care of women in labour is not well known (Jefford et al., 2010; Masterson, 2010; Young, 2011). Within the few studies on midwifery decision making during labour and childbirth, it has been shown that midwives' decision making is mainly based on linear collection of cues to generate one or more hypotheses from data. This process draws from their theoretical knowledge and experiences in the interpretation of cues (Danerek and Dykes, 2001; Cheyne et al., 2006). However, in a recent qualitative study in New Zealand of midwives' decision making processes when making transfer decisions for slow labour progress, it was concluded that midwives engaged in a more objective and probabilistic process (Patterson et al., 2015). This was as a result of the midwives' analysing patterns and cues as a form of confirmatory or contradictory evidence. This was opposed to them relying on heuristic strategies when they experienced discomfort or poor fit in a situation which required them to transfer a woman with slow labour. In contrast, using a descriptive approach, Scholes et al. (2012) identified considerable variation in clinical management of postpartum haemorrhage among 35 midwifery students in the UK. They found that the midwifery students had problems prioritising care actions where more than one response was required to a clinical cue. They also failed to utilise mnemonics as heuristic devices to guide their actions. The students were found reluctant to engage in inductive and deductive cycles to formulate a decision.

There is on the whole a current lack of robust evidence about midwifery decision making during the care of women in labour. Specifically, the details concerning the actual thinking processes undertaken by the midwives are lacking. While midwives are accountable for this area of clinical decision making, the evidence base concerning their cognitive approaches is unclear. The few studies that do exist do not adequately inform the discipline of the complexity of midwifery clinical decision-making during the first stage of labour. This gap in our knowledge of



midwifery decision prompted the researchers to explore this area further within the Malawian context.

## **Methods**

### *Aim*

The aim of this study was to explore how Malawian midwives make decisions during the care of women in first stage of labour in a hospital setting.

### **Design**

This focused ethnographic study examined Malawian midwives' decision making during first stage of labour. To our knowledge this is the first study of its kind. Ethnography has been applied in healthcare settings as a way of accessing practices that are viewed in the context in which they occur, thereby aiding understanding of behaviour surrounding healthcare practices (Savage, 2000; Allen 2004; Allsop and Saks, 2013). However, at the heart of ethnographic research is the emic perspective which allows understanding of a culture by being involved in a natural setting. As an ethnographic researcher, the first author had a dual role by being part of the experience of midwifery care provision but also keeping a degree of distance (Burns et al., 2012). By being an ethnographic research study conducted by a midwife, this afforded an opportunity for reflexive consideration of the influence of professional 'identity' during data collection. To this end, the researcher was adaptable, reflexive and sensitive to people working in the labour ward, thereby enhancing mutual trust. She tried to be sensitive to her presence and minimise its effects. In addition, the researcher's role was flexible, and as an experienced midwife, it could have been seen as unfair if she did not offer help to the midwives during busy times. She wore a nurse/midwife uniform in order to merge into the labour wards. This approach enabled the researcher to give practical help when this was clearly indicated; however, this was kept to minimum.

### **Setting and Participants**

The study was conducted in the Southern region of Malawi. Participant observations and post-observation interviews were conducted over a six month period with a purposive sample of 9 nurse-midwives who provided labour and delivery care in an urban (Hospital A) and semi

urban hospital (Hospital B). Specifically, a pragmatic approach of maximum variation sampling strategy was used to select a small but diverse sample of midwives that were able to offer a wide variety of perspectives related to midwifery decision making (Patton, 2002; Polit and Beck, 2008). The midwives' characteristics in terms of educational background, qualification and midwifery practice experience are presented in Table 1.

**Table 1: Midwifery Participants' Characteristics**

<b>Hospital</b>	<b>Pseudonym</b>	<b>Educational Background</b>	<b>Qualification</b>	<b>Length of midwifery practice</b>
<b>A</b>	Maureen	Enrolled nurse-midwife	Certificate in Nursing and Midwifery	7 years
	Mabel	Nurse-midwife technician	Diploma in Nursing and Midwifery	3 months
	Odetta	Registered midwife	Bachelor of Science in Nursing and Midwifery	3 months
	Alice	Registered midwife	Bachelor of Science in Nursing and Midwifery	2 years
	Mary	Nurse-midwife technician	Diploma in Nursing and Midwifery	7 years
<b>B</b>	Matilda	Enrolled nurse-midwife	Certificate in Nursing and Midwifery	26 years
	Linda	Nurse-midwife technician	Diploma in Nursing and Midwifery	1 year
	Monalisa	Registered midwife	Bachelor of Science in Nursing, and University Certificate in Midwifery	1 year

	Zione	Nurse-midwife technician	Diploma in Nursing and Midwifery	2 years
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### **Ethical considerations**

Ethical approval was obtained from the ethical committee of the School of Health in Social Science, University of Edinburgh and the ethics committee in Malawi. Permission to carry out the research in labour wards was obtained from relevant gatekeepers. The process of recruitment of study participants involved holding a meeting with midwives where they were given an information package and they were followed up after one week of reading through the research details; all the midwives expressed interest and consented to participate in the study. Signed consent was sought from all midwives who were purposively selected to participate prior to the start of participant observations and follow-up interviews. All midwives were given the opportunity to stop participating at any time prior to and during data collection, even after giving initial consent. Confidentiality was ensured by keeping all the information securely and password protected. All the information was kept under strict custodianship of the first author and pseudonyms were used in data transcripts and midwives' work settings.

Although women in labour were not the primary focus of the research, they were informed about the research well in advance of asking them to participate in the study. This was done by designing a poster with research details that was posted at antenatal care clinics in the two study sites. In addition, the first author gave information to the women when they reported to the labour wards and she obtained written consent before the observation could take place.

### **Data Collection**

The main data collection method was participant observations which included informal discussions and post observation follow-up interviews for a period of six months. A total of 27 observations were done. All observations and interviews were conducted by the first author. Observation periods ranged from 4 to 10 hours. Midwifery decision making was observed without using a predetermined observation schedule but allowed categories to emerge from the collected data once observations were obtained (Polit et al., 2001). To study midwifery decision making during the first stage of labour, the researchers focused on studying the entire

decision episode, data about the decision task and interactions between decision makers and environmental characteristics. Examples of decision making tasks included assessment of women in first stage of labour and midwifery care actions in first stage of labour

Conducting participant observations facilitated an emic perspective which highlighted the complexity of the role of midwives in labour and delivery care (Mason, 2002; Burns et al., 2012). Conducting participant observations was challenging and roles adopted in the field required attention. Therefore, the first author did not adopt one type of observational role but oscillated along a continuum between observer, participant and participant observer (Gold, 1958). Detailed field notes were documented in a diary after each event either during field observations or as soon as possible after leaving the field. This was done to minimise possibility of forgetting important details (Wolfinger, 2002 and Larkin, 2013).

Post observation and individual face to face interviews were conducted with midwives to explore accounts of their decision making (Mason, 2002). Interviews lasted for a period of 1 to 2 hours. They helped in eliciting descriptions of midwives' behaviours and actions during observation period to draw out their domain knowledge and understand their in-depth accounts of their perspectives and experiences about decision making (Madden, 2010). The participants decided on place and time for interviews. In addition, a reflexive approach during data collection process was maintained throughout this study. To encourage reflexive thinking, a self-reflexive journal was maintained (Koch, 2006; McGhee et al., 2007).

### **Data analysis**

The process of analysing data began as the first author immersed herself in the field, becoming familiar with the hospital labour ward. This process provided useful data as she started formulating thoughts about context, work practices and interactions, maintaining some comments and analytical memos. The digital recordings of follow up interviews were transcribed verbatim and field notes were made after each observation. Transcripts from observations and interviews were read several times and analysed as a whole. The authors adopted principles of category and theme formation by Ely et al. (1997) and Braun and Clarke (2006) to analyse the data. According to Ely et al. (1997, p.162), the aim of analysis is to identify "relationships, patterns and themes that run through categories". NVivo 10 was used to store and manage data

and it was, at times, used to organise analytical themes. Both manual and computer programmes were used to assist in data analyses.

Data analysis took the form of written thoughts regarding emerging questions, patterns and themes. As we broke the whole into constituent parts and reassembled them, we began to understand those parts in terms of the whole. Ely et al. (1997) term the constituent elements of a logbook 'meaning units' or 'thinking units'. In many readings of a segment of data, the first author inserted labels, often in the form of marginalia that identified meaning units in a process called coding.

Therefore, coding involved identification of "meaning units" (Ely et al., 1997, p.162) within the data which conveyed some significance. Coding was used in a more analytical way where there was great interaction with the data which enabled the researchers to look beyond the obvious and into the data's inherent complexity. Details of the study are presented in the unpublished thesis (Chodzaza, 2016).

Meaning units were then sorted into broad categories that were more complex than the initial coded data (LeCompte and Schensul, 2011). Each emerged category was given a label reflecting its content and making sure categories related to the data. Analysis for themes was the next step of the analytic process which involved 'searching for themes' (Braun and Clarke, 2006) and identifying the essence of the material in the categories (Ely et al., 1997) but at a more abstract and complex level. The first author undertook the primary analysis; discussing the data at supervision meeting with academic supervisors (authors 2-4). Themes were achieved by identifying relationships between the categories. In this paper, we focus upon presenting the theme 'the role of cue acquisition'. All names used in the data extracts are pseudonyms. The first author's field notes and direct quotes from interviews are presented as extracts of raw data to illustrate the cue acquisition theme.

## **FINDINGS: THE ROLE OF CUE ACQUISITION IN MIDWIFERY DECISION MAKING**

Analysis of data illuminated a six-stage process as to how Malawian midwives made decisions during the first stage of labour. Each stage illustrating that good outcome for mother and baby were related to 'successful' decision-making through midwives making valid assessments and observations of the women in labour (see Fig 1). The 'cue acquisition' framework represents original findings from the study by the authors and was not adapted from any previous framework.

Information gathering served as a precursor for determining labour status and ascertaining that labour was progressing normally physiologically, as well as to identify deviations from the normal. As demonstrated in Fig 1, the midwives drew upon their fundamental skills in order to assess labour progress, drawing out salient details from the women to inform their clinical decision making from the moment the woman was admitted in labour. To make this approach to midwifery decision making during the first stage of labour explicit, the authors have used the concept of 'the role of cue acquisition'. The midwives' data acquisition strategies identified in this study have high correspondence with the cue acquisition stage of the hypothetico-deductive reasoning model proposed by Elstein and Bordage (1978), and analysis here provides a substantive elaboration on this concept.

‘Supporting normality’ represented the underlying principle that shaped the midwives clinical judgement and decision making when they cared for women during the first stage of labour. Midwives placed priority on ensuring that there is protection from the ‘physiological decline’ of labour processes.

### STAGES OF ROLE OF CUE ACQUISITION

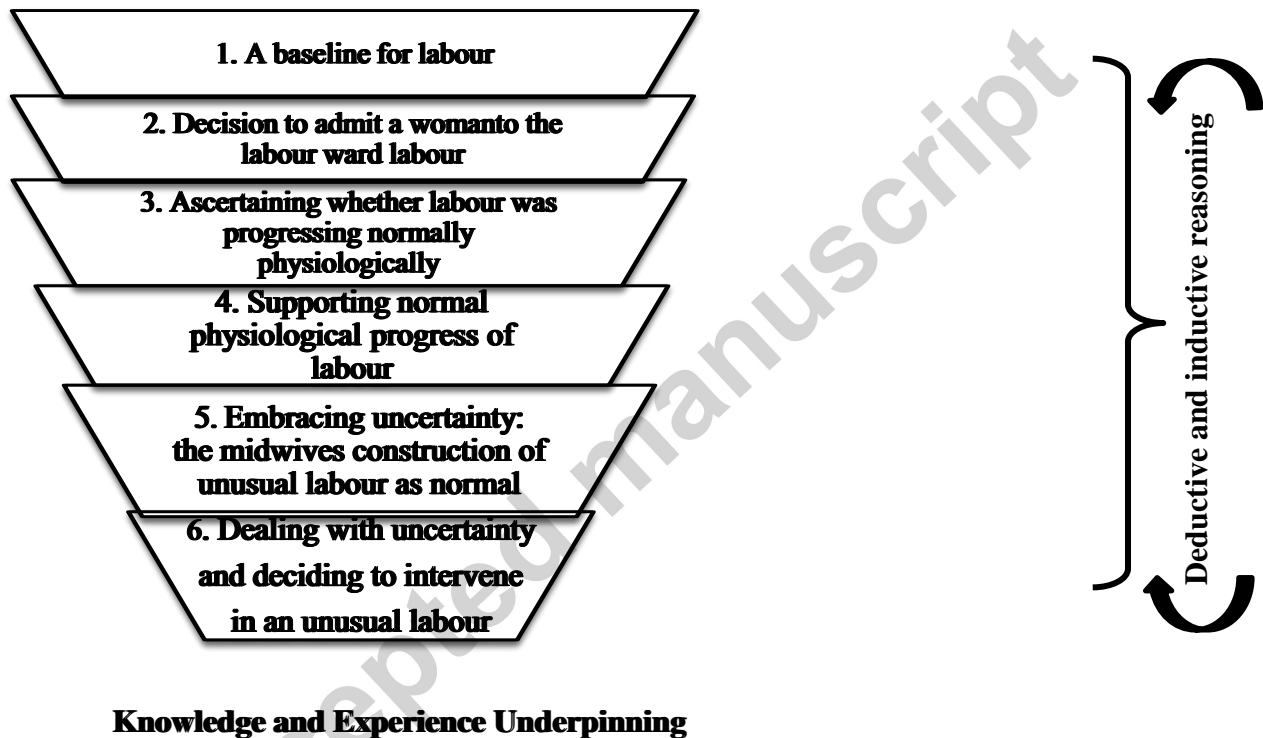


Figure 1: The Role of Cue acquisition: A conceptual framework of Midwives’ decision Making Process to Support Normal Physiological Process of Labour.

### Stage 1: A baseline for labour

This study indicated that the midwives were making various relevant assessments of women during the first stage of labour. The initial assessment typically involved general observations of the woman, obtaining various histories and performing a physical examination. These assessments provided the midwives with vital information about the immediate health status of the woman and foetus and the status of labour at that time, as commented by Odetta, a Registered Nurse Midwife (RNM).

“The first relevant assessment that I had done on the woman practically gave me the baseline information about the woman’s general condition, condition of the foetus and labour status. All the data gathered helped me to get baseline information for decision making as the labour progressed.”(Odetta hospital A, interview)

This narrative reflects that midwives consider cue acquisition as an important aspect of the early formulation of the decision-making process. Cue acquisition is an important part of the decision-making process because it gives insight regarding women’s care (Basavanthappa, 2006).

Alongside the objective assessments midwives performed on a woman in labour, there were other more covert ways of ‘knowing and doing’. Experienced midwives used subjective observations such as appearance, verbal and non-verbal behaviour of women to make assessment conclusions or judgments such as ‘she is in labour’. Mary explains the following during an informal conversation:

*“This woman is not in advanced labour, she has been mobile with contractions and chatting well and I know she is in labour, but this must be early labour that is why I advised her to walk around, do some pelvic rocking exercises and empty bladder frequently .....” (Mary, Hospital A)*

The data above illustrates that subjective phenomena such as the midwife’s perception of the woman’s pain influenced the midwives’ thought processes and she was alerted to thinking that the woman could be in early labour. Mok and Stevens (2005) assert that intuition allows a midwife to arrive at rapid judgements based on visual, verbal and nonverbal cues. Maureen, an enrolled midwife explained the following:



*“I am an old midwife and I don’t use any guidelines for care of normal labour. I am used to the way labour progresses. This was the early active phase of labour, the woman is stable with normal behavior and appeared comfortable and normal breathing pattern. When she starts groaning and making some noise then I will know things are cooking up... I have been in labour ward for some years now .....”* (Maureen, hospital A)

Maureen was talking about her intuitive knowledge; she used a form of pattern recognition when faced with familiar diagnostic tasks. She automatically retrieved the progress of labour from a network of stored knowledge.

### **Stage 2: Deciding to admit a woman to the labour ward**

When the midwives made assessment conclusions or judgments and confirmed a woman’s onset of labour, the findings assisted them to decide whether to admit the woman and provide subsequent care during the first stage of labour. This is clearly illustrated by the observation of Maureen an Enrolled Nurse Midwife (ENM).

*During initial assessment upon meeting a woman in labour, Maureen asked the woman about her labour history; focusing on the time contractions had started, whether the woman had slept or not, whether she had seen a ‘show’ or not and whether the membranes were ruptured or not. The woman reported feeling tight and experiencing painful contractions. The woman was holding her abdomen during a contraction. Maureen observed the woman writhing with labour pains. She checked descent of the foetal presenting part, assessed strength, frequency and duration of contractions and performed a vaginal examination. Cervical dilatation was 4cm. Maureen indicated that she would admit the woman into the labour ward for monitoring of labour progress and foetal and maternal responses to labour (Maureen hospital A, Observation).*

### **Stage 3: Ascertaining the normal physiological progress of labour**

Ascertaining that labour was progressing normally physiologically in this study involved continuous collection, interpretation, and synthesis of data for midwifery decision making. It was a process that required the midwives to assess, evaluate, and act upon evolving indicators of change in the women’s labour status. Matilda, an ENM, exemplifies this.

*“During the first stage of labour, I was checking the woman’s general physical health and how labour progressed until the end. I checked contractions in terms of frequency, strength and duration. The woman also reported increased intensity of contractions and she was writhing with pain. I also expect descent of the presenting part to progress as labour was progressing. This information assisted with the support that the woman required.” (Matilda, Hospital B)*

Maureen said the following on labour progress from a midwifery and women-centred perspective:

*“The increase in labour intensity was also assessed through cues that developed over the course of labour progression. The mood of the woman had changed, she had fewer movements, the woman’s breathing was deeper and more pronounced and was gripping hold of a student midwife during a contraction. All these cues indicated progression of labour.” (Maureen, Hospital A)*

Similarly Mary said the following during an informal discussion as she was caring for the woman in labour:

*“You see! The woman is now crying out in pain while grasping the abdomen and holding the bed with a contraction, expressing giving up the labour process and requesting for a caesarean section. All these signs indicate that her labour is becoming intense and progressing towards giving birth.” (Mary Hospital A)*

After obtaining an initial grasp of the labour situation, midwives also appeared to demonstrate reasoning in transitions and continuous reappraisal of the woman’s labour status. Therefore, monitoring of progress of labour using physical assessment and cues from a midwife and woman’s perspective were essential sources of information that underpinned the midwifery decision making during the first stage of labour. The midwives primary role was to watch, listen and interpret the cues provided in addition to the physical assessment.

#### **Stage 4: Facilitating and supporting the normal physiological processes of labour**

The midwives engaged in providing routine humanistic aspects of intrapartum care to the women who had been admitted in labour. They seemed to understand the assessment findings which guided them to maintain simple humanistic midwifery aspects of care for women in labour, as illustrated by Alice:

*“Basically, the assessment findings showed that the woman had no specific issues which would reflect that she needed any special care and her labour was generally progressing very well. She was moving around, able to eat porridge and was chatty. Therefore, I cared for her as a normal woman. I just encouraged her to walk around, have some porridge and to be emptying her bladder frequently to promote descent and contractions.” (Alice, Hospital A)*

Alice appears to effectively use cognitive processes during her assessment of a woman in labour to ‘digest’ the data she collected. This enabled her to recognise subtle changes in a woman’s labour progress. The data helped Alice to make clinical decisions regarding care of the woman. These components explain how the midwives use the assessment process to systematically collect information to make judgments and decisions about a woman’s labour status. This reflects the hypothetico-deductive reasoning approach where a practitioner evaluates the efficacy of treatment options relevant to the diagnosis (Elstein and Bordage, 1988).

#### **Stage 5: Embracing uncertainty: the midwives’ construction of unusual labour as normal**

Another interesting phenomenon observed was when the partograph, showing the progress of labour, indicated ‘deviation from the normal’. However, the analysis revealed that the midwives were embracing uncertainty when unusual labour occurred. The midwives seemed to tolerate unusual progress of labour because their labour assessments did not indicate a specific labour complication. Take Zione for example:

*“Descent of the foetal head remained at 3/5 for 3 hours and labour progress had gone past expected time of delivery according to partograph. I was not concerned foetal condition was good. The woman was no longer sociable and talkative as she was in early labour, she was just groaning and grimacing indicating some good progress towards transition. Contractions remained progressive throughout the labour process. Looking at the progress from the time she arrived, all parameters progressed well and this gave me hope that the woman could still have normal birth.” (Zione, hospital B).”*

Zione seems to focus on what was optimum care for the woman based on her individual labour circumstances rather than focusing on risk factors. She responded analytically to the situation of labour progress through seeking measurable evidence to support her lack of concerns

through labour-progress assessment cues. The Table below contains more data to illustrate the dynamic process of midwives' decision making

Table 2: Examples of midwives' quotes demonstrating dynamic nature of midwives' thinking

*“Labour progress seemed to be stalling according to partograph. However, intensity of contractions increased and the woman's response to labour was seen through mood changes and verbalising the need to bear down. All this gave me confidence in the mother's ability to give birth normally. Most importantly, foetus was in good condition. I reflected on admission assessment; she had 2 previous normal births, size of fundus looked average size. These assessment findings guided me to make a decision to give the woman more time to labour. I asked her to eat some porridge and walk around.” (Linda, hospital B)*

*“Well, this woman was a primigravida whose labour progress may not be according to the prescribed cervical dilatation of 1cm per hour on the partograph. Even when I looked at the labour progress across the progression span, there were several cues that indicated some progress. For example, she had normal behaviour in early labour, the following cues manifested as labour progressed: rhythmic movements increased, she appeared uncomfortable; She had a face tense and was curling herself up reflecting increased pain unlike in early labour where she could afford a smile, all this indicated good progress and I gave her enough time to have normal labour” (Odetta, hospital A)*

*“Assessment showed that contractions were becoming intense. The woman was grimacing and moaning with labour pains. There was much progress compared with how she presented when she had arrived. This made me think that I needed to give her time and she could still give birth normally. This time around the cervix was 8cm and this really gave me hope that the dilatation and the descent could still progress well.” (Monalisa, hospital B)*

## Stage 6: Dealing with uncertainty and deciding to intervene in unusual labour

Although the midwives appeared to use ‘salutogenic thinking’ in certain situations, they sometimes experienced uncertainty from labour-progress parameters. During this time, they reappraised the labour situation and felt they had enough reasons and convincing arguments to intervene in the labour progress. They showed ability to discern the difference between healthy progress and potential for pathological development during progression of labour. Maureen illustrates this:

*“... The woman was really writhing and crying out in agony the contractions were very strong and she expressed that she was in great pain. However, despite such type of intense labour pains, the descent was still poor, then I realised that this was a problem and the baby may not come out or may come out with a bad outcome. When I assessed the abdomen, I found that it was ascending to the chest and not descending into the pelvis; based on all these assessment findings I knew that labour progress was not satisfactory and I had to do something.” (Maureen, Hospital A)*

The midwives used clinical parameters to make sense of the woman’s labour progress and build an authentic case for intervening. Their decision-making process comprised inductively building a bigger picture where they sought evidence to support their decision to intervene; that is they used abductive reasoning as explained by Mabel below;

## Discussion

Although the proposed conceptual framework identified in this study is preliminary in nature, it may serve as a good starting point for moving forward a unified framework for the midwife practitioners, educationalists and researchers. The conceptual framework illuminates a range of ways in which midwives utilised cues for clinical reasoning and formulated decisions during care of women in labour. Assessment data obtained throughout the labour progression span provided input into the next stage so that it became a sequence of events that were constantly changing based on woman’s labour status. This reflexive nature of assessment and decision-making process is different from a sequential process suggested by the hypothetico-deductive reasoning (Elstein et al., 1978). This has been criticized as depicting decision making as linear; however, the current framework reflects that an ordered set of steps is not

representative of the clinical problems that midwife practitioners face. Therefore, this study points to another dimension of the process of gathering data and decision-making strategies.

In complex situations where labour progress was deemed slow, midwives attempted to reduce their uncertainty by obtaining more labour-progression parameters both from a midwifery and woman-centred perspective to build more credible evidence of their concerns to build more credible evidence of their concerns. The midwives in seemed to embrace uncertainty and promote salutogenic thinking through the use of labour assessment parameters. Salutogenesis is a term conceived by Antonovsky, an American researcher who proposed looking at health and how to promote it, and not illness and how to cure it (Antonovsky, 1979). To this end, Downe and McCourt (2004) and Schmid and Downe (2010) argue that labour-care practitioners should strive to focus on salutogenic thinking rather than on potential abnormality in all cases. Midwives in this study did not seem to always view labour progress from the ‘potential disaster’ perspective.

They used higher-level modes of thinking and cognitive justification based on assessment data. In these complex situations, the midwives employed a more focused search for information. They searched for evidence through assessment cues to support their clinical decision making throughout labour progression. They reanalysed information obtained during admission and all data obtained across the labour-progress trajectory in an attempt to reach an overall decision about labour-progress management.

There was a constant forward and backward movement of thought processes by the midwives which they hoped would uncover real case-building evidence for intervening or not intervening. These processes involved both inductive and deductive reasoning that helped the midwives to build a ‘bigger picture’ to make decisions, particularly when they were faced with complex and uncertain situations regarding the progress of labour. The midwives’ approach to the assessment task in complex situations is consistent with assertions by Schön (1987) who highlights that complex and uncertain situations require reflective practice and clinical reasoning. To this end, the clinical reasoning process is dependent upon a critical thinking ‘disposition’ (Scheffer and Rubenfeld, 2000).

The decision-making process was cyclical, dynamic and diverse in nature and it involved responses to the cues in the present situation. This mode of cognition employed by the midwives in this study relates to the nature of the assessment task. This assertion may be explicated by Patterson et al. (2015) who found that midwives engaged in a more objective and probabilistic process by analysing patterns and cues to provide confirmatory or contradictory evidence, rather than relying on heuristic strategies when they experienced discomfort or poor fit in these situations.

Therefore, the use of these abstract midwifery decision-making frameworks does not seem to suit the reflective nature of assessment process in midwifery practice, especially when there is unusual progression of labour. In light of the above explanations, the findings from this study suggests that the assessment stage within earlier frameworks for decision making may be rigid and may not accurately reflect the complexity of the cue-acquisition stage, especially in uncertain and unusual labour-progression situations.

## **Conclusion**

The findings of this study have suggested a six stage process of midwifery decision making identified as 'the role of cue acquisition' which illustrates the ways in which midwives utilise assessment data to reason and make decisions during the care of women in labour. There was a constant forward and backward moving of thinking during decision making. This was supported by the midwives taking actions that they expected would reveal a real case-building evidence for their decisions, such as whether to intervene or not during labour progress. This process is described in relation to the midwives' support of normal labour physiological processes as the underlying principle that shaped their decision making during cared of women in labour. This understanding of cue acquisition by midwives is significant for supporting safe care in the labour setting. When there was uncertainty in a woman's progress of labour, midwives used deductive reasoning, for example, by cross-checking and analysing the information obtained during the span of labour. Supporting normal labour physiological processes was identified as an underlying principle that shaped the midwives clinical judgement and decision making when they cared for women in labour. This study presents the development of an extension to the existing theoretical basis for understanding midwifery decision making in the real world context. As such, the study contributes to our understanding of how effective midwifery decision making

can be supported within the real world context of care to enable midwives to provide high quality and safer care for women internationally.

## ETHICAL STATEMENT

### 1. Conflict of interest

There are no conflicts of interests

### 2. Ethical approval

Ethical approval to conduct this research was obtained from the ethical committee of the School of Health in Social Science, University of Edinburgh and the ethics committee in Malawi [P.07/13/1418]

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## HIGHLIGHTS

- Midwives utilise assessment data to reason and make decisions during the care of women in labour.
- The processes of cue acquisition in more complex assessment situations involve both inductive and deductive reasoning that help to build a 'bigger picture' to make decisions.
- Midwives continued to seek information when labour progress 'diverted' from the 'normal', focusing on the safety of the woman and the foetus and constantly reassessing the situation while deciding the best possible action for the woman and her foetus.