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NURSE-MIDWIFERY STUDENT SELF-CONFIDENCE AND  
ANXIETY WHEN USING OBJECTIVE STRUCTURED  
CLINICAL EXAMINATIONS AS A CLINICAL  
COMPETENCY ASSESSMENT STRATEGY

A Dissertation Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Doctor of Philosophy

Deborah Duran-Snell

College of Natural and Health Sciences  
School of Nursing  
Nursing Education

August 2021

This Dissertation by: Deborah Duran-Snell

Entitled: *Nurse-Midwifery Student Self-Confidence and Anxiety When Using Objective Structured Clinical Examinations as a Clinical Competency Assessment Strategy*

has been approved as meeting the requirement for the Degree of Doctor of Philosophy in College of Natural and Health Sciences in School of Nursing, Nursing Education Program

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## ABSTRACT

Duran-Snell, Deborah. *Nurse-Midwifery Student Self-Confidence and Anxiety When Using Objective Structured Clinical Examinations as a Clinical Competency Assessment Strategy*. Published Doctor of Philosophy dissertation, University of Northern Colorado, 2021.

Current evaluation of clinical competency in nurse-midwifery education programs lacks clarity and consistency and is often a subjective process using a variety of assessment strategies. Recognizing that no single assessment strategy can provide all the information required to assess something as complex as clinical performance, the objective structured clinical examination (OSCE), when viewed alongside other forms of assessment, might be considered a valuable strategy for enhancing the assessment of nurse-midwifery student clinical competence and confidence. The main objective of this dissertation was to assess and compare self-reported confidence and anxiety levels of graduate nurse-midwifery students pre- and post-OSCE.

This exploratory quantitative research study was designed to explore student self-confidence and anxiety with OSCEs in the development of clinical decision-making through the use of the Nursing Anxiety and Self-confidence with Clinical Decision-Making (NASC-CDM; White, 2014) questionnaire that has not been used previously in the graduate nurse-midwifery population.

Ten graduate second-year nurse-midwifery students in both the Doctor of Nursing Practice (DNP) and Master of Science in Nursing (MN) programs of study participated; the setting was at a northwest United States public university. Participants completed a total of four

OSCEs between February and April of 2021. Measures included the NASC-CDM (White, 2014); this 27-item questionnaire was completed by students pre and post OSCE.

In addition, the NASC-CDM (White, 2014) was assessed for both validity and reliability for use in this study's population and setting. Three content experts found the NASC-CDM valid for use in this study's population. Cronbach's alpha found the reliability of the NASC-CDM at  $\alpha = 0.94$  for self-confidence and  $\alpha = 0.94$  for anxiety. Using paired *t*-testing, statistically significant differences occurred pre and post OSCE for both self-confidence  $p \leq .000$  and anxiety  $p \leq .001$ . The three dimensions of clinical decision-making were all statistically significant: dimension one at  $p \leq .000$  for self-confidence and  $p \leq .023$  for anxiety, dimension two at  $p \leq .008$  for self-confidence and  $p \leq .005$  for anxiety, and dimension three at  $p \leq .000$  for self-confidence and anxiety. No statistical significance was found in comparisons of program of study, online vs. face-to-face OSCEs, or differences in self-confidence or anxiety over time.

In this study, student self-confidence increased and anxiety decreased during OSCEs with the potential to positively affect strong confident clinical decisions in future clinical practicums and practice.

*Keywords:* objective structured clinical examination; nurse-midwifery and nursing clinical education; student self-confidence and anxiety; clinical decision-making.

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## CHAPTER I

### INTRODUCTION

#### **Background**

Nurse-midwifery students need to be prepared for the real-world responsibilities of clinical practice. Development of effective clinical skills is necessary to ensure safe clinical practice (Massey et al., 2017). Nurse-midwifery encompasses a full range of primary healthcare services for women from adolescence beyond menopause including the independent provision of primary care, gynecologic and family planning services, preconception care, care during pregnancy, childbirth and the postpartum period, care of the normal newborn during the first 28 days of life, and treatment of male partners for sexually transmitted infections (American College of Nurse-Midwives, 2012). Assessment of nurse-midwifery students' practical skills and clinical competence often occurs in simulations using objective structured clinical examinations (OSCEs). Objective structured clinical examinations are a form of simulation with the aim to provide objectivity and standardization to the structure and control of a clinical examination so the learner's clinical knowledge can be tested and appropriate feedback provided. Objective structured clinical examinations can demonstrate learner clinical skill competency and clinical reasoning abilities—all while working with a standardized patient. The use of standardized patient and OSCE methodology in formative and summative assessment has been documented as a means of integrating clinical knowledge and communication skills (Hodges et al., 2019).

Students could find the high-stakes OSCE highly stressful (Fidment, 2012; Hilliard, 2018; Stunden et al., 2015). High stress might hinder a student's ability to effectively

demonstrate their clinical abilities, thereby negatively impacting performance and learning (Fidment, 2012; Massey et al., 2017; Muldoon et al., 2014). Students need to learn how to manage the emotional and psychological effects of high-stakes assessment in a constructive way in order to develop the confidence required for clinical practice (Hilliard, 2018; Stunden et al., 2015). Additionally, educators need to better understand ways to enhance student confidence and decrease anxiety to ensure a more effective learning environment.

Both the American College of Nurse-Midwives and the International Confederation of Midwives strongly emphasize competency as a tenet of midwifery education and practice (Smith et al., 2012). Certified nurse-midwives are educated in two disciplines: midwifery and nursing. They earn graduate degrees, complete a midwifery education program accredited by the Accreditation Commission for Midwifery Education, and pass a national certification examination administered by the American Midwifery Certification Board to receive the professional designation of certified nurse-midwife. Choosing appropriate objective strategies to assess clinical competence can be a challenging task for nursing educators. The OSCE might increase both faculty and student confidence in clinical performance as confidence has been used as a marker of competence. The more student self-confidence displayed, the more competent the performance (McClimens et al., 2012). Indeed, self-confidence as an attribute is key in developing a sense of composure necessary as a practicing graduate nurse-midwife (Ytterberg et al., 1998). Authors have described the conceptualization and measurement of clinical competence by using an OSCE (McClimens et al., 2012; Walsh et al., 2009).

In the 1970s, Scottish professor and innovator Ronald Harden developed the objective structured clinical examination or OSCE (Harden & Gleeson, 1979; Harden et al., 1975; Hodges, 2003). It was introduced to avoid the disadvantages of traditional clinical examination for

medical students being used at the time (Harden et al., 1975). Prior to the OSCE, the student's assessment could be affected by the patient, examiner bias, non-standardized grading, and the student's actual performance (Khan et al., 2013). The aim of the OSCE was to provide objectivity and standardization to the structure and control of the clinical examination so the student's clinical knowledge could be tested and appropriate feedback provided (Harden et al., 1975).

Since the original OSCE used in medical education, the format has undergone major revisions and adaptations including use of longer duration and fewer assessment stations, with an increased focus on the patient as a unified whole being. Objective structured clinical examinations have been adapted for use in nursing with a format of fewer stations and case scenarios that offer more complete and holistic assessments. Objective structured clinical examination use in nursing assessment has the potential to assess both theory and practice as it was supported by Miller's (1990) model of "knows," "knows how," "shows how," and "does" (p. S63). This framework for clinical assessment is based on a pyramid. The bottom of the pyramid is knowledge wherein the learner demonstrates they *know* what is required to carry out clinical functions effectively. Learners must also know how to use the knowledge they have accumulated by demonstrating skill at acquiring information from a variety of sources to analyze, interpret data, and translate findings into a plan. The *knows how* level is demonstration of the quality of being functionally adequate or of having sufficient knowledge, judgement, skill, or strength for a particular duty—also known as competence. The third level on the pyramid is the *shows how* level where the learner is evaluated on performance. The final level, *does*, is the evaluation of what the learner did when functioning independently in clinical practice (Miller,

1990). Objective structured clinical examinations have the potential to assess the *shows how* level (Mitchell et al., 2009; Rushford, 2006; Smith et al., 2012).

In nursing and midwifery, OSCEs consist of a circuit or series of short assessment tasks, each of which is assessed by an examiner using a predetermined objective marking scheme. Inclusion of both a procedure and a question station add to the high stakes nature of assessing performance using simulation in multi-station examinations. The final station is constructive feedback, a critical aspect of competency assessment from which the student can learn. The station should reflect the real-life clinical environment where nurses and midwives receive feedback from their peers, clinical educators, managers, and the patient.

Several influences impact the learning and adeptness of clinical decision-making. Self-confidence and anxiety are affective influences to consider when teaching and evaluating the processes of clinical decision-making (White, 2014). The Advanced Practice Nursing Competency Assessment Instrument (Sastre-Fullana et al., 2017) was considered for use in this study but eliminated because as an instrument, it was similar to an OSCE. Critical thinking instruments were also considered including The Californina Critical Thinking Disposition Inventory (Carter et al., 2015) but eliminated because critical thinking, while similar to clinical decision-making, was not a focus of this study and there was a fee associated with its use. The Nursing Anxiety and Self-Confidence with Clinical Decision Making scale (NASC-CDM; White, 2014) was chosen as the instrument for this study after permission was obtained from the instrument developer (see Appendix A). The NASC-CDM is a self-report quantitative instrument to measure participants' perceptions of their levels of self-confidence and anxiety during the process of clinical decision-making (White, 2014). Multiple studies have found the NASC-CDM to be valid and reliable (Bektaş & Yardimci, 2019; Bektaş et al., 2017; Cobbett & Snelgrove-

Clarke, 2016; Coram, 2015; Ross & Carney, 2017; Vnenchak et al., 2019). The complete NASC-CDM scale is available from the author upon request and no special training is needed to use this instrument.

### **Problem Statement**

The problem this study sought to address was an understanding of nurse-midwifery student anxiety and self-confidence issues and how they affected learners in OSCE performance and future practice. Nursing educators are interested in OSCE as a type of simulation assessment because it can influence both self-confidence and competent behavioral performance (Franklin et al., 2014). In their descriptive qualitative study, Barry et al. (2012) identified the OSCE process as a valuable tool in increasing the depth of learning for midwifery students. The Essentials of Master's Education from the American Association of Colleges of Nursing (AACN) includes objectives addressing student preparation for critical thinking and decision-making (AACN, 2011). The OSCE is a valid and reliable method of assessing clinical competence and decision-making objectively in a variety of settings (Goh et al., 2016, 2018; Kolivand et al., 2020; Kurz et al., 2009). During OSCEs learners are expected to make clinical decisions, so lack of self-confidence and anxiety can affect the learning and adeptness of clinical decision-making (White, 2014). Consequently, these challenges require nurse-educators to develop creative educational strategies to promote development of sound student clinical practice and clinical decision-making. One strategy is the use of OSCEs (Cobbett & Snelgrove-Clarke, 2016; Stunden et al., 2015; Taala et al., 2019).

### **Purpose of Study**

The purpose of this study was to obtain information on student self-confidence and anxiety related to the administration of OSCEs in midwifery education. A simple application of an OSCE is one where students are expected to demonstrate competency in a variety of simulated situations. The aim of the OSCE is to provide objectivity and standardization to the structure and control of the clinical examination so the student's clinical knowledge can be tested and appropriate feedback provided (Aronowitz et al., 2017; Harden et al., 1975; Lindsay Miller et al., 2015; Phillips et al., 2020).

There was limited published literature on midwifery students' perceptions of OSCEs and the impact OSCEs might have on clinical skill learning and clinical practice (Barry et al., 2012; Benbenek et al., 2016; Jay, 2007; Killingley & Dyson, 2016; McClimens et al., 2012). Similar to other clinical disciplines, the value of OSCEs in increasing depth of learning for nursing students has been recognized (Barry et al., 2012). This study added to the existing literature on OSCE application, particularly in relation to confidence and anxiety in nurse-midwifery education and practice.

This study obtained information on student confidence and anxiety through use of a self-confidence and anxiety questionnaire. Self-confidence and anxiety are important individual concepts that are tightly intertwined (Bektaş et al., 2017; Ross & Carney, 2017; White, 2014; White et al., 2019). In addition, the purpose of this study was to determine if OSCEs supported the development of clinical decision-making through increased self-confidence and decreased anxiety in graduate nurse-midwifery students. Students have expressed that anxiety could be intense during OSCEs and might hinder their ability to effectively demonstrate their clinical capability (Cazzell & Rodriquez, 2011; Jay, 2007; Massey et al., 2017; Muldoon et al., 2014).

Midwifery students reported increased confidence inspired by completing OSCEs and increased confidence was translated into improved competence in clinical settings (Jay, 2007; McClimens et al., 2012). The NASC-CDM (White, 2014) questionnaire asked students about their levels of self-confidence and anxiety in a range of clinical decision-making competencies in the following domains: using resources to gather information and listening fully, using information to see the big picture, and knowing and acting.

### **Research Aim**

The OSCE has been defined as an active learning strategy that contributes to greater self-motivation and understanding of cognitive and psychomotor skills by students (Cohen & Boni, 2018). In recent studies, OSCEs were shown to influence and increase self-confidence, anxiety, competent behavioral performance, clinical competence, depth of learning, and preparation for critical thinking and decision-making (Barry et al., 2012; Fidment, 2012; Franklin et al., 2014; Hilliard, 2018; Jay, 2007; Kurz et al., 2009; McClimens et al., 2012). The main objective of this study was to evaluate and compare self-reported confidence and anxiety levels of graduate nurse-midwifery students—pre- and post-OSCE. A secondary objective was to validate reliability and validity of the use of the NASC-CDM scale in a graduate nurse-midwifery population. The NASC-CDM has not been used in graduate nurse-midwifery education to date. However, the NASC-CDM was found to be reliable and valid in nursing (Cobbett & Snelgrove-Clarke, 2016; Coram, 2015; Ndiwane et al., 2017; Ross & Carney, 2017; White et al., 2019).

### **Professional Significance of the Study to Nursing Science**

The role of competency in education has grown as healthcare providers and educators identified the gap between education and practice (Scott Tilley, 2008). Clinical competency assessment is multifaceted and difficult to measure. The best methods to teach and evaluate



nursing students' competence remain unclear and thus further research was needed. The determination of student competence is often influenced by a student's level of comfort, anxiety, stress, confidence, and self-efficacy (Pijl-Zieber et al., 2014).

This study raised important considerations for nurse-midwifery educators engaged in assessing students using OSCEs. The OSCE has been appraised to be objective in assessing clinical competence and decision-making as it allows students to demonstrate their competence in what they know at the "show how" level (Miller, 1990, p. S63). It was anticipated the findings of this study would be congruent with previous research in the nursing and midwifery literature and would support increased depth of learning and increased self-confidence with the use of OSCE. Evidence on OSCE's application, particularly in relation to student self-confidence and anxiety in midwifery education and practice, has the potential to make a very effective and meaningful contribution to the profession.

### **Research Question and Hypotheses**

- Q1 Will the nurse-midwifery students taking the OSCE effect their self-confidence and anxiety scores as measured by the NASC-CDM scale? Is there a difference in nurse-midwifery student self-confidence and anxiety scores in clinical decision-making at the end of the OSCE as compared to scores prior to OSCE?
- H01 There will be no difference in mean pre-test and post-test self-confidence and anxiety scores.
- H1 Mean post-test self-confidence and anxiety scores will be significantly different from the mean pre-test self-confidence and anxiety scores.

Objective structured clinical examinations have the potential to enhance clinical judgement and provide effective decision-making. Use of an OSCE could serve as a non-subjective measure of clinical competence. To assess multiple domains of learning (theoretical, affective, psychomotor, and cognitive) and therefore the ability of individuals to demonstrate competence, OSCEs along with standardized examinations in the classroom and direct preceptor

observation could become a gold-standard of assessment (Benbenek et al., 2016; Carraccio & Englander, 2000; Delavar et al., 2013; Franklin & Melville, 2015). When holistic care and practice are incorporated in OSCEs, there is the potential to enhance clinical judgment and foster effective decision-making (Cohen & Boni, 2018; Hermansson & Martensson, 2011).

White (2014) developed a questionnaire tool to measure self-confidence and anxiety in nursing students during clinical decision-making. The 27-item NASC-CDM scale is a 6-point Likert-type tool with two subscales (see Appendix B). The NASC-CDM is an instrument designed for multiple uses among different program types, different level of students, and varied clinical situations (White, 2014). This instrument might be useful to evaluate changes in self-confidence and anxiety with clinical decision-making when used in a pre and post-test design. Additionally, the instrument could be used both in a formative or summative fashion (White, 2014). As OSCEs are a simulated clinical evaluation of students that could be both formative or summative, the NASC-CDM instrument fit the criteria needed for the current study (Cobbett & Snelgrove-Clarke, 2016; White et al., 2019).

### **Research Objectives**

A primary objective was to validate reliability and validity of the use of the NASC-CDM scale in a new population: graduate student nurse-midwives. The key objective of this study was to assess and compare self-reported confidence and anxiety levels of graduate nurse-midwifery students pre- and post-OSCE. Once users of the scale identified the level of participants' self-confidence and anxiety in relation to the process of clinical decision-making in an OSCE, teaching-learning strategies could be tailored to help learners with competence in the process of clinical decision-making better (White, 2014).

Overall, the emphasis placed on educators in the medical field to ensure patient safety and quality necessitated that high-quality, reliable, valid, and educationally sound assessment tools be used for evaluation of clinical competence and clinical decision-making. The OSCE has become standard practice within medical education and when modified, it could be successfully used in nursing and midwifery education programs to assess clinical confidence and competence. In particular, OSCE strengths lie in terms of assessor objectivity. However, it is paramount that new OSCEs be piloted to ensure reliability and validity. Researchers could assist the continued maturation of OSCE pedagogy by aspiring to higher levels of evaluation and reporting both psychometric measures and the steps taken to assure validation (Adamson et al., 2013).

Learning through engagement in activities that are perceived to be authentic demands inclusion of interactions that occur in a socio-cultural, holistic, safe, and controlled environment. Objective structured clinical evaluations allow for improved patient outcomes and could benefit patients, students, and faculty (Benbenek et al., 2016; Kurz et al., 2009; Traynor & Galanouli, 2015). When graduate nurse-midwifery students make strong, confident clinical decisions, they are meeting the expectations of the American College of Nurse-Midwives and International Confederation of Midwives and are establishing a cornerstone skill for professional practice. How an increased level of confidence after OSCE could be translated into improved competence in practical settings required in-depth investigation. When nurse-educators successfully evaluate where students' levels of self-confidence and anxiety lie, they can intervene with appropriate teaching-learning strategies to alleviate anxiety, boost confidence, and increase competence (Fidment, 2012; Moscaritolo, 2009; Poorman et al., 2019; Stunden et al., 2015). The emotional barriers of low self-confidence and increased anxiety have been shown to affect the clinical decision-making process (White, 2014). When self-confidence is stronger, learners are able to

focus on the client and decision-making but when self-confidence is weaker, learners focus on their own anxiety (White, 2014).

### **Definition of Terms**

**Anxiety.** Physiological, psychological, or behavior responses concerned with failure or negative outcomes related to a particular situation (Hilliard, 2018).

**Clinical Decision-Making.** Selecting the most appropriate choice to solve the problems of patients (Bektaş et al., 2017).

**Competence.** The combination of skills, knowledge, attitudes, values, and abilities that underpin effective performance in professional practice (Franklin & Melville, 2015).

**Critical Thinking.** The ability to think systematically and reflect on the reasoning process used to ensure safe practice (Zarifsanaiey et al., 2016).

**Objective Structured Clinical Examination.** The OSCE is an approach to the assessment of clinical competency in which the components of holistic competence are assessed in a planned or structured way with attention being paid to the objectivity of the examination, allowing students to practice acquired knowledge and skills and demonstrate safe performance through multiple observations including a variety of contexts (Duran-Snell, 2018).

**Self-Confidence.** Confidence linked with the concept of self-efficacy and defined simply as one's perception of his or her ability to perform a task (Ytterberg et al., 1998).

## CHAPTER II

### REVIEW OF THE LITERATURE

This literature review brought together relevant knowledge from the disciplines of nursing, nurse-midwifery, medicine, and health sciences education. This review of the literature includes consideration of the theoretical description of anxiety, self-confidence, OSCEs, and the theoretical frameworks that supported this study. This literature review concludes with a short summary and directions for future research.

#### **Sources and Study Criteria**

This literature review utilized several electronic databases including Google Scholar, Cumulative Index of Nursing and Allied Health Literature, PubMed, Proquest, and EBSCOhost. The focus of the initial data search was on results relevant to use of objective structured clinical examination (OSCE) in medical, nursing and midwifery education. Advanced searches included the terms “nursing education,” “medical education,” “midwifery education,” “reliability,” “validity,” “clinical decision making,” “confidence,” “anxiety,” and “competence,” with “OSCE.” The total number of articles found was 54,030. Publication in peer-reviewed English language journals along with access to full text online were key to inclusion in this review of literature. Studies were chosen based on the following: initial use of Objective Structured Clinical Examinations to ensure the acronym was not misconstrued, OSCE use in medical education, OSCE use in nursing education, OSCE use in midwifery education, reliability and validity of OSCEs, self-confidence, anxiety and competence measurements with OSCEs, and systematic literature reviews of OSCEs. Studies were selected so a blend of both qualitative and

quantitative research designs could be reviewed. The articles were reviewed manually for the above inclusion criteria. Based on the above criteria, 84 articles were selected for the literature review.

### **Objective Structured Clinical Examination Reliability and Validity**

Competency assessment tools like OSCEs are challenged to demonstrate validity in the clinical environment as competent patient care is more difficult to assess when factoring both the technical skills and the ability to prioritize, critically think, and effectively coordinate patient care (Franklin & Melville, 2015). The reliability of any competency assessment tool means the researchers achieved the same result time and again when the circumstances of their study had not changed (Franklin & Melville, 2015; Polifroni, 2011). Objective structured clinical examinations have been widely considered to be a reliable and valid assessment of clinical skills (Traynor & Galanouli, 2015). A descriptive, correlational study of OSCEs used in evaluating the clinical skills of 23 midwifery students found significant relationships between clinical scores and OSCEs ( $r = 0.45$ ;  $p = .03$ ) and reliability lowest to highest correlation coefficients between observers at 0.58 and 1.00, respectively (Nasiri et al., 2015). In an updated review of OSCEs in nursing education, several studies reported reliability and validity (Adamson et al., 2013; Bagnasco et al., 2016; Cazzell & Howe, 2012; Goh et al., 2016, 2018; Hutton et al., 2010; Mitchell et al., 2009; & Selim et al., 2012).

### **Objective Structured Clinical Examination and Medical Education**

In Harden et al.'s (1975) seminal article, the first use of an OSCE is described and assessed for correlation to poor performance in clinical and written examinations. The OSCE as a clinical examination is a performance assessment concerned with what students can do rather

than what they know (Harden, 1988). In the original study, there was a highly significant correlation between the marks in the clinical and written examinations of the students who took the OSCE ( $n = 99$ ). The authors defined the structure of the exam including the format, score sheets, types of questions, and how the examiner was to score the examination (Harden et al., 1975).

As a follow-up to this landmark study, Harden and Gleeson (1979) published a booklet that further discussed the validity, reliability, and practicability of the use of the OSCE. Details describing the components of the examination stations and organization were highlighted. In addition, areas of competence that could be tested were outlined. Disadvantages such as lack of holism in assessing standardized patients were addressed along with the demand on time for both the examiners and the standardized patients.

There was an abundance of literature on the use of OSCEs in medical education including its construction, psychometric properties, cost, and scoring (Walsh et al., 2009). Additionally, multiple studies demonstrated excellent statistical properties of reliability and validity of OSCEs (Brannick et al., 2011; Carraccio & Englander, 2000; Cuschieri et al., 1979; Sloan et al., 1996; Turner & Dankoski, 2008; Wallenstein & Ander, 2015).

### **Objective Structured Clinical Examination and Nursing Education**

Objective structured clinical examinations in nursing education emanated from McMaster University, Hamilton, Ontario, Canada in 1984 (Major, 2005). Objective structured clinical examination use in nursing education has required a large number of adaptations from the original version used in medical education and, therefore, new documentation of reliability and validity

must be established (Cazzell & Rodriguez, 2011; El-Nemer & Kandeel, 2009; Goh et al., 2018; Mitchell et al., 2009; Traynor & Galanouli, 2015).

In a study conducted by Selim et al. (2012), statistically significant correlations among OSCE and clinical evaluation, final oral exam, final written exam, and total grades were found. Inter-rater reliability was calculated using non-parametric Spearman's correlation, finding a statistically significant positive correlation between two raters at multiple stations ( $p = .001$ ). Internal consistency was measured using Cronbach  $\alpha > 0.7$  in multiple stations (Selim et al., 2012).

Kurz et al. (2009) conducted a quasi-experimental, post-test study with a control group of 35 graduate nurse-practitioner students using a Likert scale to assess student satisfaction and correlation to clinical competency measured by practical examination and preceptor evaluations. This study was limited to statistically significant findings due to sample size. However, the research group (OSCE) did have higher scores in general. Objective structured clinical examinations have been highly recommended by many nursing educators as useful and a positive assessment strategy. However, small sample sizes and a lack of psychometric property testing have limited their generalization (Yanhua & Watson, 2011).

### **Objective Structured Clinical Examination and Midwifery Education**

In this literature review, 13 articles were included that distinctly related OSCEs and midwifery education. Jay (2007) conducted semi-structured interviews, finding student midwives perceived OSCEs as valid and OSCE evaluations increased confidence in their clinical skills. Students, midwifery faculty, and clinical midwives perceived OSCEs to be credible, consistent, reliable, and enhanced learning in multiple recent studies (Barry et al., 2013; Benbenek et al.,



2016; Delavar et al., 2013; Erfanian & Khadivzadeh, 2011; Henderson et al., 2013; Jay, 2007; Killingley & Dyson, 2016; Malakooti et al., 2018). Concerns have been raised that OSCEs have not been developed to recognize the totality of the woman in care (Cohen & Boni, 2018; Jay, 2007; Khattab & Rawlings, 2001; Smith et al., 2012). When holistic care and practice is incorporated in OSCEs, there is the potential to enhance clinical judgement and provide effective decision-making (Cohen & Boni, 2018; Hermansson & Martensson, 2011).

A qualitative descriptive approach was used by Barry et al. (2012) where midwifery students undertaking OSCEs in obstetric emergencies were invited to participate ( $n = 36$ ). Four focus groups facilitated by midwifery students were taped and transcribed verbatim. Burnard's framework was used for coding and categorization. Barry et al.'s findings were congruent with previous research in nursing and midwifery supporting depth of learning with OSCEs, which might ensure students are safe and competent practitioners.

A cross-sectional study of 52 midwifery students was conducted to evaluate student's perceptions of OSCE versus the traditional method of evaluation previously used at Babol University in Iran (Delavar et al., 2013). Both face and content validity of the questionnaire were determined by the coefficient test and analyses were performed using statistical package for social science (SPSS), version 16. In comparing the student's perspective, *t*-test and chi-square tests were done with a level of significance set at 0.05 (Delavar et al., 2013). Overall, the students felt the OSCE was fair, credible, consistent, reliable, and enhanced their learning of course materials.

Malakooti et al. (2018) completed a descriptive, cross-sectional study with reliability confirmed by a Cronbach's alpha coefficient of .97 for the questionnaires used in their study along with face and content validity of the modified versions of the questionnaires. Conversely,

Erfanian and Khadivzadeh (2011) found inconsistencies in the measurements of performance with OSCE used to measure competency of midwifery students in intrauterine device (IUD) service delivery and, therefore, initiated a workshop program for further skill development.

Mitchell et al. (2015) in a mixed method study found modified OSCEs using best practice guidelines were feasible to implement, realistic, and valued. Internal validity of the surveys and focus groups was determined, allowing for the framework of best practice guidelines to provide a logical guide in the teaching and assessment of their students (Mitchell et al., 2015). A summary of key studies on OSCE and midwifery education is provided in Appendix C.

### **Objective Structured Clinical Examinations and Self-Confidence**

Nursing educators are interested in OSCEs as a method of simulation because they can influence both self-confidence and competent behavioral performance (Franklin et al., 2014; Henderson et al., 2013; Omu, 2016). Ytterberg et al. (1998) studied the association between medical student self-confidence and clinical skills during an OSCE at the University of Minnesota-Minneapolis. One hundred and eighty students were asked to complete a brief survey about confidence levels in their clinical skills. A total of 155 students (86%) completed both the pre- and posttest questionnaire that used a 10-point rating scale. Statistically significant increases were found in the students' level of confidence in their clinical skills by matched pairs *t*-tests ( $p < .001$ ). In addition, there was a statistically significant positive correlation (Pearson's correlation coefficient) between confidence level and students' OSCE performance scores. A weakness in this study was the lack of description of the pre- and posttest questionnaire, other than to say it included a 10-point rating scale. However, this study found clinical experience

provided in an OSCE that included exposure to challenging clinical scenarios and immediate feedback enhanced students' confidence in their clinical skills.

One observational study evaluated the relationship between confidence and OSCE performance in midwifery students. McClimens et al. (2012) investigated the relationship between self-reported confidence and performance in the OSCE of 103 first and third year midwifery students from the United Kingdom. Anxiety was not a metric assessed in this study. The students completed a modified confidence questionnaire before and after the OSCE. Weaknesses in this study were the questionnaire was not made available or published and it consisted of 52 items. While this study did show evidence by independent *t*-tests that third year students reported greater total confidence than did first year students ( $t = 8.276$ ;  $p < .001$ ;  $n = 80$ ), this finding was not surprising as confidence was expected to increase through progression of a midwifery education program. Paired *t*-tests revealed both first and third year students demonstrated significant increases in confidence after completion of the OSCE ( $p < .001$ ); however, there was no correlation between confidence levels and OSCE performance scores.

Emotional barriers due to low self-confidence can affect the decision-making process so a methodological research study was conducted to test, validate, and establish psychometric properties for the nurse anxiety and self-confidence in clinical decision-making (NASC-CDM) scale (White, 2014). According to White (2014), items were reduced or revised based on expert panelist feedback and content validity indices. Further revision and reduction of items modified the original scale of 82 items to the 41-item scale used for pilot testing (White, 2014). After pilot testing, the scale became a 27-item scale evaluating both self-confidence and anxiety (Bektaş et al., 2017; Coram, 2015; Vnenchak et al., 2019). The final 27-item scale was found to be reliable and valid in recent studies (Cobbett & Snelgrove-Clarke, 2016; Coram, 2015; Ndiwane et al.,

2017; Ross & Carney, 2017; White et al., 2019). The NASC-CDM identified three characteristics of self-confidence: belief in positive achievements, persistence, and self-awareness (Vnenchak et al., 2019; White, 2014). A summary of key studies on OSCE and self-confidence can be found in Appendix D.

### **Objective Structured Clinical Examinations and Anxiety**

Students who were clinical evaluated by OSCEs reported significant anxiety (Cazzell & Rodriquez, 2011; Fidment, 2012; Hilliard, 2018; Moscaritolo, 2009; Stunden et al., 2015). Hermeneutic phenomenology was the underpinning for the study by Fidment (2012) that utilized semi-structured interviews. Ten students were interviewed and a key theme became apparent related to student anxiety. Anxiety was one of the first things interviewees wanted to talk about and students showed strong emotion when recalling their experiences (Fidment, 2012). Students who had already been exposed to OSCEs described feeling less anxious and better prepared for clinical practice (Fidment, 2012). While OSCEs caused feelings of anxiety, students felt OSCEs were ultimately beneficial.

Massey et al. (2017) found lack of student understanding of or unfamiliarity with OSCE process requirements increased stress. The authors used a set of digitized OSCE exemplars in a course website as part of the usual learning activities. The exemplars were monitored, pre and post OSCE surveys were conducted, and qualitative data were collected to evaluate their approach (Massey et al., 2017). In the quantitative portion of the study, Massey et al. used chi-squared analysis and found the 176 student participants rated their level of confidence and skill level higher in the post-survey compared to the initial survey. Student focus groups found four interconnected themes: the ability of OSCE videos to clarify expectations, the perceived value of exemplars for OSCE preparation, usefulness of accessibility to the digital exemplars, and the

stress/anxiety reducing benefit of the OSCE exemplars (Massey et al., 2017). A summary of key studies on OSCE and anxiety can be found in Appendix E.

### **Systematic Reviews**

Several critical and systematic reviews have been published regarding OSCE use in medical, midwifery, and nursing education (Brannick et al., 2011; Rushford, 2006; Smith et al., 2012; Turner & Dankoski, 2008; Walsh et al., 2009). Brannick et al. (2011) specifically reviewed reliability of OSCE with medical students and practitioners. These authors reviewed 39 studies and found better than average reliability when a greater number of stations with a higher number of examiners was used. A weakness of this literature review was the use of only two databases (Pubmed and PsycINFO) to identify relevant studies for inclusion. Additionally, identifying this review as a meta-analysis was a weakness due to the limited number of features that could be coded. However, the review was strengthened by inclusion of statistical measurements of the reviewed articles. Similarly, Turner and Dankoski (2008) reviewed reliability, validity scoring along with practical issues, and feasibility when an OSCE was used for medical examinations. It was uncertain as to the number of articles that were reviewed and the conclusions presented were mixed. However, these authors' findings were consistent with the previous literature review and called for continued research to support the use of OSCEs.

Rushford's (2006) review had strength in comparing OSCE to other modes of assessment as well as reviewing overall reliability, validity, test-re-test reliability, and use of marking tools. This review addressed challenges found in using OSCEs that were originally developed for medical education and adapting them to the more holistic approach of nursing education and evaluation.

The two strongest reviews, both in comprehensiveness of articles reviewed and overall information provided, were Smith et al. (2012) and Walsh et al. (2009). The Smith et al. review was specific to midwifery education and included a reference to the five domains of competence used in Ireland for entry to practice. In particular, this article discussed an example of an OSCE scenario based on a lactation case. A limitation of this review was the uncertainty of its applicability to general midwifery education use as it reviewed only the example of an OSCE used in a lactation scenario. The Walsh et al. review used multiple data sources in their search including Cumulative Index of Nursing and Allied Health Literature, Cochrane, Academic Search Premier and MEDLINE, which resulted in 41 articles meeting the inclusion criteria. The Walsh et al. literature review's strength was in the discussion of validity and reliability from articles in both the medical and nursing education literature. In particular, this review clarified the major gaps existing in nursing literature on the use of OSCEs for assessing clinical competence. An emphasis was placed on the lack of quantitative studies used in evaluating clinical competence.

### **Theoretical and Conceptual Frameworks**

Foundational to competency assessment tools is the ability to evaluate both critical thinking and application of judgment and reasoning skills (Franklin & Melville, 2015; Tanner, 2006). Assessing competence in both nursing and midwifery can be challenging as it involves complex interpersonal knowledge and clinical judgement measures (noticing, interpreting, responding, and reflecting) rather than just a series of psychomotor actions demonstrating clinical expertise (Franklin & Melville, 2015; Scott Tilley, 2008; Tanner, 2006).

The theoretical origins for OSCEs were experiential and situational learning as active pedagogical strategies that were learner centered (Bland et al., 2011; Cohen & Boni, 2018). The

learning domains of affective, cognitive, and psychomotor skills have been a focus of OSCEs (Adamson et al., 2013; Bland et al., 2011; Cohen & Boni, 2018; Khan et al., 2013). The OSCE has been defined as an active learning strategy that contributes to greater self-motivation and understanding of cognitive and psychomotor skills by students (Cohen & Boni, 2018). The concept of BEBOLDER (**b**est evidence, **e**ducational theories, **b**eginning assessments, **o**bjectives, **l**ogistics, **d**ecisions, **e**valuation/feedback, and **r**evisions) could help faculty document opportunities and challenges for student learning and assist faculty in the curriculum development of OSCEs (Bonnell et al., 2019, p. 9).

### **Constructivism**

Constructivism is a major theory of learning that could be an umbrella for mediated learning through cognitive constructivism, radical constructivism, situated constructivism, and co-constructivism (Mattar, 2018). Human beings construct meanings as they engage with the world and make sense of it based on their historical and social perspectives. The basic generation of meaning was always social, arising in and out of interaction with others and bestowed upon us by our culture (Creswell & Creswell, 2018; Mattar, 2018; McGaghie & Harris, 2018). In educational philosophy, constructivism is a theory about how people learn with two important concepts: (a) people construct or build new knowledge on what they already know and (b) people actively construct meaning through experiencing things and reflecting on those experiences (Mattar, 2018). In constructivism, teachers acknowledge each student is an individual with unique learning needs. Learning is interactive, building on previous knowledge and experience. Students work in groups, learning from each other, and teachers value students' past experiences, culture, and knowledge. Constructivism pedagogy encourages specially designed activities that allow novices to gain mastery cumulatively over a range of simplified

and specially designed domains of knowledge and activity (Ernest, 1995). Constructivism focuses on an individual's ability to employ a large range of tools and methods, even unconventional ones, and therefore on students' inventiveness, resourcefulness, and imaginativeness (Crotty, 2015).

### **Kirkpatrick's Framework**

Kirkpatrick's framework is useful to categorize evaluation strategies in OSCEs (Adamson et al., 2013; Johnston et al., 2018). Evaluation of the educational impact of OSCEs provides valuable feedback that could assist with the development and improvement of teaching methods. Kirkpatrick's levels of evaluation is based on the premise that learning resulting from training programs are classified into four levels: reaction, learning, behavior, and outcomes (Adamson et al., 2013; Johnston et al., 2018). In supporting the pedagogical intent of transferring learning from the OSCE to future practice, the OSCE blends academic learning and authentic real-world connections through simulations of real-life scenarios by emphasizing the relevance for real-world learners (Johnston et al., 2018).

### **Reflective Practice and Transformative Learning**

Reflective practice in nurse-midwifery is considered an essential aspect of personal and professional development with critical reflection considered a cornerstone of being an accountable and autonomous practitioner (Bass et al., 2017). Transformative learning includes teaching approaches that encourage reflection, critique, and the development of self-awareness (Weimer, 2013). The final step in the OSCE format is the debrief, a form of clinical teaching using reflection-in-action, reflection-on-action, and reflection-beyond-action to teach clinical reasoning, thinking, and integration of theory and practice (Dreifuerst, 2015). Debriefing following OSCE is a critical process for deep learning where the OSCE simulation experience is



reexamined with the aim of assimilation and accommodation of learning (Johnston et al., 2018). When learners practice reflection, they are provided an opportunity to explore practice experiences and integrate existing knowledge with new insights and understanding (Bass et al., 2017).

### **Bandura's Social Cognitive Theory and Tanner's Model**

Bandura's (1998) social cognitive theory and Tanner's (2006) model of clinical judgement work together to form a theoretical framework linking self-confidence and anxiety in clinical decision-making. Emotional arousal is described as a source of self-efficacy and equates to the level of anxiety a person experiences when confronted with a threatening situation (Coram, 2016; White, 2014). Self-confidence could assist with the control needed over anxiety for learners to realize and curb their level of emotional arousal to engage fully in the clinical decision making process (White, 2014). The OSCE could provide guidance to the learner as they learn clinical judgement skills essential for practice (Coram, 2016).

### **Theory of Unpleasant Symptoms**

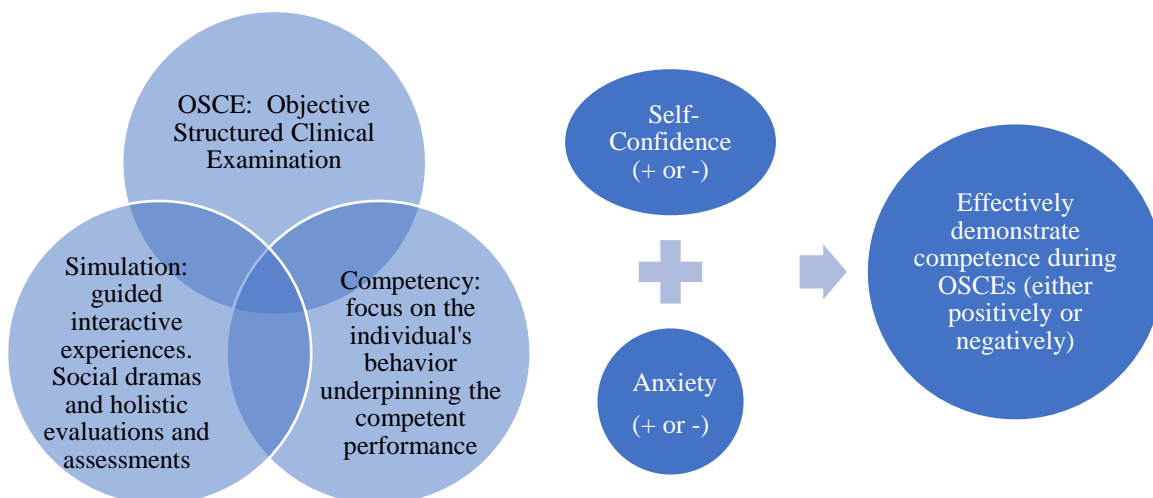
The middle range theory of unpleasant symptoms (TOUS) could provide a structured, comprehensive way to understand a symptom like anxiety (Blakeman, 2019). The TOUS has three over-arching concepts: influencing factors, symptoms, and performance (Blakeman, 2019). In this study, the influencing factor of OSCEs could cause the psychologic factor of anxiety that influenced the occurrence, intensity, timing, distress level, and the significance of the anxiety symptom (Blakeman, 2019). The symptom of anxiety could have an impact on an individual's ability to perform in the influencing factor (OSCE). This study was interested in determining the degree to which OSCEs could impact the symptom severity of anxiety. By identifying anxiety as a symptom related to OSCEs, it was important for nurse-educators to focus on interventions to

help in managing the symptom and therefore improve performance in OSCEs and in future practice.

The description of the concept OSCE can be seen in the visual model (see Figure 1; Duran-Snell, 2018). The overlapping of the concept OSCE with the complementary concepts of simulation and competency is intentional to explain the interrelationships. Objective structured clinical examinations are powerful social-dramas (simulation) that create and reinforce the performance roles (competency) of students (Hodges, 2003). Additionally, the model indicates the relationship of self-confidence and anxiety with the ability to effectively demonstrate clinical competence in an OSCE performance which may positively or negatively impact learning.

**Figure 1**

*Objective Structured Clinical Examination Concept and Relationship to Self-Confidence and Anxiety*



## Discussion

This literature review emphasized the significance of Harden et al.'s (1975) original study on OSCE use in medical, nursing, and midwifery education. Their findings indicated the

OSCE was shown to be a valid and reliable method of evaluation if the construction of the tool was appropriately applied. To assess multiple domains of learning (theoretical, affective, psychomotor, and cognitive) and therefore competence, OSCE along with standardized examinations and direct preceptor observation could be used to set a gold-standard of assessment (Benbenek et al., 2016; Carraccio & Englander, 2000; Delavar et al., 2013; Franklin & Melville, 2015). There was a need for more psychometric measurements of OSCEs using more sophisticated methods analysis and scaling (Yanhua & Watson, 2011). Studies were reviewed in the context of student confidence, competence, and OSCE (Barry et al., 2012; Henderson et al., 2013; Jay, 2007; McClimens et al., 2012; Ytterberg et al., 1998). In these studies from medical, nursing, and midwifery education, the students reported increased self-confidence in their clinical skills when OSCEs were used. Students also reported satisfaction through the use of OSCEs in their courses and following a clinical course (Kurz et al., 2009). Two studies specifically looked at anxiety levels and OSCEs without the inclusion of self-confidence (Fidment, 2012; Hilliard, 2018). Both of these studies found proper preparation and effective planning could reduce students' levels of anxiety.

Several studies reflected concern over the lack of a holistic perspective in the medical programs' use of OSCE and its adaptability to nursing (Franklin & Melville, 2015; Khattab & Rawlings, 2001; Rushford, 2006). Often the nursing OSCE looked very different from the traditional medical OSCE (Rushford, 2006). When holistic care and practice was incorporated in OSCEs, there was the potential to enhance clinical judgement and provide effective decision-making (Cohen & Boni, 2018; Hermansson & Martensson, 2011). When an OSCE was designed offering links to different stations like a short multiple-choice exam following a clinical assessment, holism was more likely to be promoted (Harden et al., 1975; Khattab & Rawlings,

2001). The OSCE could be used with midwifery and nursing students to demonstrate their competence at the “shows how” level of clinical assessment (Mitchell et al., 2009; Rushford, 2006; Smith et al., 2012).

### **Limitations of These Studies**

The dominant evidence presented in the use of OSCEs was derived from medical education and practice. Objective structured clinical examination use in nursing and midwifery education often has been adapted and looks different from the original use of the OSCE in the traditional medical model. Major gaps in the nursing and midwifery literature were evident regarding the examination of psychometric properties of adapted OSCEs designed and currently being used for a more holistic evaluation. While a number of qualitative studies were reported in this literature review, there was a paucity of quantitative studies, especially in the limited nursing and midwifery educational literature tied to OSCEs. Most of the quantitative studies were specific to measures of psychometric properties and were found in the medical literature. While the concept of holistic care was addressed in a few articles from a conceptual point of view, there was a shortage of defined OSCE scenarios that integrated holism (Cohen & Boni, 2018; Delavar et al., 2013; Mitchell et al., 2009; Smith et al., 2012). Both student self-confidence and anxiety with OSCE were not well defined in the literature. There were no studies in the nurse-midwifery literature that studied both student self-confidence and anxiety with a clinical competency assessment strategy such as OSCEs.

### **Summary**

The purpose of this study was to lay the ground work for a program of research focusing on anxiety and self-confidence in OSCEs in graduate nurse-midwifery education. Quantitative studies are needed to assess the reliability and validity of modified OSCEs for use in graduate

nurse-midwifery education. Since the original OSCE, the format has undergone major modifications including use of longer duration and fewer assessment stations, with an increased focus on the patient as a unified whole being (Cohen & Boni, 2018; Delavar et al., 2013; Smith et al., 2012). Nurse-researchers need to examine other measures of clinical competency compared to OSCE to assess the effectiveness of measuring clinical competency. Very little research ( $n = 10$ ) has looked at confidence and anxiety independently related to competency testing and evaluation, yet confidence has been used as a marker in competency evaluation. Increasing student confidence related to clinical assessment when OSCEs are used could lead to higher levels of competency and better student satisfaction (McClimens et al., 2012; Omu, 2016; Ytterberg et al., 1998). Faculty could benefit from further understanding of how anxiety could be mediated when using OSCEs (Fidment, 2012; Hilliard, 2018; Moscaritolo, 2009; Poorman et al., 2019; Stunden et al., 2015). Additionally, faculty confidence regarding a student's competence might be increased through use of OSCEs in nurse-midwifery graduate education (McClimens et al., 2012; Ndiwane et al., 2017; Omu, 2016).

Further research is needed on the integration of clinical decision-making and holistic care in the development of OSCE scenarios. When an instrument like OSCE is used in a new and different way from what was originally intended, researchers need to report the process and statistics associated with validating the instrument for the new purpose. More research is needed on how OSCEs affect anxiety, confidence, learning, behaviors, and ultimately patient outcomes. In particular, studies are needed to look at the patterns of both student self-confidence and anxiety in a high-stakes clinical competency evaluation strategy like OSCEs. Very little is known about how to obtain, organize, and analyze data that measure anxiety and self-confidence when using OSCEs as a clinical competency assessment strategy. This investigation provided data

about the patterns of selected nurse-midwifery student self-confidence and anxiety when OSCEs were used as a clinical evaluation assessment strategy. Baseline data are provided to guide future studies of nurse-midwifery student self-confidence and anxiety along with suggested replicable methods for the evaluation of nurse-midwifery student self-confidence and anxiety with OSCEs.

### CHAPTER III

#### METHODOLOGY

In this chapter, the methodology used to carry out the study is presented. Included are descriptions of the design, setting, sample, procedure, instrument, analysis, and ethical considerations.

#### **Design**

A non-experimental, exploratory study approach was used to conduct this investigation. Such an approach was appropriate for the purpose of describing the relationship between nurse-midwifery student self-confidence and anxiety using objective structured clinical examinations (OSCEs) as a clinical competency assessment strategy. This study was prospective and longitudinal in nature and the data were quantitative. This research study was designed to explore student self-confidence and anxiety with OSCEs in the development of clinical decision-making through the use of a self-confidence and anxiety questionnaire that has not been used previously in the graduate nurse-midwifery population.

#### **Objective Structured Clinical Examinations Development**

Prior to OSCE use and development, clinical assessment of students was based on clinical preceptor observations, evaluations, and standardized written examinations on content. The aim of the OSCE was to provide objectivity and standardization to the structure and control of the clinical examination so the student's clinical knowledge could be tested and appropriate feedback provided (Harden et al., 1975). Through a needs assessment, it was determined the

varied conditions in clinical practicums, individual preceptor teaching philosophy and ability, and preceptor evaluations contributed to inconsistencies and a lack of objectivity in learner clinical competency assessment. Therefore, OSCEs were implemented into the nurse-midwifery program (at the study site) because they could assess competency in a safe environment and add depth to learner evaluation. Clinical education OSCE development and implementation need the expertise and clinical experience of faculty who demonstrate both creative and technological skills (Bambini, 2016; Skiba et al., 2008). The OSCE could be described as a dynamic process involving the creation of a hypothetical opportunity that incorporates an authentic representation of reality, facilitates student engagement, and integrates the complexities of practical and theoretical learning with opportunity for feedback, evaluation, and reflection (Bambini, 2016; Bland et al., 2011).

Four OSCEs were developed by nurse-midwifery subject matter faculty experts based on best evidence available to examine nurse-midwifery management skills in (a) an antepartum clinic visit, (b) a post-partum hemorrhage, (c) newborn assessment and lactation education/support, and (d) an unfolding case on labor and birth management. These OSCEs tested discrete knowledge, clinical, and professional skills regularly practiced in simulations and clinical practicums and had been used at the study site consistently since 2017 involving 102 student experiences. The intent was for the OSCE to assess skills previously performed multiple times in the clinical setting demonstrating learner confidence and competence. The OSCEs were an example of learners demonstrating a new process: a familiar procedure being used in a new platform.

Each OSCE began with outcomes and objectives (Bambini, 2016). The flow of the scenario had a beginning, middle, and ending phase (Bambini, 2016). Finally, the OSCEs ended



with debriefing delivered in a learner-centered approach (Bambini, 2016; Dreifuerst, 2015). The authenticity and consistency (validity) regarding the OSCEs were reviewed by three experts in nurse-midwifery, each with a minimum of 20 years of clinical experience. Best practice guidelines were used to incorporate content, a holistic marking guide, mastery of skills, sequencing (including debriefing), supportive environment, feedback, and ongoing practice for both formative and summative assessment (Kelly et al., 2016). Prior to implementation, the OSCE marking guide was reviewed by the nurse-midwifery faculty to ensure accuracy. Use of a global rating scale was implemented to offer greater context and meaning during the feedback portion of the OSCE. Interrater liability of the marking guides was conducted during the first year use of the OSCEs. In addition, students provided constructive feedback on their experience with the OSCEs in the introductory year.

### **Pilot Study**

Research and evaluation are necessary when implementing a new assessment strategy. In November of 2018, a pilot study was performed with second year nurse-midwifery students ( $n = 11$ ) using the Nursing Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM) instrument pre and post OSCE to measure student self-confidence only as the anxiety subscale was not used in this pilot study (White, 2014). According to White (2014), through exploratory factor analysis of the instrument, a stable three factor solution was revealed. Dimension one indicated the level of self-confidence in the ability to use resources to gather information and listen fully. Dimension two used information to see the big picture and dimension three indicated knowing and acting (White, 2014). Paired  $t$ -tests on each of the dimensions revealed statistically higher self-confidence levels post OSCE for all three dimensions of clinical decision-making. A paired samples  $t$ -test computed on student self-

confidence scores revealed the students had statistically higher self-confidence scores post OSCE then before OSCE testing. The mean score pretest was 119.81 and mean posttest score was 129.72 ( $t = -4.342$ ;  $p = .001$ ;  $df = 10$ ;  $n = 11$ ). For dimension one, the mean pretest score was 61.90 and the posttest score was 65.54 ( $t\text{-test} = -2.667$ ;  $df = 10$ ;  $p < .024$ ;  $n = 11$ ). The dimension two mean pretest score was 29.81 and the posttest score was 32.81 ( $t\text{-test} = -3.245$ ;  $df = 10$ ;  $p < .009$ ;  $n = 11$ ). Dimension three's mean pretest score was 28.09 and the posttest score was 31.36 ( $t\text{-test} = -5.051$ ;  $df = 10$ ;  $p < .001$ ;  $n = 11$ ).

### **Setting**

The setting for this study was a large public university in the northwest region of the United States. The OSCEs took place both online through the use of WebEx © by Cisco or face-to-face in a simulation designed classroom. WebEx © by Cisco is a program used by the university during the time of COVID-19 to teach online and for selected OSCEs. Therefore, the setting included two subgroups: on-line and face-to-face, which was specifically addressed in the data analysis.

### **Sample**

Convenience sampling of university students enrolled in a graduate nurse-midwifery educational program that utilized OSCEs at a large northwest U.S. public university was used for this study. Participants were nurse-midwifery students over the age of 20 enrolled in an accredited nurse-midwifery program through Accreditation Commission for Midwifery Education (ACME). The students included both accelerated baccalaureate nursing students and students with previous registered nurse experience prior to acceptance to the graduate nurse-midwifery program. Participation was voluntary. Prior to the administration of the OSCE students reviewed the consent form (see Appendix F). Included in all communications with

students was a statement that read: “Your decision to participate in this study, or not, will have no impact on your evaluation for the class or affect your course grade.” If the student consented, the student was given the pretest questionnaire to complete administered by the program’s academic administrator (not the researcher). The student completed the posttest self-confidence and anxiety questionnaire following feedback and debrief from the OSCE assessor/faculty instructor.

### **Instrumentation**

White (2014) developed a questionnaire tool to measure self-confidence and anxiety in nursing students during clinical decision making. The 27-item NASC-CDM scale is a 6-point Likert-type tool with two subscales. The variables in this questionnaire were similar to those of interest to this study. The sample size needed for a paired *t*-test based at an alpha level of 0.05 with 0.8 power and moderate effect size of 0.5 would be 34 based on G-power (Faul et al., 2009).

### **Instrument Development**

A preliminary appraisal of content validity of the 82-item first draft was performed to assess the scale for relevancy, clarity, and comprehensiveness (White, 2014). Both item content validity and scale content validity indices were calculated. Based on feedback, a 6-point forced choice response option format, ranging for 0 = *not at all* to 6 = *totally*, was chosen. Items were reduced or revised based on expert panelist feedback and content validity indices. The second draft was critiqued by registered nurses and nursing students to ensure clarity and readability along with face validity. As reported by White (2014), construct validity per exploratory factor analysis was used in the instrument development. Item analysis was conducted using  $< 0.30$  and  $> 0.70$  as indicators for weak or redundant items. As a result, nine items were reduced from

the modified 41-item pilot version of the instrument. Convergent validity with a positive Pearson  $r$  correlation coefficient of  $\sim 0.50$  was acceptable. A statistically significant, moderate positive correlation was noted between the variables: NASC-CDM self-confidence and the General Perceived Self-Efficacy (GSE) scale ( $r = 0.62, p < .01, n = 242$ ). Reliability was computed using Cronbach's alpha internal consistency reliability coefficient. The NASC-CDM self-confidence subscale resulted in an  $\alpha = .98$  and the anxiety subscale resulted in an  $\alpha = .97$  (White, 2014).

### **Instrumentation Use in Research**

A review of the literature found several published research studies that had used the modified/revised NASC-CDM instrument since its original development in 2009 (Bektaş & Yardimci, 2019; Bektaş et al., 2017; Cobbett & Snelgrove-Clarke, 2016; Coram, 2015; Cowperthwait et al., 2015; Ross & Carney, 2017; Vnenchak et al., 2019; Warren, 2015; Zulkosky et al., 2016). These research studies used the instrument to measure nursing student self-confidence and/or anxiety in simulated scenarios with and without standardized patients. A study by Bektaş et al. (2017) was a descriptive and cross-sectional study to analyze the validity and reliability of the NASC-CDM instrument. Content validity was obtained through the opinions of 10 experts with ranges of .82 to .98. In the self-confidence section of the scale, the Kaiser-Meyer-Olkin (KMO) coefficient was .97 and the result of the Bartlett's test was  $X^2 = 8185.52$  and  $p < .001$ . In the anxiety section of the scale, the KMO coefficient was .97 and the result of the Bartlett's test was  $X^2 = 7518.51$  and  $p < .001$ . The alpha coefficient of the first sub-scale was .96, the second sub-scale was .88, and the third sub-scale was .91. Test-retest reliability coefficients were statistically significant at  $p < .001$ . Content validity was assessed for this study population prior to the beginning of the study. A goal prior to using the NASC-CDM instrument in this study was reassessment of the validity of the instrument by five to seven nurse-

midwifery faculty experts for use in this specific population. Reliability was assessed during the data analysis phase of this study.

### **Data Collection Procedures**

Students were invited to participate in the study following Institutional Review Board (IRB) approvals from the University of Northern Colorado and Oregon Health and Sciences University (see Appendix G). A pre-run of the study took place in the winter term of 2021 with four Doctor of Nursing Practice (DNP) students and the program academic administrator. Participation was voluntary. Participants were invited to participate using a scripted invitation and information form (see Appendix H) that included an overview of the study (description, purpose, and procedure), participant time commitment and expectation, and risks/benefits.

Students arrived to the assigned room (either virtual or face-to-face) for the OSCE and, after the introduction and information for participation was read and all questions were answered, the students were provided the questionnaire and instructed to place the completed pretest in the folder held by the program academic administrator. The NASC-CDM questionnaire allowed learners to document how the OSCE experience impacted their clinical decision-making. While all students were thanked for their time, only the students who completed the pretest were considered study participants. A printed copy of the consent form along with the investigator's contact information were attached to each pre- and posttest (see Appendix F). The participants were asked to set aside the consent form for their records. Completion of the pretest questionnaire served as their consent to participate. No student names or identification numbers were used on either the pretest or the posttest. The participants created their own unique pre- and posttest identification numbers by using their mothers' maiden names (or whomever they considered to be their mothers) as unique identifiers: the first two letters of the first name and

first two letters of the last name and birth month using a number between 1 and 12. While the OSCE was a real examination, the research did not interfere with the OSCE itself, and the OSCE results were included based on pass/fail only to better understand the unexplored area of nurse-midwifery student self-confidence and anxiety measured by the NASC-CDM instrument.

The participants (the students who took the pretest) were asked to take the posttest at the end of the OSCE. Only those who completed a pretest completed the posttest. The study introduction and information were reread to the students, the posttest was distributed and the participants were asked to place the completed test in the folder. All students were thanked for their time. The pre- and posttests were matched using the unique identifier each participant created and was not identifiable to the investigator. The student result on the OSCE as either a pass or a fail as demonstrated by the OSCE score sheet was added to the NASC-CDM posttest by the academic program administer.

A personal journal was kept by the investigator to record all other observations and impressions of the study progress and difficulties encountered in the conduct of the study. Only initials were used in this journal and no other information was listed that could link to a specific student. This journal was kept in a locked cabinet set aside for this study. When no longer needed for this research project, the journal was destroyed.

### **Data Analysis Procedures**

The data were analyzed in three stages. The first stage was analysis and computation of the descriptive statistics and the distribution of the data for each variable. Variables were measures pre and post OSCEs between and within subject trends and were evaluated including the four study domains. Statistical Package for the Social Sciences (SPSS) version 26 was used to analyze the data. Data sets were cleaned and doubled checked before data analysis. The range

of all possible values was checked and those outside possible range were reviewed, deleted, or kept based on all of the variables having valid and usable values. A type I error of 5% was used for all tests of statistical significance. If too many participants were missing values for a given variable, the variable might not be usable. The study subjects were analyzed in terms of pre-existent demographics. Measures of frequency and measures of central tendency were applied to the demographic data collected from the NASC-CDM survey. Results of the OSCE intervention results of pass/fail were assessed and used as variables in this study.

After analysis of the central tendencies and data distributions, the appropriate inferential statistical test was selected based on the distribution of the data. The observations were defined as the differences between two sets of values; each assumption referred to these differences and not the original data values. In this study, the dependent variables of student self-confidence and anxiety were measured in an interval level of measurement.

By reviewing previous limited research on the use of the NASC-CDM, the effect size for this study was determined a priori and was based on a medium effect of 0.5. Due to the sample size, basic statistical procedures were used to examine the dependent variables of student self-confidence and anxiety at two separate observations. The reliability of the NASC-CDM was determined to be strong and therefore could positively impact the results. The data set was checked for reliability with a measure of internal consistency such as Cronbach's alpha. The results obtained from the data analysis procedures were explained in terms of what the results meant. Further discussion identified study limitations, explained conclusions in consideration of the study limitations, determined generalizability of the findings, considered the implications for nursing's body of knowledge, and included suggestions for further research.

The primary goals of the analysis were to identify trends and associates among the variables through intra-and inter-subject comparisons. For this study, repeated measurements were obtained at the beginning and at the end of each OSCE. Choice of the parametric or nonparametric statistical test employed was based on the level of measurement (interval), the number of participants for each data element, and the normality of the distribution of the data. Post hoc analyses were computed using the two-tailed dependent-tests or two-tailed Wilcoxon signed rank tests with a Bonferroni's procedure to maintain a family-wise significance level of  $\alpha = .05$ .

### **Data Handling Procedures**

Results of the study were presented in aggregate and all original paperwork was kept in locked cabinets behind a locked door on campus or in the researcher's home (due to COVID-19 restrictions). The researcher strove to protect the anonymity and confidentiality of the responses through use of a password-protected computer and no inclusion of identified data that would put individuals at civil liability or material harm. Once all of the data were transferred into SPSS and data analysis had concluded, the pre- and posttests were destroyed. The data will be destroyed once published.

### **Management of Attrition and Missing Data**

Ten graduate nurse-midwifery students were enrolled in the study. Four were DNP students and six were Master of Science in Nursing (MN) students. The four DNP students participated in two OSCEs: the antepartum clinical visit and the postpartum hemorrhage OSCE. The six MN students participated in three OSCEs: the postpartum hemorrhage OSCE, the newborn assessment OSCE, and the comprehensive OSCE. One MN student was provided an incorrect link to the on-line NASC-CDM and was not able to complete data collection for the



newborn assessment OSCE. One MN student only submitted the pretest portion of the NASC-CDM but did not complete posttest NASC-CDM for the on-line newborn assessment. Finally, one MN student declined to participate in the final comprehensive OSCE. Total completed and matched pretest and posttest data from the NASC-CDM was 23.

### **Duration of the Study**

It was expected the study would be conducted during the months of January-May, 2021. This duration allowed for a significant number of OSCEs to be performed with the expectation of three OSCEs conducted in January and February and an additional three OSCEs completed in March, April, and May. Continuing this study longer would have only resulted in a limited number of additional OSCEs from a small cohort of students.

### **Ethical Considerations**

Students were invited to participate in the study following IRB approvals from the University of Northern Colorado and Oregon Health and Sciences University (see Appendix G). Any changes to the original summary of the study protocol submitted with the original application were addressed in a manner prescribed by the study institutions' IRB committees. Precautions and safeguards were taken to assure the safety and comfort of the subjects. Data collected were considered confidential. All subject data were coded and maintained in project files under a personal identification numbers rather than the name of the student and kept in a locked cabinet in a locked university office or the locked home of the researcher due to COVID-19 restrictions. Only project personnel had access to the project files. All records linking student names and numbers were destroyed.

### **Risks, Discomforts, and Benefits**

Risks were minimal. Participating students were asked questions regarding self-confidence and anxiety. The probability and magnitude of harm or discomfort anticipated in the research were not greater in and of themselves as during the performance of a physical, psychological test, or OSCE. The decision to participate or not participate had no impact on the evaluation in the class or affected the course grade. There were no incentives to participate in this study; however, participation helped inform nursing clinical education strategies.

## CHAPTER IV

### DATA ANALYSIS AND RESULTS

A non-experimental, exploratory study approach was used to conduct this investigation. Such an approach was appropriate for the purpose of describing the relationship between nurse-midwifery student self-confidence and anxiety using objective structured clinical examinations (OSCEs) as a clinical competency assessment strategy. The problem this study sought to explore was an understanding of nurse-midwifery student anxiety and self-confidence issues and how they could affect learners in OSCE performance and future practice. This research study was designed to explore student self-confidence and anxiety with OSCEs in the development of clinical decision-making through the use of the Nursing Anxiety and Self-Confidence with Clinical Decision-Making (NASC-CDM) questionnaire that has not been used previously in the graduate nurse-midwifery population (White, 2014). This data analysis is in three sections: (a) validity and reliability of the NASC-CDM; (b) demographics of the study population; and (c) exploration of the data collected and the results.

#### **Validity and Reliability**

Evidence could not be located where the NASC-CDM questionnaire was used in a previous study with graduate nurse-midwifery students. The NASC-CDM is copyrighted by Dr. Krista White and the only changes that could be made when using the questionnaire in this study were in the demographic section (see Appendix A for permission). An appraisal of content validity of the 27-item NASC-CDM was performed by three content experts in graduate nurse-midwifery education to assess the questionnaire for relevancy, clarity, and comprehensiveness

for use in this study. All three assessors provided specific feedback and found the questionnaire to be valid for use in graduate nurse-midwifery students.

Of note, two experts reported that Question 27 seemed repetitive to Question 14, finding uncertainty with the expression “seems” right in the promotion of decision-making. Furthermore, one expert interpreted Question 27 as a possible antithesis of evidence-based medicine with the potential for implicit bias. The expert noted the value of intuition with novice learners should be tempered with the encouragement of students to articulate the reasons why something “seems” right. Finally, Question 22 included asking “the clinical nurse instructor or staff nurse,” which might not be the best representation for nurse-midwifery students. An equivalent for the graduate nurse-midwifery student might be to ask their clinical preceptor or clinical faculty.

Cronbach’s alpha was used by the original author of the NASC-CDM (White, 2014) to measure internal reliability for the self-confidence and anxiety subscales of the NASC-CDM questionnaire. Results indicated the self-confidence subscale of  $\alpha = 0.98$  and the anxiety subscale of  $\alpha = 0.97$ . Review of the item-total statistics for both subscales revealed no significant influence on the alpha if any item was deleted (White, 2014).

The reliability coefficient Cronbach’s  $\alpha$  was used in this study to test for reliability of the NASC-CDM (White, 2014) when used by a new population: graduate nurse-midwifery students. The 6-point Likert responses for the self-confidence subscale were 1 = *Not at all*, 2 = *Just a little*, 3 = *Somewhat*, 4 = *Mostly*, 5 = *Almost Totally*, and 6 = *Totally*. Higher scores on the self-confidence subscale indicated higher levels of self-confidence. The case process summary showed the  $n = 38$  with 27 items (questions) tested. The scale mean was 117.68 with a standard deviation of 14.78. The Cronbach’s alpha was 0.94 for the self-confidence subscale.

The 6-point Likert responses for the anxiety subscale were 1 = *Not at all*, 2 = *Just a little*, 3 = *Somewhat*, 4 = *Mostly*, 5 = *Almost Totally*, and 6 = *Totally*. Higher scores on the anxiety subscale indicated higher levels of anxiety. The case process summary showed the  $n = 39$  with 27 items (questions) tested. The scale mean was 60.26 with a standard deviation of 12.63. The Cronbach's alpha was 0.94 for the anxiety subscale. Examination of the item-total statistics for both subscales revealed no substantial influence on the alpha if an item was deleted.

### Demographic Statistics

Ten graduate nurse-midwifery students participated in the study. Students ( $n = 4$ ) currently enrolled in the Doctor of Nursing Practice (DNP) participated in one OSCE: the postpartum hemorrhage OSCE. Six students currently enrolled in the Master of Science in Nursing (MN) participated in three OSCEs: the postpartum hemorrhage, newborn assessment, and the comprehensive labor management. The participant demographics are outlined in Table 1.

**Table 1**

#### *Participant Demographics*

|   | DNP | MN |
|---|-----|----|
| Gender  |     |    |
| Female  | 4   | 5  |
| Non-conforming  |     | 1  |
| Age   |     |    |
| 26-30   | 3   | 4  |
| 36-40   | 1   | 1  |
| 40-45   |     | 1  |
| Ethnicity   |     |    |
| Caucasian   | 4   | 5  |
| Hispanic  |     | 1  |
| Degrees Prior to Admission to Nurse-Midwifery Program |     |    |
| Bachelor's  | 2   | 4  |
| Master's  | 1   | 1  |
| Multiple Degrees                                      | 1   | 1  |

*Note.*  $N = 10$

### Descriptive Statistics

Statistical Package for the Social Sciences (SPSS) version 26 was used to analyze the data. Measures of frequency and measures of central tendency were applied to the data collected from the NASC-CDM questionnaire (White, 2014). Higher scores on the self-confidence subscale indicated higher perceived self-confidence. Lower scores on the anxiety subscale indicated lower perceived student anxiety. Results of the OSCE intervention were planned to be used in this study. However, since all 22 OSCE evaluations resulted in a passing score, a correlation on pass versus non-pass was not available.

The data analysis began by utilizing the scoring suggested by the author of the NASC-CDM (White, 2014). For this pretest/posttest design, the paired  $t$  test was used for data analysis. Paired  $t$  tests were used to compare the pretest and posttest raw values from the NASC-CDM questionnaire. The study met the assumptions of a paired  $t$  test despite the small sample size. The observations were defined as the differences between two sets of values and each assumption referred to these differences, not the original data values. In this study, the dependent variables of student self-confidence and anxiety were measured in an interval level of measurement. To test the assumption of normality, a variety of methods were available but to inspect this data, the analysis included a histogram. When the  $n$  was insufficient (less than 10 pairs) a Wilcoxon signed rank test was used to test the null hypothesis that the median of differences between pretest and post-test equaled 0.

This exploratory research was descriptive and correlational in design. The attempt of this research design was to address additional hypotheses as the data were collected. The correlational design attempted to determine relationships between two or more variables using

statistical data. Relationships between and among were sought and interpreted. This exploratory correlational research recognized trends and patterns in the data.

By reviewing the previous limited research on the use of the NASC-CDM (White, 2014), the effect size for this study was estimated a priori and was based on a medium effect of .5. Due to the small sample size, the statistical procedures were kept simple by looking at the dependent variables of student self-confidence and anxiety at two separate observations. Since a larger sample size was not available, factor analysis by the original author was important and a valuable tool. The reliability of the NASC-CDM was determined to be strong and therefore could positively impact the results even with a small sample size.

### **Exploration of Raw Total Scores for Each Subscale**

One of the main objectives of this study was to evaluate and compare self-reported confidence and anxiety levels of graduate nurse-midwifery students—pre- and post-OSCE. The first grouping to be explored was both the MN and DNP students and their raw scores for pretest and posttest self-confidence and pretest and posttest anxiety on the four OSCEs performed. There were 22 pretest variables and 21 posttest variables to analyze. The descriptive statistics for the pretest self-confidence subscale of this analysis are provided in Table 2.

**Table 2***Total Descriptive Raw Scores for All Objective Structured Clinical Examinations*

| Variable                    | <i>M</i> | Median | Mode   | <i>SD</i> | Paired <i>t</i> -test<br>2-tailed<br>significance |
|-----------------------------|----------|--------|--------|-----------|---|
| Self-Confidence<br>Pretest  | 113.73   | 111.00 | 106.00 | 12.97     |   |
| Self-Confidence<br>Posttest | 123.67   | 118.00 | 112.00 | 13.99     | $t = -4.99$<br>$p \leq .000$                      |
| Anxiety Pretest             | 63.80    | 61.00  | 69.00  | 12.91     |   |
| Anxiety Posttest            | 58.26    | 56.00  | 45.00  | 10.81     | $t = 3.84$<br>$p \leq .001$                       |

*Note.*  $n = 24$  (pretest),  $n = 23$  (posttest).

### **Three Dimensionality of the Nursing Anxiety and Self-Confidence with Clinical Decision Making Scale**

The second grouping to explore in this analysis was the comparison of means for each of the three dimensions of clinical decision-making from the NASC-CDM questionnaire. Based on an exploratory analysis (alpha factoring with promax rotation) of results from two samples of nursing students, a stable three-factor solution was revealed by the author of the NASC-CDM (White, 2014). Dimension one used resources to gather information and listening fully and corresponded to item numbers 8-12, 16, 18, 19, and 22-26. Dimension two used information to see the big picture and corresponded to item numbers 1-4, 6, 7, and 13. Dimension three was knowing and acting and corresponded to items 5, 14, 15, 17, 20, 21, and 27 (White, 2014). Table 3 provides the three dimensions of clinical decision-making from the NASC-CDM questionnaire.



**Table 3**

*Three Factor Dimensionality of Clinical Decision-Making from the Nursing Anxiety and Self-Confidence with Clinical Decision Making Scale*

|   | Self-<br>Confidence<br>Pretest ( <i>M</i> ) | Self-<br>Confidence<br>Posttest ( <i>M</i> ) | Anxiety<br>Pretest ( <i>M</i> ) | Anxiety<br>Posttest ( <i>M</i> ) | Significance <i>p</i><br>value                                |
|---|---|--|---------------------------------|----------------------------------|---|
| Dimension 1: Using<br>resources to gather<br>information and<br>listening fully | 59.05                                       | 63.79  | 25.25                           | 22.68                            | Self-confidence<br><i>p</i> = .000<br>Anxiety <i>p</i> = .023 |
| Dimension 2:<br>Using information<br>to see the big<br>picture                  | 27.00                                       | 29.16  | 19.10                           | 17.00                            | Self-confidence<br><i>p</i> = .008<br>Anxiety <i>p</i> = .005 |
| Dimension 3:<br>Knowing and acting  | 25.90                                       | 28.74  | 19.10                           | 16.95                            | Self-confidence<br><i>p</i> = .000<br>Anxiety <i>p</i> = .000 |

*Note.* *N* = 10

### **Postpartum Hemorrhage Objective Structured Clinical Examination for Master of Science in Nursing and Doctor of Nursing Practice Students**

The third grouping to explore was the DNP and MN students (*N* = 10) and the comparison of the means based on their raw scores on the NASC-CDM for self-confidence and anxiety with the postpartum hemorrhage OSCE. The postpartum hemorrhage OSCE was the only OSCE both subgroups (DNP and MN students) participated in to make a comparison. The postpartum hemorrhage OSCE was conducted face-to-face and was considered a “high-stakes” OSCE. Table 4 provides a detailed description of the self-confidence and anxiety scores from the postpartum hemorrhage OSCE.

**Table 4***Postpartum Hemorrhage Objective Structured Clinical Examination Scores*

| Variable                    | <i>M</i> | Median | Mode   | <i>SD</i> | Paired <i>t</i> -test<br>2-tailed<br>significance |
|-----------------------------|----------|--------|--------|-----------|---|
| Self-confidence<br>Pretest  | 108.90   | 108.00 | 106.00 | 11.11     |   |
| Self-Confidence<br>Posttest | 117.80   | 114.50 | 105.00 | 11.60     | $t=-2.874$<br>$p=.018$                            |
| Anxiety Pretest             | 70.10    | 67.50  | 66.00  | 14.50     |   |
| Anxiety Posttest            | 61.10    | 58.00  | 45.00  | 13.53     | $t=4.658$<br>$p=.000$                             |

**Relationship of Self-Confidence and  
Anxiety to Master of Science in  
Nursing and Doctor of Nursing  
Practice Students**

Data from the postpartum hemorrhage OSCE were used to explore if the distribution of self-confidence and anxiety was the same across categories of MN students ( $n = 6$ ) and DNP students ( $n = 4$ ). The first null hypotheses stated the distribution of self-confidence pretest and posttest is the same across categories of MN/DNP students. The independent-samples Mann-Whitney U test had a significance of  $p \leq .067$  with a mean rank of 7.00 for the pretest and .610 with a mean rank of 3.25 for the posttest scoring for the self-confidence subscale. The second hypotheses stated the distribution of anxiety pretest and posttest is the same across categories of MN/DNP students. The independent-samples Mann-Whitney U test had a significance of  $p \leq .476$  with a mean rank of 6.17 for the pretest and  $p \leq .352$  with a mean rank of 4.50 for the post-test scoring for the anxiety subscale.

### **Relationship of Self-Confidence and Anxiety to Face-to-Face Versus Online Formats**

Both groups of students (DNP and MN;  $n = 15$ ) participated in face-to-face OSCEs: (a) postpartum hemorrhage and (b) comprehensive OSCE (unfolding case on labor and birth management). In addition, the MN student groups ( $n = 4$ ) participated in the online OSCE: newborn assessment and lactation support. The face-to-face OSCEs might be perceived by students as “high-stakes.” Students could find the high-stakes OSCE stressful (Fidment, 2012; Hilliard, 2018; Stunden et al., 2015). High stress might hinder a student’s ability to effectively demonstrate their clinical abilities, thereby negatively impacting performance and learning (Fidment, 2012; Massey et al., 2017; Muldoon et al., 2014). Students need to learn how to manage the emotional and psychological effects of high-stakes assessment in a constructive way in order to develop the confidence required for clinical practice (Hilliard, 2018; Stunden et al., 2015).

The null hypotheses tested whether the distribution of self-confidence pretest was the same across categories (face-to-face vs. online) and the distribution of self-confidence post-test was the same across categories (face-to-face vs. online). In addition, the null hypotheses tested whether the distribution of anxiety pretest was the same across categories (face-to-face vs. online) and the distribution of anxiety posttest was the same across categories (face-to-face vs. online). In this study, the mean rank of self-confidence pretest in the face-to-face OSCEs was 9.53. The mean rank of self-confidence pretest in the online OSCEs was 11.75. The mean rank of self-confidence posttest in the face-to-face OSCEs was 9.50. The mean rank of self-confidence posttest in the online OSCEs was 11.88. The Mann-Whitney  $U$ -test was significant with a  $p < .05$ , the result of this study for self-confidence pretest was  $p \leq .530$ , and the self-confidence

posttest was  $p \leq .469$ . The summary for both face-to-face and online pretest and posttest self-confidence was to retain the null hypothesis.

The face-to-face anxiety pretest mean rank was 10.63 and the online anxiety pretest mean rank was 7.63. The face-to-face anxiety posttest mean rank was 10.50 and the online anxiety posttest mean rank was 8.13. The Mann-Whitney *U*-test was significant with a  $p < .05$ , the result of the test in this study for anxiety pretest was  $p \leq .357$ , and the result for the test for anxiety posttest was  $p \leq .469$ . The summary for both face-to-face and online pretest and posttest anxiety was to retain the null hypothesis.

### **Differences in Self-Confidence and Anxiety Over Time**

This exploratory study tested the differences in self-confidence and anxiety scores of students over time. The analysis of variance (ANOVA) provided statistics on the means of three OSCE self-confidence and anxiety scores to demonstrate potential differences from one another. The MN group of students participated in the postpartum hemorrhage OSCE on February 29, 2021, the Newborn assessment OSCE on March 12, 2021, and the COSCE on April 2, 2021. The following research question was explored: Is there a difference in self-confidence and anxiety scores over time? Or, in other words, did the self-confidence scores increase with the number of OSCEs completed and did the anxiety scores decrease with the number of OSCEs? For this statistical test, posttest self-confidence and anxiety scores were used for review.

The null hypothesis stated that none of the groups would differ on the mean self-confidence or anxiety scores from the NASC-CDM over time. The alternative hypothesis stated that at least one the groups would have a different mean on the self-confidence and anxiety scores from the NASC-CDM over time. The one-way ANOVA completed on self-confidence found the following means for the three OSCEs: postpartum hemorrhage = 119.16 with a

standard deviation of 11.53, newborn assessment = 128.00 with a standard deviation of 18.54, and the comprehensive OSCE = 127.00 with a standard deviation of 14.35. The Levene statistic based on mean was 1.975,  $df1 = 2$ ,  $df2 = 12$  with a significance of  $p \leq .181$ . The ANOVA had an  $f$ -statistic of .652 with a significance of  $p \leq .539$ . The Bonferroni *post hoc* did not find significant differences among any of the three OSCEs. The Kruskal-Wallis test was also conducted due to small sample size to test for any differences among the three groups. The test statistic was .790 with a degree of freedom = 2 and an asymptotic significant (2-sided test) was  $p \leq .674$ .

The one-way ANOVA completed on anxiety found the following means for the three OSCEs: postpartum hemorrhage = 65.50 with a standard deviation of 15.63, newborn assessment = 53.75 with a standard deviation of 6.75, and the comprehensive OSCE = 52.20 with a standard deviation of 9.23. The Levene statistic based on mean was 4.17,  $df1 = 2$ ,  $df2 = 12$  with a significance of  $p \leq .042$ . The ANOVA had an  $f$ -statistic of 2.041 with a  $p$ -value of .173. The Bonferroni *post hoc* did not find significant differences among any of the three OSCEs. The Kruskal-Wallis test was also conducted due to small sample size to test for any differences among the three groups. The test statistic was 1.878 with a degree of freedom = 2 and an asymptotic significant (2-sided test) was  $p \leq .391$ .

## CHAPTER V

### SUMMARY AND DISCUSSION

This study was conducted to explore the relationships between student self-confidence and anxiety during objective structured clinical examinations (OSCEs). Assessment of nurse-midwifery students' practical skills and clinical competence often occurs in simulations using OSCEs. Objective structured clinical examinations are a form of simulation with the aim to provide objectivity and standardization to the structure and control of a clinical examination so the learner's clinical knowledge can be tested and appropriate feedback provided. The 10 participants in this study were second-year graduate nurse-midwifery students in both the Doctor of Nursing Practice (DNP) and master's in nursing (MN) programs of study. Measures included the Nursing Anxiety and Self-Confidence with Clinical Decision-Making Scale (NASC-CDM) (see Appendix B). This 27-item questionnaire was completed by students pre and post OSCE. This final chapter of the dissertation describes the research problem and reviews the methodology used in this exploratory and foundational study. The major sections of this chapter summarize the results, discuss their implications, and provide recommendations for educators and suggestions for future research.

#### **Statement of the Problem**

The problem this study sought to address was an understanding of nurse-midwifery student anxiety and self-confidence issues and how they could affect learners in OSCE performance and future practice. Nursing educators are interested in OSCE as a type of simulation assessment because it can influence both self-confidence and competent behavioral

performance (Franklin et al., 2014). The *Essentials of Master's Education in Nursing* from the American Association of Colleges of Nursing (AACN, 2011) included objectives addressing student preparation for critical thinking and decision-making. The OSCE is a valid and reliable method of assessing clinical competence and decision-making objectively in a variety of settings (Goh et al., 2016, 2018; Kolivand et al., 2020; Kurz et al., 2009). During OSCEs, learners are expected to make clinical decisions so lack of self-confidence and anxiety could affect the learning and adeptness of clinical decision-making (White, 2014). Consequently, these challenges require nurse-educators to develop creative educational strategies to promote development of sound student clinical practice and clinical decision-making. One strategy is the use of OSCEs (Cobbett & Snelgrove-Clarke, 2016; Stunden et al., 2015; Taala et al., 2019).

### **Review of the Methodology**

A non-experimental, exploratory study approach was used to conduct this investigation. Such an approach was appropriate for the purpose of describing the relationship between nurse-midwifery student self-confidence and anxiety using OSCEs as a clinical competency assessment strategy. This exploratory research study was designed to assess validity and reliability of the NASC-CDM (White, 2014) questionnaire and explore student self-confidence and anxiety with OSCEs in the development of clinical decision-making.

Students were invited to participate in the study following IRB approvals from the University of Northern Colorado and the Oregon Health and Sciences University (see Appendix G). Participation was voluntary. Participants were invited to participate using a scripted invitation and information form (see Appendix H) that included an overview of the study (description, purpose, and procedure), participant time commitment and expectation, and risks/benefits. The NASC-CDM (White, 2014) questionnaire allowed learners to document how

the OSCE experience impacted their clinical decision-making. While all students were thanked for their time, only the students who completed the pretest were considered study participants.

The reliability coefficient, Cronbach's  $\alpha$ , was used in this study to test for reliability of the NASC-CDM when used by a new population, i.e., graduate nurse-midwifery students. The 6-point Likert responses to the self-confidence subscale were 1 = *Not at all*, 2 = *Just a little*, 3 = *Somewhat*, 4 = *Mostly*, 5 = *Almost Totally*, and 6 = *Totally*. Higher scores on the self-confidence subscale indicates higher levels of self-confidence. The 6-point Likert responses for the anxiety subscale were 1 = *Not at all*, 2 = *Just a little*, 3 = *Somewhat*, 4 = *Mostly*, 5 = *Almost Totally*, and 6 = *Totally*. Higher scores on the anxiety subscale indicated higher levels of anxiety.

The primary goals of the analysis were to identify trends and associations among the variables through intra- and inter-subject comparisons. For this exploratory study, repeated measurements were obtained at the beginning and at the end of each OSCE. Choice of the parametric or nonparametric statistical test employed was based on the level of measurement (i.e., nominal, ordinal, interval, or ratio), the number of participants for each data element, and the normality of the distribution of the data. Post hoc analyses were computed using two-tailed dependent-*t*-tests or two-tailed Wilcoxon signed rank tests with a Bonferroni's correction to maintain a family-wise significance level of  $\alpha = .05$ .

This exploratory research was descriptive and correlational in design. This research design attempted to address additional hypotheses as the data were collected. The correlational design attempted to determine relationships between two or more variables using statistical data. Relationships between and among were sought and interpreted. This exploratory correlational research recognized trends and patterns in the data.



### Summary of the Results

The results of this exploratory study were concentrated in the following areas. Was the NASC-CDM (White, 2014) questionnaire considered valid and reliable in this new population: graduate nurse-midwifery students? The next two areas explored were taken from the NASC-CDM. Was there a difference in raw scores of student self-confidence and anxiety before and after the OSCE assessment? Was there a difference in each of the three dimensions of clinical decision-making before and after an OSCE assessment? The final four areas of exploration came from the exploratory design of this study. Was there a difference in student self-confidence and anxiety before and after a high-stakes OSCE (postpartum hemorrhage OSCE)? Was there a difference in the before and after self-confidence and anxiety scores between the DNP students and the MN students? Was there a difference in the before and after self-confidence and anxiety scores in face-to-face OSCEs vs. online OSCEs? Finally, was there a difference in student self-confidence and anxiety scores over time?

Cronbach's alpha found the reliability of the NASC-CDM (White, 2014) in this study population at  $\alpha = 0.94$  for self-confidence and  $\alpha = 0.94$  for anxiety. In using paired *t*-testing, there was a statistically significant difference in the pre and post OSCE scores for self-confidence at  $p \leq .000$  and anxiety at  $p \leq .001$ . The three dimensions of clinical decision making were all statistically significant: dimension one at  $p \leq .000$  for self-confidence and  $p \leq .023$  for anxiety, dimension two at  $p \leq .008$  for self-confidence and  $p \leq .005$  for anxiety, and dimension three at  $p \leq .000$  for self-confidence and anxiety.

The postpartum hemorrhage OSCE was used to assess pretest and posttest scores on self-confidence and anxiety for both the MN and DNP groups. The comparison for the postpartum hemorrhage OSCE was found to be statistically significant for self-confidence by paired *t* test = -

2.874 and 2-tailed significance of  $p \leq .018$ . Due to the small sample size, a Wilcoxon signed rank test was analyzed as well with a significance of  $p \leq .021$ . The anxiety subscale was also found to be statistically significant by the paired  $t$  test = 4.658 and 2-tailed significance of  $p \leq .001$ . Due to small sample size, a Wilcoxon signed rank test was analyzed and found a significance of  $p \leq .008$ . No statistical significance was found in the comparisons of program of study, online vs. face-to-face OSCEs, or differences in self-confidence or anxiety over time.

### **Discussion and Interpretation of the Results**

The purpose of this study was to determine if student self-confidence and anxiety scores changed from the pretest questionnaire to the posttest questionnaire after an OSCE assessment. Another area of exploration was to determine the usefulness of the questionnaire in a graduate nurse-midwifery population. The OSCE has been determined to be an effective method to assess student clinical knowledge and performance. The emotional barriers of low self-confidence and high anxiety are tightly intertwined and have been shown to affect the decision-making process (White, 2014). While students have found OSCEs to be stressful, the overall findings of this study demonstrated an increase in student self-confidence and a decrease in anxiety following OSCE assessments. It is hoped that through participation in OSCE assessments, students will be able to transfer the increased self-confidence and decreased anxiety into their clinical practicums and future practice as nurse-midwives.

In the assessment of a high stakes OSCE (the postpartum hemorrhage), students still demonstrated higher self-confidence and reduced anxiety after completion of the OSCE. Therefore, it might be possible to conduct more rigorous and high stakes OSCEs and have outcomes of increased self-confidence and decreased anxiety. In addition, face-to-face OSCEs and on-line OSCEs were not found to be significantly different in the pretest and posttest of both

self-confidence and anxiety. Therefore, nurse-midwifery educators could continue to explore the development and further assessment of on-line OSCEs without significant concerns for a difference in student perceptions of confidence and anxiety. Perhaps on-line OSCEs could have a positive and informative effect.

Oregon Health & Sciences University (OHSU) has been educating nurse-midwifery graduate students since the 1980s. More than a decade ago, OHSU began to offer students the option of a third year beyond the two-year MN program to complete a DNP. In 2019, the last class of MN students was admitted to the program as now only students seeking a DNP are admitted. In this exploratory study, all the MN participants did not have previous RN experience and were admitted directly from an accelerated bachelor's degree in nursing program. The four DNP students came into the nurse-midwifery program with a Bachelor of Science in Nursing and the majority had previous experience in maternity care. In this exploratory study, there were no differences in program of study on self-confidence or anxiety; this could indicate that by the final terms of education, the students direct from an accelerated bachelor degree program had similar confidence and anxiety levels of students with previous RN experience during OSCE assessments.

Limitations are common in any empirical study and were noted in this exploratory study. Nurse-midwifery students were all from the same graduate school. The NASC-CDM (White 2014) questionnaire is proprietary and the only changes approved were for demographic questions. As the content experts addressed, while valid for use in the graduate nurse-midwifery population, some questions could have been more appropriately re-worded with nurse-midwifery student clinical decision-making. Use of convenience sampling with a paucity of participants created selection bias and limited the generalizability of the findings.

### **Relationship of the Current Study to Previous Research**

A comprehensive literature review was completed through several searches over time during the preparation of this exploratory study and the previous pilot test in 2018. The review found published studies that measured self-confidence and OSCEs or anxiety and OSCEs but not both. Being aware of the gap comparing both self-confidence and anxiety, this exploratory study sought to evaluate in tandem anxiety and self-confidence. In addition, the literature on OSCE use in midwifery and nursing education provided information on the differences of OSCE procedures compared to the medical model.

Three studies found nursing and midwifery students felt more confident and ready for clinical practicums after OSCE assessments (Barry et al., 2012; Jay, 2007; Omu, 2016). Participants in the Irish study (Barry et al., 2012) reported deeper and more meaningful learning (by engaging fully in the OSCE task in order to understand the meaning of their actions) was achieved through preparation for and completing the OSCE. High levels of stress and anxiety were also associated with the assessment. Participants in the Irish study identified the value of preparing with colleagues for the OSCE as a positive learning tool (Barry et al., 2012). Nursing educators are interested in OSCEs as a method of simulation because it can influence both self-confidence and competent behavioral performance (Franklin et al., 2014; Omu, 2016). McClimens et al. (2012) found increased levels of confidence following OSCE assessment; however, the midwifery students' self-assessment of their confidence and competence as measured by OSCE scores was not found to be statistically significant. Ytterberg et al. (1998) studied the association between medical student self-confidence and clinical skills during an OSCE at the University of Minnesota-Minneapolis. There were statistically significant increases in students' level of confidence in their clinical skills by matched pairs *t*-tests ( $p < .001$ ). Unlike

the McClimens et al. (2012) study, there was a statistically significant positive correlation (Pearson's correlation coefficient) between confidence level and students' OSCE performance scores (Ytterberg et al., 1998).

Research has shown that students identify their clinical learning environment as one of the most anxiety-provoking components of their education. Students who were clinically evaluated by OSCEs reported significant anxiety in multiple studies (Cazzell & Rodriguez, 2011; Fidment, 2012; Hilliard, 2018; Jay, 2007; Moscaritolo, 2009; Stunden et al., 2015). Although anxiety could act as a motivator to enhance performance, high levels could be debilitating and jeopardize student success (Moscaritolo, 2009). A Canadian study (Cobbett & Snelgrove-Clarke, 2016) reviewed the effectiveness of a maternal newborn clinical simulation. Use of the NASC-CDM (White, 2014) showed higher anxiety levels in students completing the virtual clinical simulations. The authors' recommendation was to implement anxiety reducing strategies prior to any clinical simulation experience (Cobbett & Snelgrove-Clarke, 2016).

Participants in this exploratory study demonstrated increased self-confidence and decreased anxiety following multiple OSCEs and supported the findings from the self-confidence and anxiety studies. In contrast to the Canadian study (Cobbett & Snelgrove-Clarke, 2016), this exploratory study found student anxiety decreased after the completion of the OSCEs. The participants all had passing scores on the OSCE, which would suggest a correlation of self-confidence and OSCE performance. Similar to the Ndiwane et al. (2017) study, this exploratory study found the OSCEs were used as a measurement of clinical competence, which could help educators identify clinical strengths and weaknesses. In addition, educators were able to assess interpersonal clinical behaviors such as interviewing, assessment skills, problem solving, patient teaching, and clinical knowledge.

## **Theoretical Implications**

In educational philosophy, constructivism is a theory about how people learn with two important concepts: (a) people construct or build new knowledge on what they already know and (b) people actively construct meaning through experiencing things and reflecting on those experiences (Mattar, 2018). In this exploratory study, students demonstrated learned clinical skills and decision-making during OSCE assessments. In addition, the debrief section of the OSCE promoted student reflection of their learned experience.

Kirkpatrick's level of evaluation (as cited in Johnston et al., 2018) supports the pedagogical intent of transferring learning from the OSCE to future practice. The OSCE blends academic learning and authentic real-world connections through simulations of real-life scenarios by emphasizing the relevance for real-world learners (Johnston et al., 2018). In this study, evaluation of the educational impact of OSCEs provided valuable feedback that could assist with the development and improvement of teaching methods.

Reflective practice in nurse-midwifery is considered an essential aspect of personal and professional development with critical reflection a cornerstone of being an accountable and autonomous practitioner (Bass et al., 2017). Transformative learning includes teaching approaches that encourage reflection, critique, and the development of self-awareness (Weimer, 2013). The final step in the OSCE format is the debrief—a form of clinical teaching using reflection-in-action, reflection-on-action, and reflection-beyond-action to teach clinical reasoning, thinking, and integration of theory and practice (Dreifuerst, 2015). In this study, debriefing occurred with students during a period of increased confidence and decreased anxiety, allowing a more critical process for deep learning where the OSCE simulation experience was reexamined with the aim of assimilation and accommodation of learning (Johnston et al., 2018).

Bandura's (1998) social cognitive theory and Tanner's (2006) model of clinical judgement worked together to form a theoretical framework linking self-confidence and anxiety in clinical decision-making. Self-confidence could assist with the control needed over anxiety for learners to realize and curb their level of emotional arousal to engage fully in the clinical decision-making process (White, 2014). In this study, increased confidence and decreased anxiety during the OSCE process provided guidance to the learner during clinical judgement skills essential for practice (Coram, 2016).

The middle range theory of unpleasant symptoms (TOUS) could provide a structured, comprehensive way to understand a symptom like anxiety (Blakeman, 2019). In this study, the influencing factor of OSCEs could cause the psychologic factor of anxiety that influenced the occurrence, intensity, timing, distress level, and the significance of the anxiety symptom (Blakeman, 2019). The symptom of anxiety could have an impact on an individual's ability to perform in the influencing factor (OSCE). This study was interested in determining the degree to which OSCEs could impact the symptom severity of anxiety and found student anxiety was decreased upon completion of the OSCE process.

### **Unanticipated Findings**

Since there was a statistically significant finding of increased self-confidence and decreased anxiety for all OSCEs, there was an expectation that a statistically significant increase in self-confidence and decrease in anxiety would be expressed over time. It is possible the limited time of three months to assess overall changes in self-confidence and anxiety was too short to display a difference.

The face-to-face OSCEs used in this exploratory study could be considered as "high stakes." The postpartum hemorrhage OSCE and the comprehensive OSCE (COSCE) were

designed to assess a student's clinical decision-making in an emergency situation. The COSCE is a required benchmark for students prior to entering the final clinical practicum—Integration. However, it was unanticipated that both the postpartum OSCE and the COSCE did not demonstrate statistical significance in pre and post OSCE self-confidence and anxiety scores.

In further reflection on the unexpected finding that the high stakes OSCEs did not have a statistically significant difference in anxiety pre and post OSCE, an alternative data analysis could have been conducted. Comparing the pretest anxiety scores in the face-to-face OSCEs versus the pretest anxiety scores for the on-line OSCE could have provided a clearer understanding of anxiety levels of students prior to a high-stakes OSCE. Capturing an accurate level of anxiety before a high-stakes OSCE provides support for educators in development and implementation of anxiety reducing pre-OSCE interventions.

### **Recommendations for Educators and Suggestions for Additional Research**

Future studies with a broader selection of nurse-midwifery students and a larger sample size recruited throughout the United States might have improved the generalizability of the findings. The increased level of reported self-confidence and decreased anxiety following the OSCE intervention could be translated into improved competence in the clinical settings but further research is needed to understand the mechanisms by which this occurs. Large studies with mixed methodology should shed more light on this important area of nurse-midwifery education and assessment research. There were major gaps regarding the psychometric properties of OSCEs used in nursing and midwifery education. More research is needed to inform educational practice on the psychometric properties of the OSCE tool, especially when correlated to other evaluative methods in current use. Future practice in nurse-midwifery will require a



calm mind during emergency management; the confidence needed to abate the negative impact of anxiety might be developed through the use of OSCEs in clinical education and assessment.

### **Conclusion**

Despite its limitations, this study raised important considerations for nurse-midwifery educators engaged in clinical assessment of students using OSCEs. The OSCE has been appraised to be objective in assessing clinical competence and decision-making as it allows students to demonstrate their competence in what they know and at the “show how” level. The findings in this study were congruent with previous research on OSCEs in the nursing and midwifery literature, supported the depth of learning, and increased self-confidence and decreased anxiety with the use of OSCE. Self-confidence is an affective influence to consider when teaching and evaluating the processes of clinical decision-making (White, 2014).

Nurse-midwifery students need to be prepared for the real-world responsibilities of clinical practice. Development of effective clinical skills is necessary to ensure safe clinical practice (Massey et al., 2017). Nurse-midwifery practice encompasses a full range of autonomous primary healthcare services for persons from adolescence beyond menopause and newborns until 28 days of life. Overall, the emphasis placed on educators in the medical field to ensure patient safety and quality necessitates that high-quality, reliable, valid, and educationally sound assessment tools be used for evaluation of clinical competence and clinical decision making. The AACN’s (2011) *Essentials of Master’s Education in Nursing* has recently been updated and this exploratory study might help lay the groundwork to support the new essentials. Evidence of OSCE application, particularly in relation to student self-confidence and anxiety, in midwifery education and practice has the potential to make an effective and meaningful contribution.

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**APPENDIX A****PERMISSION TO USE NURSING ANXIETY AND  
SELF-CONFIDENCE WITH CLINICAL  
DECISION MAKING SCALE**



GEORGETOWN UNIVERSITY  
School of Nursing & Health Studies

September 21, 2018

Dear Ms. Duran-Snell,

Thank you for your interest in the *Nursing Anxiety and Self-Confidence with Clinical Decision Making* (NASC-CDM®) scale. This letter is written to acknowledge your request to utilize the NASC-CDM® scale in your study to examine graduate nurse-midwifery students' levels of self-confidence and anxiety with CDM around the use of Objective Structured Clinical Examinations (OSCEs). You are granted permission to use the scale and modify the demographic questions to best accommodate the intent of your study. All items of the scale will remain as they read.

As the scale is copyrighted, be sure to use the © symbol when citing the scale initials. Include the following notice at the end of the scale (either electronic or hard copy version). Or you may place the notice as the footer of the hard copy document.

*Copyright © 2011, Krista Elaine White. All rights reserved.*

Violation of the copyright notice or any use of the scale other than the one outlined in this letter will result in revocation of this permission. Your receipt of this permission letter is acknowledgement of acceptance of these terms.

One condition does exist in relation to the permission to use the NASC-CDM® scale. The scale may not be printed in its entirety in any documents related to your study or in any subsequent publications which may commence upon the completion of this research study.

Please use the following notation when writing a sample of items in a publication:  
**Used with permission, Krista A. White PhD, RN, CCRN-K, CNE.**

Best wishes with your upcoming research.

Sincerely,

*Dr. Krista A. White RN*

Krista A. White, Ph.D., R.N., CCRN-K, CNE  
Instrument developer  
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**APPENDIX B****ADAPTED NURSING ANXIETY AND SELF-CONFIDENCE  
WITH CLINICAL DECISION MAKING SCALE  
FOR USE IN THIS STUDY**

*ADAPTED NASC-CDM<sup>®</sup> SCALE FOR USE IN STUDY*

Nursing Anxiety and Self-Confidence with Clinical Decision Making Scale (NASC-CDM)<sup>®</sup>

**Purpose of the Scale:** The purpose of this self-reported quantitative instrument is to measure participants' perceptions of their levels of self-confidence and anxiety during the process of clinical decision making (CDM).

**Response Options:** The NASC-CDM<sup>®</sup> scale is a forced choice 6-point Likert type scale. The response options are:

*1 = Not at all; 2 = Just a little; 3 = Somewhat; 4 = Mostly; 5 = Almost totally; 6 = Totally.*

**Directions:** Reflect thoughtfully upon each item and answer it as accurately as possible. There is no right or wrong answer to questions in the survey. Read each of the 27 statements and choose the option which reflects how you usually feel. Answer both the self-confidence and the anxiety portion for each item.

**Time Frame:** The scale takes about 10-15 minutes to complete.

## DEMOGRAPHIC QUESTIONS

## 1. Gender

☐ Female☐ Male☐ TransMale☐ TransFemale☐ Gender nonconforming☐ Something else☐ Decline to answer

## 2. Age

☐ 20-25☐ 26-30☐ 31-35☐ 36-40☐ 41-45☐ 46-50☐ >50

## 3. Ethnicity

☐ African American☐ American Indian☐ Asian☐ Caucasian☐ East Indian

\_\_\_\_\_Hispanic

\_\_\_\_\_Other

4. How much college experience did you have before beginning your graduate nurse-midwifery program?

\_\_\_\_\_Bachelor's degree

\_\_\_\_\_Master's degree

\_\_\_\_\_Multiple degrees

5. How many OSCEs have you participated in prior to today?

\_\_\_\_\_1

\_\_\_\_\_2

\_\_\_\_\_3

\_\_\_\_\_4

\_\_\_\_\_5

\_\_\_\_\_>5

## THE NASC-CDM® SCALE ITEMS

1. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to easily see important patterns in the information I gathered from the client.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

2. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to identify which pieces of clinical information I gathered are related to the client's current problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

3. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to see the full clinical picture of the client's problem rather than focusing in on one part of it.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

4. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to recall knowledge I learned in the past that relates to the client's current problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

5. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to implement the "best" priority decision option for the client's problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

6. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to interpret the meaning of a specific assessment finding related to the client's problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

7. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to evaluate if my clinical decision improved the client's laboratory findings.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

8. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to recognize the need to talk with my clinical nursing instructor to help sort-out client assessment findings.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

9. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to use active listening skills when gathering information about the client's current problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

10. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to assess the client's nonverbal cues.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

11. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to recognize the need to review a protocol, procedure, or nursing literature to help me make a clinical decision.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

12. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to decide if information given by significant other/family is important to the client's current problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

13. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to use my knowledge of anatomy and physiology to interpret information I gathered about the client's current problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

14. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to act on at least one intervention I considered based on my gut-feeling or intuition.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*



15. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to analyze the risks of the interventions I am considering for the client's current problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

16. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to recognize important information about a client problem from information I received during shift-change report.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

17. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to INDEPENDENTLY make a clinical decision to solve the client's problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

18. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to ask the client additional questions to get more specific information about the current problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

19. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to correlate physical assessment findings with the client's nonverbal cues to see if they match or don't match.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

20. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to implement one accurate intervention if the client is having an urgent problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

21. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to use my knowledge of diagnostic tests, like lab results or x-ray findings, to help create a possible list of decisions I could implement.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

22. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to realize the need to talk with my clinical nursing instructor or the staff nurse about interventions I am considering.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

23. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to remain open to different reasons for the client's problem even though the information I gathered may point to only one reason.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

24. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to ask the client's significant other/family questions to gather information about the current problem.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

25. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to evaluate if the clinical decisions I made influenced client satisfaction.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

26. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to incorporate personal things I know about the client in order to make decisions in his or her best interest.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

27. I am \_\_\_\_\_self-confident and \_\_\_\_\_anxious in my ability to consider a possible intervention for the client's problem just because it "seems" right.

**SC:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

**A:** 1 = *Not at all*; 2 = *Just a little*; 3 = *Somewhat*; 4 = *Mostly*; 5 = *Almost totally*; 6 = *Totally*

## **APPENDIX C**

### **SUMMARY OF KEY STUDIES OF OBJECTIVE STRUCTURED CLINICAL EXAMINATIONS AND MIDWIFERY EDUCATION**

| Article Citation  | Research Type                       | Study Purpose   | Setting   | Sample Size  | Summary of Findings   |
|---|-------------------------------------|---|---|--|---|
| Barry et al. (2012). An exploration of student midwives' experiences of the objective structured clinical examination assessment process. <i>Nurse Education Today</i> , 32(6), 690-694.<br><a href="https://doi.org/10.1016/j.nedt.2011.09.007">https://doi.org/10.1016/j.nedt.2011.09.007</a> | Qualitative descriptive approach    | To explore student midwives' experiences of using modified objective structured clinical examinations (OSCE) as part of the assessment process for obstetric emergencies  | University in Ireland. Four focus groups.   | Purposive sampling of students undertaking OSCE assessment of obstetric emergencies were invited to participate (n=36). Four focus groups completed the study (n=26).                  | Three themes were identified. Preparation for OSCEs, The OSCE process, and Learning through simulated practice. Overall, students felt more confident and prepared for clinical practice after completing their OSCE assessment. Participants in this study reported that a deeper more meaningful learning was achieved through preparation for and completing the OSCE. High levels of stress and anxiety were associated with the assessment. Participants identified the value of preparing with colleagues for the OSCE as a positive learning tool. |
| Delavar et al. (2013). Using the objective structured clinical examinations in undergraduate midwifery students. <i>Journal of Medicine and Life</i> , 6(1), 76-79.   | Cross-sectional Quantitative Design | The purpose of this study was to assess the use of the OSCE as a tool to evaluated the abilities of undergraduate midwifery students and to compare the perspectives of the students regarding the OSCE and traditional examinations. | Two groups of midwifery students from the Faculty of Midwifery of Babol University of Medical Sciences in Iran. | 52 midwifery students at the University of Babol in Iran. 20 students were evaluated using the traditional method of examination and 32 students were evaluated using the OSCE method. | In the OSCE group, the students indicated the OSCE was stressful ( $p=0.0001$ ). The students indicated OSCEs as credible ( $p=0.0001$ ), consistent and reliable ( $p=0.001$ ), and enhances the teaching previous learned ( $p=0.008$ ).  |

| Article Citation  | Research Type                                   | Study Purpose  | Setting   | Sample Size  | Summary of Findings  |
|---|---|--|---|--|--|
| Jay, A. (2007). Student's perceptions of the OSCE: A valid assessment tool? <i>British Journal of Midwifery</i> , 15(1), 32-37. <a href="https://doi.org/10.12968/bjom.2007.15.1.22677">https://doi.org/10.12968/bjom.2007.15.1.22677</a>   | Qualitative                                     | The purpose of this study was to explore student midwives' perceptions of OSCE. Semi-structured interviews of 12 mostly open questions about their feelings before, during, and after the OSCE.  | University of Hertfordshire in the United Kingdom.  | 10 volunteers from a potential sample of 23 final year midwifery students.   | A summary of the perceived learning benefits include: OSCE motivates students to learn the actual psychomotor skill rather than just "knowing how" to perform it; OSCE promotes deep learning; OSCE promotes shared learning and cooperation; and preparing for OSCE increases confidence in carrying out the skills in question.  |
| Malakooti et al.. (2018). Assessment of the midwifery students' clinical competency before internship program in the field based on the objective structured clinical examination. <i>Iranian Journal of Midwifery Research</i> , 23(1), 31-35. <a href="https://doi.org/10.4103/ijnmr.ijnmr_181_16">https://doi.org/10.4103/ijnmr.ijnmr_181_16</a> | Descriptive cross-sectional Quantitative design | The purpose of this study was to indicate the students' abilities in cases such as pelvic examination, probing, Leopold examination, fetal resuscitation, fetal ECG interpretation, physical exam, and breast exam before internship in the field through use of OSCE. | OSCEs were conducted at a skills laboratory with all eight stations completed in one day. | Convenience sampling of 27 third year midwifery students enrolled at the Isfahan University of Medical Sciences in Iran. | Researcher developed OSCE checklists were used with content and face validity and reliability confirmed by Cronbach's alpha coefficient of 0.97. Scores higher than 50% were considered desirable and acceptable. Pelvic examination (57.96, SD=17.63), bladder catheterization (76.96, SD=19.19), and Leopold's examination (53.40, SD=10.40 all met the 50% threshold. The remaining five examinations did not meet the threshold. |

| Article Citation  | Research Type        | Study Purpose  | Setting  | Sample Size  | Summary of Findings  |
|---|----------------------|--|--|--|--|
| Mitchell et al. (2015). Application of best practice guidelines for OSCEs—an Australian evaluation of their feasibility and value. <i>Nurse Education Today</i> , 35(5), 700-705. <a href="https://doi.org/10.1016/j.nedt.2015.01.007">https://doi.org/10.1016/j.nedt.2015.01.007</a> | Mixed-Methods Design | The purpose of this study was to evaluate the feasibility and utility of using Best Practice Guidelines (BPG) within an OSCE format. | Four diverse settings were identified to test the BPG. The selection was designed to provide maximum diversity in Australia. Three settings were Metropolitan each from a separate state (one midwifery and two nursing) and one remote territory for post-graduate nursing. | 671 under-graduate and post-graduate nursing and midwifery students. 12 lecturers teaching in the course were also invited to participate. | Surveys were used to analyze the 557 student response (81% response rate). The open-ended question on the survey, interviews, and focus groups were subjected to thematic content analysis by two research members to validate themes. All lecturers were able to modify the use of OSCEs using the BPG's in the teaching and assessment of students within their curriculum. Students valued the realistic nature of the modified OSCEs integrating the “whole of the person”. Preparing for and undertaking OSCEs contributed to student confidence and preparation for clinical practice. |

## **APPENDIX D**

### **SUMMARY OF KEY STUDIES OF OBJECTIVE STRUCTURED CLINICAL EXAMINATIONS AND SELF-CONFIDENCE**

| Article Citation  | Research Type       | Study Purpose  | Setting  | Sample Size   | Summary of Findings  |
|---|---------------------|--|--|---|--|
| Franklin et al. (2014). Psychometric testing on the NLN student satisfaction and self-confidence in learning, simulation design scale, and educational practices questionnaire using a sample of pre-licensure novice nurses. <i>Nurse Education Today</i> , 34(10), 1298-1304. <a href="http://dx.doi.org/10.1016/j.nedt.2014.06.011">http://dx.doi.org/10.1016/j.nedt.2014.06.011</a> | Quantitative-Survey | To establish the psychometric properties of three scales based on reliability (item analysis, discrimination, and Cronbach's alpha), and validity testing (confirmatory and exploratory factor analysis, concordant and discordant validity) | Liberal arts university in the southern United States.       | The sample of 2200 nursing students enrolled in either a traditional or accelerated baccalaureate nursing program.  | All three scales have sufficient reliability and validity to be used in nursing education research. The evidence supports the judgments made about self-confidence following a simulation experience are valid and reliable. |
| Henderson et al. (2013). An implementation framework for using OSCEs in nursing curricula. <i>Nurse Education Today</i> , 33(12), 1459-1461. <a href="https://doi.org/10.1016/j.nedt.2013.04.008">https://doi.org/10.1016/j.nedt.2013.04.008</a>  | Descriptive         | To implement a framework through shared experiences of nursing educators contributing to success in OSCE implementation.   | Three different nursing and midwifery programs in Australia. | Nursing and midwifery faculty including a project leader, project officer, participating leads from education facilities offering OSCEs and observations and feedback from project members familiar with OSCEs. | OSCE as a form of valid and authentic assessment led to an increase in student confidence.   |



| Article Citation  | Research Type  | Study Purpose   | Setting   | Sample Size   | Summary of Findings  |
|---|--|---|---|---|--|
| McClimens et al. (2012). Confidence and performance in objective structured clinical examination. <i>British Journal of Midwifery</i> , 20(10), 746-751.<br><a href="https://doi.org/10.12968/bjom.2012.20.10.746">https://doi.org/10.12968/bjom.2012.20.10.746</a>               | Quantitative-Observational   | The purpose of this study was to compare self-reported confidence levels within and between 1 <sup>st</sup> and 3 <sup>rd</sup> year midwifery students pre-and post OSCE. Examine associations between reported confidence levels pre-OSCE and competence as assessed by the scores of the OSCE. | Sheffield Hallam University in the United Kingdom.  | 103 1 <sup>st</sup> and 3 <sup>rd</sup> year students were invited to participate. 72 pre-registration 1 <sup>st</sup> and 3 <sup>rd</sup> year midwifery students. 1 <sup>st</sup> year = 32, 3 <sup>rd</sup> year = 40 completed the study. | Independent t-tests revealed third year students reported greater total confidence prior to taking the OSCE than first year students ( $t=8.276$ ; $P<1.001$ ; $n=80$ ). Paired t-testing revealed both first and third year students demonstrate a significant increase in confidence once they completed the OSCE ( $t=3.592$ ; $P<0.001$ ; $n=30$ ) and ( $t=5.817$ ; $P<0.001$ ; $n=42$ ). No significant correlation between confidence levels before taking OSCE and final OSCE test scores. |
| Omu, F.E. (2016). Attitudes of nursing faculty members and graduates towards the objective structured clinical examination (OSCE). <i>Open Journal of Nursing</i> , 6(5), 353-364.<br><a href="https://doi.org/10.4236/ojn.2016.65037">https://doi.org/10.4236/ojn.2016.65037</a> | Descriptive cross-sectional Quantitative design. Use of a descriptive survey using a 16-item, 5-point Likert scale questionnaire | The objective of the study was to evaluate the attitude and perception of nursing faculty and graduates towards their OSCE experiences as an objective method of clinical competency and skill assessment in nursing.   | College of Nursing, The Public Authority for Applied Education and Training in Safat, Kuwait. | A convenient sample of 140 subjects from three main groups: 20 nursing faculty members involved in conducting OSCEs, 27 BSN graduates, and 93 ADN graduates who were assessed using OSCEs during their training programs.                     | Kruskal-Wallis test in evaluating differences among the three groups was significant: $X^2$ (df 2, $N=140$ ) = 8.421, $P=0.015$ . 80% of faculty members, 74% of BSN graduates, and 62.3% of ADN graduates agreed that OSCE represented an objective evaluation. OSCE helps students develop confidence in practicing skills taught in the clinical setting by all three groups.   |

| Article Citation   | Research Type                | Study Purpose   | Setting   | Sample Size   | Summary of Findings   |
|--|------------------------------|---|---|---|---|
| Ytterberg et al. (1998). Cognition, confidence, and clinical skills. <i>Academic Medicine</i> , 73(10), S103-S105. <a href="https://doi.org/10.1097/00001888-199810000-00060">https://doi.org/10.1097/00001888-199810000-00060</a> | Quantitative, survey format. | The aim of this study was to answer if confidence in clinical skills enhanced during an OSCE and is confidence correlated with performance on the OSCE. | University of Minnesota-Minneapolis Medical School. | A convenient sampling of 155 (86%) 2 <sup>nd</sup> year medical students completed both pre-and post OSCE questionnaire | Student confidence levels in clinical skills before and after OSCE were all statistically significant in history taking, physical examination, interacting and communication, clinical reasoning, and dealing with difficult patients (p-value .001 for all). Overall, the findings found the OSCEs exposure and immediate feedback enhanced student's confidence in their clinical skills. |

## **APPENDIX E**

### **SUMMARY OF KEY STUDIES OF OBJECTIVE STRUCTURED CLINICAL EXAMINATIONS AND ANXIETY**

| Article Citation   | Research Type                               | Study Purpose  | Setting   | Sample Size   | Summary of Findings   |
|--|---|--|---|---|---|
| Cazzell, M. & Rodriquez, A. (2011). Qualitative analysis of student beliefs and attitudes after an objective structured clinical evaluation: Implications for affective domain learning in undergraduate nursing education. <i>Journal of Nursing Education</i> , 50(12), 711-714. <a href="https://doi.org/10.3928/01484834-20111017-04">https://doi.org/10.3928/01484834-20111017-04</a> | Qualitative Exploratory focus group design. | To explore the feelings, beliefs, and attitudes of senior-level undergraduate pediatric nursing students upon completion of a pediatric medication administration OSCE.  | A large university in south-western United States.  | Two 30-minute focus group sessions involving 10 senior-level nursing students each. N=20.   | Students integrated the attitude of safety first into future practice but felt that anxiety, loss of personal control, reacting under pressure, and no immediate feedback affected their ability to connect their OSCE performance with future clinical practice. |
| Fidment, S. (2012). The objective structured clinical exam (OSCE): A qualitative study exploring the healthcare student's experience. <i>Student Engagement and Experience Journal</i> , 1(1), 1-18. <a href="https://doi.org/10.7190/seej.v1i1.37">https://doi.org/10.7190/seej.v1i1.37</a>   | Qualitative                                 | The aim of this study was to explore and understand the experience of undertaking an OSCE, with the purpose to inform the future development of this type of assessment. | Large university in the United Kingdom which has a large component of healthcare students at both undergraduate and graduate level. | Purposive sample of 20 registered healthcare professionals studying on a continuing professional development specialist pediatric module. | A key theme was anxiety. All the participants interviewed spoke of feelings of anxiety experienced either before and/or during the OSCE. While the OSCE had caused feelings of anxiety, students felt that the assessment was ultimately beneficial to them.      |

|   |                   |   |  |  |   |
|---|-------------------|---|--|--|---|
| Hilliard, T.C. (2018). <i>Exploring Anxiety Among Graduate Nursing Students During High-Stakes Clinical Testing</i> (Doctoral dissertation, Capella University).  | Qualitative       | The purpose of the study was to discover how Advanced Practice Registered Nursing (APRN) students described their experience of anxiety related to the OSCE, the issues identified by the students as contributing to anxiety, and the strategies utilized to address OSCE-related anxiety. | An academic health sciences center in the Southwest United States. | Purposive sampling of 11 students enrolled online APRN program.                          | Four distinct themes were identified from the study: 1. Personal experiences from anxiety, 2. Factors contributing to anxiety, 3. Student-led strategies to decrease anxiety, and 4. Faculty-directed strategies to manage anxiety. |
| Moscaritolo, L.M. (2009). Interventional strategies to decrease nursing student anxiety in the clinical learning environment. <i>Journal of Nursing Education</i> , 48(1), 17-23. <a href="https://doi.org/10.3928/01484834-20090101-08">https://doi.org/10.3928/01484834-20090101-08</a> | Literature Review | To provide an overview of the use of humor, peer instructors and mentors, and mindfulness training to decrease stress and anxiety in undergraduate nursing students in the clinical learning environment.   | N/A  | 10-peer reviewed articles were reviewed that focused on contributing factors to anxiety. | Anxiety can be a motivator and performance enhancer however, high levels can be debilitating and jeopardize student success in performance and is negatively influenced.  |

| Article Citation  | Research Type     | Study Purpose   | Setting | Sample Size                              | Summary of Findings   |
|---|-------------------|---|---------|--|---|
| <p>Stunden et al. (2015). Tools to reduce first year nursing students' anxiety levels prior to undergoing objective structured clinical assessment (OSCA) and how this impacts the student's experience of their first clinical placement. <i>Nurse Education Today</i>, 35(9), 987-991.<br/> <a href="https://doi.org/10.1016/j.nedt.2015.04.014">https://doi.org/10.1016/j.nedt.2015.04.014</a></p> | Literature Review | To present the best available evidence into strategies that help reduce first year nursing students' anxiety levels prior to undergoing OSCA and clinical assessment. | N/A     | Eight articles were included for review. | <p>The majority of students reported simulation sessions prior to OSCA increased students' confidence and reduced their anxiety levels. Students reported that they valued the OSCA as a worthwhile assessment. Four themes emerged:</p> <ol style="list-style-type: none"> <li>1. Students were anxious about attending the OSCE,</li> <li>2. That adequate preparation was seen as a coping strategy,</li> <li>3. That simulation was a further cause for anxiety, and</li> <li>4. The simulation experience could also be used as an OSCE tool.</li> </ol> |

**APPENDIX F**

**CONSENT FORM FOR HUMAN PARTICIPANTS  
IN RESEARCH**



CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH  
UNIVERSITY OF NORTHERN COLORADO

**Project Title:** Nurse-Midwifery Student Self-Confidence and Anxiety When Using Objective Structured Clinical Examinations (OSCEs) as a Clinical Competency Assessment Strategy

**Researcher:** Deborah Duran-Snell, CNM, MS, PhD candidate, University of Northern Colorado  
Phone: 503.539.3325 E-mail: [dura7078@bears.unco.edu](mailto:dura7078@bears.unco.edu)

**Faculty Advisor:** Kathleen Dunemmn, PhD, CNM

**Email:** [Kathleen.Dunemmn@unco.edu](mailto:Kathleen.Dunemmn@unco.edu) **Phone:** (970) 351-3081 or (803) 409-8391

I am researching self-confidence and anxiety in graduate nurse-midwifery students. As a participant in this research you will be asked to complete two questionnaires (which will not count towards your grade in the class). These will be given to you prior to and after completing the Objective Structured Clinical Examination. The questionnaires will ask you about self-confidence and anxiety. Each questionnaire will take about 15 minutes to complete.

You will not provide your name on the questionnaires. The questionnaires are anonymous, but you will be required to provide your age, gender, racial background, other healthcare experience, and how many times you have participated in OSCEs previously. Only the researcher will examine individual responses. Results of the study will be presented in group form only (e.g., averages) and all original paperwork will be kept in locked cabinets on campus or in the researcher's home (due to Covid-19 restrictions). The researcher will strive to protect the anonymity and confidentiality of your responses.

Risks are minimal. Participating students will be asked questions regarding self-confidence and anxiety. The probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves as during the performance of a physical, psychological test, or OSCE. The decision to participate, or not participate, will have no impact on the evaluation in the class or affect the course grade. There are no incentives to participate in this study; however, participation will help inform nursing clinical education strategies.

Participation is voluntary. You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled.

By completing the questionnaire, you give your permission to be included in this study as a participant. You may keep this form for future reference. If you have any concerns about your



selection or treatment as a research participant, please contact Sherry May, IRB Administrator, Office of Sponsored Programs, 25 Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-1910.

Thank you for assisting me with my research.

---

Subject's Signature

Date

---

Researcher's Signature

Date

**APPENDIX G**  
**INSTITUTIONAL REVIEW BOARD APPROVALS**



Date: 02/09/2021  
 Principal Investigator: Deborah Duran-Snell  
 Committee Action: **IRB EXEMPT DETERMINATION – New Protocol**  
 Action Date: 02/09/2021  
 Protocol Number: **2101020078**  
 Protocol Title: Nurse-Midwifery Student Self-Confidence and Anxiety When Using Objective Structured Clinical Examinations (OSCEs) as a Clinical Competency Assessment Strategy  
 Expiration Date:

The University of Northern Colorado Institutional Review Board has reviewed your protocol and determined your project to be exempt under 45 CFR 46.104(d)(701) (702) for research involving

Category 1 (2018): RESEARCH CONDUCTED IN EDUCATIONAL SETTINGS. Research, conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact students' opportunity to learn required educational content or the assessment of educators who provide instruction. This includes most research on regular and special education instructional strategies, and research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

Category 2 (2018): EDUCATIONAL TESTS, SURVEYS, INTERVIEWS, OR OBSERVATIONS OF PUBLIC BEHAVIOR. Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects; (ii) Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or (iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by 45 CFR 46.111(a)(7).



You may begin conducting your research as outlined in your protocol. Your study does not require further review from the IRB, unless changes need to be made to your approved protocol.

**As the Principal Investigator (PI), you are still responsible for contacting the UNC IRB office if and when:**

- You wish to deviate from the described protocol and would like to formally submit a modification request. Prior IRB approval must be obtained before any changes can be implemented (except to eliminate an immediate hazard to research participants).
- You make changes to the research personnel working on this study (add or drop research staff on this protocol).
- At the end of the study or before you leave The University of Northern Colorado and are no longer a student or employee, to request your protocol be closed. \*You cannot continue to reference UNC on any documents (including the informed consent form) or conduct the study under the auspices of UNC if you are no longer a student/employee of this university.
- You have received or have been made aware of any complaints, problems, or adverse events that are related or possibly related to participation in the research.

If you have any questions, please contact the Research Compliance Manager, Nicole Morse, at 970-351-1910 or via e-mail at [nicole.morse@unco.edu](mailto:nicole.morse@unco.edu). Additional information concerning the requirements for the protection of human subjects may be found at the Office of Human Research Protection website - <http://hhs.gov/ohrp/> and <https://www.unco.edu/research/research-integrity-and-compliance/institutional-review-board/>.

Sincerely,

A handwritten signature in black ink that reads "Nicole Morse".

Nicole Morse  
Research Compliance Manager

University of Northern Colorado: FWA00000784



## IRB MEMO

Research Integrity Office

3181 SW Sam Jackson Park Road - L106RI  
Portland, OR 97239-3098  
(503)494-7887 irb@ohsu.edu

### APPROVAL OF SUBMISSION

February 22, 2021

Dear Investigator:

On 2-22-2021, the IRB reviewed the following submission:

|                         |   |
|-------------------------|---|
| IRB ID:                 | STUDY00022709   |
| Type of Review:         | Initial Study   |
| Title of Study:         | Nurse-Midwifery Student Self-Confidence and Anxiety When Using Objective Structured Clinical Examinations (OSCEs) as a Clinical Competency Assessment Strategy  |
| Principal Investigator: | Deborah Duran-Snell   |
| Funding:                | None  |
| IND, IDE, or HDE:       | None  |
| Documents Reviewed:     | <ul style="list-style-type: none"> <li>• CITI certification</li> <li>• UNCO exempt IRB approval</li> <li>• Minimal Risk Protocol Template</li> <li>• Consent Form</li> <li>• NASC-CDM Questionnaire</li> <li>• Invitation and Information Script</li> </ul> |

The IRB granted final approval on 2/22/2021. The study requires you to submit a check-in before 2/20/2024.

Review Category: Exempt Category # 1 and 2

Copies of all approved documents are available in the study's **Final** Documents (far right column under the documents tab) list in the eIRB. Any additional documents that require an IRB signature (e.g. IIAs and IAAs) will be posted when signed. If this applies to your study, you will receive a notification when these additional signed documents are available.

**Ongoing IRB submission requirements:**

- Six to ten weeks before the eIRB system expiration date, submit a check-in..
- Any changes to the project must be submitted for IRB approval prior to implementation.
- Reportable New Information must be submitted per OHSU policy.
- Submit a check-in to close the study when your research is completed.

**Guidelines for Study Conduct**

In conducting this study, you are required to follow the guidelines in the document entitled, "[Roles and Responsibilities in the Conduct of Research and Administration of Sponsored Projects](#)," as well as all other applicable OHSU [IRB Policies and Procedures](#).

**Requirements under HIPAA**

If your study involves the collection, use, or disclosure of Protected Health Information (PHI), you must comply with all applicable requirements under HIPAA. See the [HIPAA and Research](#) website and the [Information Privacy and Security](#) website for more information.

**IRB Compliance**

The OHSU IRB (FWA00000161; IRB00000471) complies with 45 CFR Part 46, 21 CFR Parts 50 and 56, and other federal and Oregon laws and regulations, as applicable, as well as ICH-GCP codes 3.1-3.4, which outline Responsibilities, Composition, Functions, and Operations, Procedures, and Records of the IRB.

Sincerely,

The OHSU IRB Office

**APPENDIX H****INVITATION AND INFORMATION SCRIPT FORM**

*Invitation and Information Script Form*

You are being invited to participate in a research study. The purpose of this study is to obtain information on student self-confidence and anxiety during administration of Objective Structured Clinical Examinations (OSCEs). A simple definition of OSCE is where students are expected to demonstrate competency in a variety of simulated situations. The aim of the OSCE is to provide objectivity and standardization to the structure and control of the clinical examination so the student's clinical knowledge can be tested and appropriate feedback provided.

This study proposes to obtain information on student confidence and anxiety through use of a measurement tool. The measurement approach is a self-confidence and anxiety questionnaire. The questionnaire will ask you about your level of confidence and anxiety in a range of competencies.

After consenting to participate and prior to the administration of the OSCE, you will be given the pre-test questionnaire to complete. It is expected to take about 10-15 minutes to complete the questionnaire. The OSCE would be approximately 45 minutes in length you will complete the post-test self-confidence questionnaire following feedback and debrief from the OSCE assessor/faculty instructor. Total time commitment to complete the questionnaire both pre and posttest along with the OSCE should be 65-75 minutes or 20-30 minutes in addition to the planned OSCE.

As the researcher for this study my role will be to answer any questions you have regarding the study before your consent and participation. I will not be an assessor during the OSCE, nor will I be providing you with feedback. The program administrator will disperse and collect the questionnaire should you choose to participate. I will not see your questionnaires until data analysis begins. You will create your own unique pre and posttest identification number by using your mother's maiden name (or whomever you consider to be their mother) as a unique identifier as follows: the first two letters of the first name and first two letters of the last name and birth month using a number between 1 and 12. This process should ensure confidentiality.

Risks are minimal. Participating students will be asked questions regarding self-confidence and anxiety. The probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves as during the performance of a physical, psychological test, or OSCE. Your decision to participate, or not participate, will have no impact on your evaluation in this class or affect your course grade. There are no incentives to participating in this study; however, your participation will help inform nurse-midwifery education.

Participation is voluntary. You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled.