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Using root cause analysis to promote critical thinking in final year Bachelor of Midwifery students

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SUMMARY

Background: Midwives require well developed critical thinking to practice autonomously. However, multiple factors impinge on students' deep learning in the clinical context. Analysis of actual case scenarios using root cause analysis may foster students' critical thinking and application of 'best practice' principles in complex clinical situations.
Objective: To examine the effectiveness of an innovative teaching strategy involving root cause analysis to develop students' perceptions of their critical thinking abilities.
Methods: A descriptive, mixed methods design was used. Final 3rd year undergraduate midwifery students ($n = 22$) worked in teams to complete and present an assessment item based on root cause analysis. The cases were adapted from coroners' reports. After graduation, 17 (77%) students evaluated the course using a standard university assessment tool. In addition 12 (54%) students provided specific feedback on the teaching strategy using a 16-item survey tool based on the domain concepts of Educational Acceptability, Educational Impact, and Preparation for Practice. Survey responses were on a 5-point Likert scale and analysed using descriptive statistics. Open-ended responses were analysed using content analysis.
Results: The majority of students perceived the course and this teaching strategy positively. The domain mean scores were high for Educational Acceptability (mean = 4.3, SD = .49) and Educational Impact (mean = 4.19, SD = .75) but slightly lower for Preparation for Practice (mean = 3.7, SD = .77). Overall student responses to each item were positive with no item mean less than 3.42. Students found the root cause analysis challenging and time consuming but reported development of critical thinking skills about the complexity of practice, clinical governance and risk management principles.
Conclusions: Analysing complex real life clinical cases to determine a root cause enhanced midwifery students' perceptions of their critical thinking. Teaching and assessment strategies to promote critical thinking need to be made explicit to students in order to foster ongoing development.

Introduction

Although scientific knowledge underpinning evidence-based midwifery practice is rapidly expanding there remains uncertainty regarding 'best practice' in many clinical situations (Scholes et al., 2012). In order to promote safe autonomous practice, midwives are required to possess and enact high levels of professional judgement, critical thinking and decision making skills (Lake and McInnes, 2012; Cioffi et al., 2005; Kitson-Reynolds, 2009). Critical thinking involves higher level thinking and reasoning skills that facilitate thinking in a controlled, purposeful, focussed and conscious way when making decisions (Simpson and Courtney, 2002). "Cognitive competence" of this nature is critical for effective, safe, autonomous practice (Newstead and Hoskins, 2003; Cronenwett et al., 2007), yet there is a dearth of literature about how midwives make decisions and develop the required cognitive skills (Jefford et al., 2010). Midwives often report limited confidence in their clinical judgment and seek validation of their decisions from perceived higher order authorities such as doctors (Jefford et al., 2010).

Best practice midwifery involves continuity of care throughout the perinatal period provided by a known midwife (Hodnett, 2008). Accredited undergraduate midwifery programs therefore need to develop students' cognitive skills to enable them to work as autonomous practitioners (Australian Nursing and Midwifery Council, 2010). These skills are important in promoting safe, evidence-based practice rather

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than the adoption of ritualistic behaviour and routines (Kramer and Schmalenberg, 2008; Cronenwett et al., 2007). It is often assumed that students develop critical thinking skills during their clinical placement when engaged in the mentor–student relationship. However, the reluctance of some midwives to be autonomous decision makers may limit students' development of critical thinking skills. With escalating clinical workloads and dwindling staffing levels, the preceptor relationship is often not prioritised (Fisher and Webb, 2007) further limiting opportunities for students to observe and learn critical problem-solving skills. Consequently, it is not surprising that students report observing poor care and decision making practices during clinical placement (Licqurish and Seibold, 2008). Students also report being reluctant to challenge practice. They tend to conform to their preceptor's behaviour, and adopt routine practices rather than learning to develop and apply their own critical thinking to their practice (Begley, 2001).

Although development and assessment of critical thinking and decision making can be addressed during on-campus learning this is not consistently achieved. For example, a review of a midwifery curriculum by Lake and McInnes (2012) found limited consideration was given to developing students' cognitive abilities. Regardless of whether students were actually developing these skills, the students were not aware of attempts to do so, and did not recognise explicit teaching strategies. Participating in focus group discussions as part of the research study encouraged students to reflect on their learning and recognise instances of cognitive skill development not noted previously during their studies (Lake and McInnes, 2012).

Several teaching strategies aim to enhance critical thinking. Simulated clinical scenarios are a predominant teaching and assessment strategy used in midwifery preparatory programs to develop and assess students' cognitive skills. Cioffi et al. (2005), for example, compared the effects of clinical simulation ($n = 18$) with a standard lecture ($n = 18$) on midwifery students' critical thinking abilities. Students who received the simulation intervention collected more clinical information, re-examined collected clinical information less often, made fewer formative judgements, reported higher confidence, and made final decisions quicker than students in the control condition (Cioffi et al., 2005). However, Scholes et al. (2012) studied responses of midwifery students to a complex simulated postpartum haemorrhage scenario and found that students had difficulty prioritising their actions when more than one response was required to a clinical cue. The students failed to demonstrate any inductive and/or deductive reasoning or thinking. Similar findings were reported by Mitchell et al. (2009) in their review of the use of clinical simulation using an OSCE (Objective Structured Clinical Examination). Mitchell et al. (2009) concluded that at the undergraduate level, it is the concrete, measurable aspects of clinical performance that are best assessed by the OSCE and that a variety of assessment methods is required to measure critical thinking skills. While simulation activities are useful for clinical skill development, including decision making, simulation activities are limited in developing critical thinking in clinical situations where interpretation of multiple data sources is required (Mitchell et al., 2009). Mong-Chue (2000) argued that critical thinking requires controlled, purposeful, focussed and conscious processes. Development of critical thinking requires a deeper learning approach using analytical skills and judgements above and beyond standard clinical simulation where rapid decision making is paramount. Similarly, Kitson-Reynolds (2009) argued there is limited evidence measuring the effectiveness of simulation on fitness to practice in the complex world of midwifery practice.

Assessment has the capacity to influence students' behaviour more than the actual teaching they receive. Assessment tasks can prompt students to truly engage with teaching content and promote deeper learning (Biggs and Tang, 2007). It is particularly important for students to be proficient in situations they will encounter when they graduate, therefore assessment should be focussed on meaningful tasks that replicate real world challenges (Mueller, 2005). The authenticity of an assessment is measured by the similarity between the cognitive demands of the assessment compared to that of the real life situation on which the assessment is based (Boud and Falchikov, 2006). An authentic assessment item in midwifery would need to encompass teamwork, communication, and decision making in uncertain and unpredictable circumstances (Homer et al., 2009). Furthermore, such assessment would need to be congruent with the development of critical thinking and decision making and require simultaneous decisions amongst a multitude of variables. Utilising real world assessments that contain multiple complexities for students to problem solve may be effective in developing critical thinking skills.

This study aimed to evaluate the effectiveness of an innovative teaching strategy involving root cause analysis to develop students' critical thinking within a clinical decision-making framework. Root cause analysis is a systematic process used to promote quality and safety by identifying the source of the problem, and preventing the problem from reoccurring (Connelly, 2012). In health care, the problem often has multiple, interrelated root causes in areas such as policies and procedures, human resources, environment of care, information management, and communication. An important aspect of root cause analysis is to focus on the system rather than individuals when analysing the situation. A systems approach examines how a particular system failed to produce the desired outcome and led to the error. Connelly (2012) argues that all factors that lead to errors should be examined in order to identify ways to prevent repetition of the error. There is limited research on the use of root cause analysis in health professional education. Lamberton and Mahlmeister (2010) described the use of a simulated root cause analysis with undergraduate nursing students but its use has not been explored in midwifery education. Although Lamberton and Mahlmeister (2010) suggested this simulation activity could reduce the likelihood of errors as students enter the profession, no measurement of changed thinking or improved safe practices was attempted. There is a need to measure the effectiveness of root cause analysis as a teaching strategy.

Method

A descriptive, mixed methods design was used to examine the effectiveness of an innovative assessment process involving root cause analysis designed to develop critical thinking in student midwives.

Context

The Bachelor of Midwifery is an accredited three-year program which commenced in 2010 and offered through the School of Nursing and Midwifery in a publically-funded, research intensive Australian University. The curriculum is designed around a philosophy of woman-centred care and incorporates reflection and development of critical thinking into teaching, learning, and assessment strategies at each year level. The program is delivered in blended mode, which involves a combination of face-to-face intensive teaching, interactive on-line material including “real time” webinars (web-based discussions), supervised clinical practice, and lecturer-led face-to-face tutorials situated in clinical sites. Students are placed within the same practice organisation for the duration of their degree program. This flexible mode of delivery allows students to focus their learning within clinical practice and the single placement option enables students to develop relationships and consolidate learning within one organisation.

The final clinical course (or subject) of the program focuses on transition to professional midwifery practice. This capstone course is designed to consolidate knowledge, provide an opportunity to apply critical thinking to plan, deliver, and evaluate care within a reflective framework. In 2012 there were 22 students enrolled in the final year course.