



Measuring critical thinking in pre-registration midwifery students: A multi-method approach

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ABSTRACT

Objective: Test the concurrent validity of three newly developed tools (student self-rating, preceptor rating, and reflective writing) that aim to measure critical thinking in midwifery practice.

Design: A descriptive matched cohort design was used.

Setting: Australian research intensive university offering a three year Bachelor of Midwifery programme.

Sample: Fifty-five undergraduate midwifery students.

Methods: Students assessed their ability to apply critical thinking in midwifery practice using a 25-item tool and a 5-item subscale in Motivated Strategies for Learning Questionnaire. Clinical preceptors completed a 24-item tool assessing the students' application of critical thinking in practice. Reflective writing by students was assessed by midwifery academics using a 15-item tool. Internal reliability, and concurrent validity were assessed. Correlations, *t*-tests, multiple regression and confidence levels were calculated for the three scales and associations with student characteristics.

Results: The three scales achieved good internal reliability with a Cronbach's alpha coefficient between 0.93 and 0.97. Matched total scores for the three critical thinking scales were moderately correlated; student/preceptor ($r = 0.36, p < 0.01$); student/reflective writing ($r = 0.38, p < 0.01$); preceptor/reflective writing ($r = 0.30, p < 0.05$). All critical thinking mean scores were higher for students with a previous degree, but only significant for reflective writing ($t(53) = -2.35, p = 0.023$). Preceptor ratings were predictive of GPA ($\beta = 0.50, p < 0.001, CI = 0.10$ to 0.30). Students' self-rating scores were predictive of year level ($\beta = 0.32, p < 0.05, CI = 0.00$ to 0.03).

Conclusion: The student, preceptor, and reflective writing tools were found to be reliable and valid measures of critical thinking. The three tools can be used individually or in combination to provide students with various sources of feedback to improve their practice. The tools allow formative measurement of critical thinking over time. Further testing of the tools with larger, diverse samples is recommended.

1. Introduction

The provision of midwifery care is unique, multifaceted and complex and hence requires high level technical and cognitive abilities. There is increasing recognition that midwifery care leads to optimisation of outcomes for women and newborns (Renfrew et al., 2014; ten Hoope-Bender et al., 2014). To achieve these optimal outcomes, midwives are required to provide evidence-based, safe, and individualised care in partnership with women (Mènage, 2016a; Jefford et al., 2010). Hence, midwives need well developed cognitive skills to apply critical thinking in decision making using intellectual independence. However, there is limited literature focussing on thinking processes in midwifery practice (Mong-Chue, 2000).

Critical thinking involves in-depth and higher order thinking that facilitates knowledge development, contextual decision making and problem solving skills, and analyses situations from different perspectives (Facione and Facione, 1996). Contextually appropriate decision-making is key to the provision of high quality and safe midwifery care (Jefford, 2012), and critical thinking is a crucial cognitive skill in reaching sound professional judgements.

Midwifery decision making is holistic and made in partnership with women, requiring significant interpersonal skills, whilst acknowledging and valuing the woman's autonomy to make informed choices (Davis-Floyd, 2004; Mènage, 2016b; Jefford et al., 2010). Decisions need to be based on the best available evidence, however, whilst evidence, and the production of clinical guidelines, protocols and care pathways are

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proliferating, uncertainty remains regarding 'best practice' in many scenarios (Scholes et al., 2012). In addition, not all clinical guidelines or protocols are based on the best available evidence, and may be out-of-date (Mènage, 2016b; Prusova et al., 2014). Similarly, there may be institutional barriers to the overt use of best practice guidelines, potentially limiting the midwife's capacity to use those guidelines to inform decision making (Toohill et al., 2017).

In order to provide safe quality care midwives need to critically appraise all of the evidence available and assess the quality and relevance to the woman and her situation. Whilst available evidence and clinical guidelines are important resources, they need to be considered in conjunction with the woman's preferences, values and beliefs as well as the midwife's intuitive knowledge. Intuitive decision making is commonly used by highly experienced midwives who rely on pattern recognition and heuristics based on prior experience (Steinhauer, 2015). In addition, a key part of midwifery decision making is self-awareness, where the midwife reflects on their own knowledge and skills and identifies gaps, and alternative approaches or expertise needed (Mènage, 2016b).

The development and measurement of critical thinking skills in undergraduate midwifery students is vital to ensure they are able to apply critical thinking to practice and decision making. Measurement of this cognitive skill can highlight areas for development and provide academics with feedback on the efficacy of their teaching practices. Currently the measurement of critical thinking in nursing and midwifery is inconsistent or neglected (Walsh and Seldomridge, 2006). Critical thinking tools used for midwifery students need to encompass the uniqueness of midwifery decision making, be meaningful, purposeful and ultimately promote improvement in practice.

2. Background/Literature

The most commonly used measures to evaluate critical thinking abilities are standardised, commercially available tools such as the California Critical Thinking Skills Test (CCTST), California Critical Thinking Disposition Inventory (CCTDI), Health Sciences Reasoning Test (HSRT) and Watson-Glaser Critical Thinking Appraisal (WGCTA). These tools focus on the measurement of formal logic and general thinking skills, utilising a multiple-choice format. In a recent systematic review evaluating tools used to measure critical thinking development in nursing and midwifery undergraduate students, of the 34 studies reviewed 21 utilised one of these standardised tools (Carter et al., 2015). The review authors found variation of reported reliability across studies using the same measure, placing doubt about the reliability of these tools when used with nursing and midwifery students. In a further systematic review of the literature evaluating the efficacy of teaching methods used to develop critical thinking skills in nursing and midwifery undergraduate students, inconsistent results were found when testing similar interventions with these tools (Carter et al., 2016a).

Several authors have attempted to develop discipline-specific tools to measure critical thinking in nursing, but a review of these tools revealed limited reporting of reliability and psychometric testing (Carter et al., 2015). No discipline specific tools that measure critical thinking in midwifery practice were found at that time.

Several authors expressed concern about the absence of discipline specific tools that capture the complexity, richness and multi-dimensional nature of critical thinking in nursing and midwifery practice (Carter et al., 2015; Jacob et al., 2017; Paul, 2014; Zuriguel-Pérez et al., 2015, 2017). This complexity of critical thinking is even more paramount in midwifery, where midwives are recognised as partners in care which is holistic, woman centred, and promotes shared decision making (Carter et al., 2017a; Davis-Floyd, 2004; Jefford et al., 2010).

The application of critical thinking in nursing and midwifery practice is complex, and multiple lenses are required to capture its' depth and breadth (Carter et al., 2015; Raymond-Seniuk and Profetto-

McGrath, 2011; Rubenfeld and Scheffer, 2015). The use of multiple reliable and valid measures and triangulation of data would more likely capture the complex and multi-faceted nature of critical thinking in midwifery. Valid and reliable tools are needed to measure the development and refinement of students' critical thinking in practice. The current study reports on the reliability and concurrent validity of three new tools designed to measure critical thinking skills in pre-registration midwifery students.

3. Methods

3.1. Design

A descriptive, matched, cohort design was used.

3.2. Setting

The Bachelor of Midwifery programme at Griffith University in Australia has a strong woman-centred, values-based philosophy. The programme is delivered within a transformative educational framework. Aligned with the Australian Qualifications Framework, two of the core aims of the Bachelor of Midwifery programme are to produce graduates who have highly developed critical thinking skills, and are critically reflective and reflexive practitioners (Australian Qualifications Framework Council, 2013). Teaching, learning and assessment strategies in relation to critical thinking development are embedded and scaffolded throughout the three-year degree.

Students complete up to 1800 clinical placement hours primarily at one site (hospital or private midwifery practice) for the duration of their degree. Students undertake two to three shifts per week in an integrated clinical placement model which facilitates the consolidation of learning in one organisation, and enables the development of meaningful relationships with midwifery staff and preceptors. The preceptor role involves the facilitation, monitoring, support and assessment of students' learning and progress during clinical placement. Midwifery preceptors are supported by university-employed onsite practice lecturers.

Students produce three structured pieces of reflective writing per semester related to clinical events. The reflective writing pieces are uploaded by the student into an online e-portfolio and midwifery lecturers provide feedback. Students use the Bass Model of Holistic Reflection (Bass et al., 2017), which encompasses six inter-dependent phases; self-awareness, description, reflection, influences on knowing, evaluation and learning to guide their reflective writing. To encourage the development of reflection and transformational learning, students are provided with guidelines and prompts for each phase of the model (Bass et al., 2017).

3.3. Sample/Participants

The sample consisted of students enrolled in the Bachelor of Midwifery programme who had completed at least one semester of clinical placement and completed the self-rating tool ($n = 85$).

4. Measures

Development and initial testing of the student self-rating tool (Carter et al., 2017a), preceptor rating (Carter et al., 2016b) and reflective writing (Carter et al., 2017b) have been described elsewhere. In summary, tool development followed the staged model recommended by DeVellis (2017). During the tool development, items were tested for conceptual coherence, and mapped against the consensus definition of critical thinking in nursing developed by Scheffer and Rubenfeld (2000). Content validity for each tool was established using a judgement-quantification review process by an expert panel. Items with a Content Validity Index score of < 0.7 were deleted. Each tool was

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