

THE IMPACT OF EVIDENCE BASED-GUIDELINES ON UTILIZATION OF FIRST-
TRIMESTER FETAL ULTRASOUNDS PERFORMED BY CERTIFIED NURSE-
MIDWIVES AND ADVANCED PRACTICE REGISTERED NURSES IN AN
OBSTETRIC TRIAGE SETTING

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By

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ABSTRACT

The scope of practice for Certified Nurse-Midwives (CNMs) and Advanced Practice Registered Nurses (APRNs) has expanded to encompass the performance of obstetrical ultrasounds in a variety of settings, including obstetric triage. The focus of this Doctor of Nursing Practice (DNP) project evaluated the impact of implementation of evidenced-based guidelines on the utilization of first-trimester ultrasound by CNMs and APRNs in an obstetric triage unit.

The project took place over a six-month period of time and data collection included three consecutive months of retrospective data prior to implementation of guidelines followed by three consecutive months post-implementation of guidelines. A two-sample test of proportions using Stata 17 (StataCorp, College Station, TX) was performed. The rate of first ultrasounds performed pre-implementation of evidence-based practice guidelines was 8.92% and post-implementation was 8.03%. This difference was not statically significant with $p= 0.108$ and $z=1.240$.

There was not a statistically significant difference in the rate of first-trimester ultrasounds being performed by CNMs and APRNs pre-implementation versus post-implementation of evidence-based practice guidelines. However, best practices were identified and included improved consistency and accuracy in ultrasound documentation, utilization of first-trimester ultrasounds based on clinical indications, and adoption of the evidenced based protocol by the

institution as part of assessing ongoing quality of care. First-trimester ultrasounds within obstetric triage are now being performed based on medical indications outlined by the guidelines that were implemented through this DNP project.

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Sincerely,
Sarah C. DeLong

TABLE OF CONTENTS

Chapter I.....	3
Introduction.....	3
Background and Significance	3
Literature Review.....	6
LEGEND: Table of Evidence Levels	6
The Expansion of Obstetrical Triage	6
The Importance of Midwifery Led Ultrasound Usage.....	8
First Trimester Complications	9
Global Impact of Ultrasound Usage by Midwives	10
Perception of Ultrasound Usage by Midwives	11
Recommendation of Body of Evidence	11
Search Strategy	12
Organizational Needs Assessment.....	14
Theoretical Framework.....	15
The Donabedian Model for Quality of Care	15
Duck’s Change Curve Model.....	17
Definition of Terms.....	19
Rationale for the DNP Project	20
PICOT Question.....	21
Purpose and Aims	22
Chapter II	23
Project Design.....	23
Human Subject Review.....	24
Setting and Population	24
Plan, Timeline, and Implementation.....	25

Data Collection Procedures.....	26
Data Analysis Plan	27
Chapter III.....	28
Analysis of Data.....	28
Performance of Ultrasounds in Obstetric Triage	28
Performance of First-Trimester Ultrasounds	29
Summary of Findings.....	29
Chapter IV.....	31
Discussion of Findings.....	31
Limitations	34
Practice Implications.....	35
Recommendations for Further Study	36
Conclusions.....	38
Appendix A: LEGEND Table of Evidence	39
Appendix B: Monitoring Implementation Sheet.....	40
Appendix C: First-Trimester Ultrasound Guidelines	41
Bibliography	45

Chapter I

Introduction

The scope of practice for Certified Nurse-Midwives (CNMs) and Advanced Practiced Registered Nurses (APRNs) includes the performance of obstetric ultrasounds in a variety of settings, including Obstetric Triage. CNMs and APRNs perform obstetric ultrasounds within an obstetric triage setting often without the benefit of standardized guidelines. A range of guidelines already exist for CNMs and APRNs through AIUM, ACOG, ACNM, and AWHONN, but are not always utilized to make clinical decisions. This leads to a growing need for more structured evidence-based practice guidelines to guide and support CNMs and APRNs as they perform obstetric ultrasounds.

Background and Significance

Advanced practice registered nurses (APRNs) are registered nurses educated at a master's or post master's level that can assess, diagnose, manage patient problems, order tests and prescribe medications. Certified Nurse-Midwives (CNMs) are APRNs that specialize in providing care to people during their reproductive lifespan extending from adolescence to beyond menopause, including attending births. Through expanding scope of practice, CNMs and APRNs are increasingly incorporating the usage of ultrasounds into the care of patients to provide more comprehensive, accurate care and diagnoses. CNMs and APRNs are becoming more common in a range of practice settings, such as obstetrical triage, where ultrasounds are used regularly to expedite diagnoses and more timely dispositions for patients.

Ultrasonography is a valuable tool in the assessment of pregnant individuals. The scope of practice for CNMs and APRNs has expanded to encompass the performance of ultrasounds to

determine crucial elements of information that aid in the quick assessment and diagnosis of patients who present to obstetric triage.

The expansion of ultrasound in clinical practice for CNMs and APRNs is supported by recommendations and guidelines developed by the American Institute of Ultrasound in Medicine (AIUM) *Training Guidelines for Advanced Clinical Providers in Women's Health Performing and Interpreting Limited Obstetric Ultrasound* (AIUM, 2018), the American College of Obstetricians and Gynecologists (ACOG) *Ultrasound in pregnancy: Practice Bulletin No. 175* (ACOG, 2016), the American College of Nurse Midwives (ACNM) *Ultrasound in Midwifery* (ACNM, 2018), and the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) *Ultrasound Examinations Performed by Nurses in Obstetrics, Gynecologic, and Reproductive Medicine Settings: Clinical Competencies and Education Guide* (AWHONN, 2016). These recommendations provided the framework identifying the educational preparation needed to provide ultrasounds as a CNM and APRN and an understanding for when ultrasound examinations need to be performed to care for pregnant individuals (AIUM, 2018). Additionally, these guidelines established pathways for CNMs and APRNs to collaborate, seek consultations and referrals for abnormal ultrasound findings (ACNM, 2018). Guidelines for ultrasound education programs also set forth additional parameters to ensure that CNMs and APRNs fully understand the various components of ultrasounds and the indications for use, while being provided with comprehensive continuing education (ACNM, 2018).

Ultrasound has quickly become an integral tool that can be used by CNMs and APRNs to quickly identify and evaluate patients; particularly in the presence of an emergency care setting, such as obstetric triage. Point-of-care (POC) ultrasounds can be performed in an acute clinical situation to quickly yield information to appropriately manage care for patients and give rapid

feedback to providers on potential diagnoses (AIUM, 2018). POC ultrasounds improve outcomes by giving rapid feedback and allowing CNMs and APRNs to gain specific information in the assessment of the pregnant individual that aids in the clinical decision-making process, particularly surrounding early pregnancy identification and assessment (ACNM, 2018; ACOG, 2016).

Developing the skill set of performing obstetric ultrasounds must be accompanied by the implementation of evidenced-based practice guidelines to ensure appropriate use and patient safety. AIUM (2018), ACOG (2016), AWHONN (2016), and ACNM (2018) have provided the educational guidelines and competencies that need to be in place for CNMs and APRNs to provide ultrasounds. However, there must also be individualized practice guidelines that provide recommendations for CNMs and APRNs at each institution in order to optimize patient care within a particular setting. The lack of existing practice protocols based on evidence-based practice guidelines in a unit raises concerns for CNMs and APRNs related to performing these new advanced skills and the measures needed to be put into place to ensure ultrasounds are being performed and documented appropriately. Obstetric triage is a fast-paced environment that requires accurate assessment skills to ensure the appropriate care of pregnant individuals. The development of tools, algorithms and practice guidelines ensure appropriate documentation and clinical assessment of pregnant individuals when they present to obstetric triage (Angelini & Howard, 2014). The standardization and implementation of guidelines through clinical protocols allows for the best evidence-based care of pregnant individuals within obstetric triage and can lower liability risk exposure to providers and minimize harm to patients (Angelini & Howard, 2014; Angelini & LaFontaine, 2017). Standardizing evidence-based practice guidelines within obstetric triage leads to safer practice and higher quality of patient care

through enabling staff to assess, act and efficiently coordinate care for pregnant individuals (Angelini & Howard, 2014; Angelini & LaFontaine, 2017). If CNMs and APRNs are to provide ultrasound as part of their scope of practice, they must be supported by evidence-based practice guidelines. The focus of this Doctor of Nursing Practice (DNP) project will assess the impact of implementation of an evidence-based protocol designed for CNMs and APRNs conducting first-trimester ultrasounds in an obstetric triage setting.

Literature Review

LEGEND: Table of Evidence Levels

The Let Evidence Guide Every New Decisions (LEGEND) rating system was used to rate each article used within the literature review. See Appendix A for the LEGEND Table of Evidence Levels. The LEGEND system is a systematic way to evaluate the quality of evidence and assist in synthesizing evidence in order to provide the best patient outcomes (Cincinnati Children's, 2012). Each article within the literature was given a rating ranging from 1a, 1b, 2a, 2b, 3a, 3b, 4a, 4b, 5a, and 5b based off the LEGEND Table of Evidence Levels and then the overall body of evidence was graded at moderate due to most studies being 2a or 2b (Cincinnati Children's, 2012). The studies included were clinically important and consistent, the benefits were greater than any risk of harm of the research, and patient's values and preferences were discussed and considered throughout the studies (Cincinnati Children's, 2012).

The Expansion of Obstetrical Triage

Obstetric triage is an evolving field that requires an expanding scope of practice for many CNMs and APRNs. To ensure that obstetrical triages operate at their highest standards of quality and safety, there must be evidence-based practice guidelines and quality improvement processes in place to ensure the best quality of care (Angelini et al., 2014). A LEGEND score of 1b rating

was given to (Angelini et al., 2014) for being a systematic review; however, the article did identify a significant gap in the literature concerning outcomes-based research within obstetric triages. It was recommended now that evidence-based practice guidelines, quality improvement interventions, and best practices have been identified to use randomized controlled trials to test these practices within obstetric triages (Angelini et al., 2014).

Obstetric triage is a hospital based obstetrical unit that collaborates with emergency and hospital ancillary services to provide care to pregnant individuals who present to the hospital with a range of acute needs, including bleeding within the first trimester (ACOG, 2016). There are many pregnant individuals in their first trimester who present to obstetric triage for concerns of spotting or bleeding, which may be caused by complications such as: miscarriage, threatened miscarriage, infection, cervical and vaginal lesions, or even a life threatening ectopic pregnancy (Breeze, 2016, Po et al., 2016). Bleeding in early pregnancy is one of the main concerns that causes people to present to obstetrical triage and is extremely common with 20 – 40% of pregnant people experiencing bleeding (Breeze, 2016). While bleeding can be benign in early pregnancy, it is often distressing to the pregnant individual, and they often seek out reassurance concerning the pregnancy from a provider within an obstetric triage setting (Breeze, 2016). The initial assessment by a provider for vaginal bleeding within the first trimester must determine if the pregnant person is hemodynamically stable and appropriate to remain and be seen within obstetric triage. If the patient is not hemodynamically stable it could be due to a ruptured ectopic pregnancy, a hemorrhage secondary to a miscarriage, or incomplete miscarriage with “cervical shock,” which is the parasympathetic stimulation caused by products of conception still within the cervix that leads to hypotension and bradycardia (Breeze, 2016). If it is determined the patient is not hemodynamically there must be shared decision between the attending physician

and provider in obstetric triage to determine the most appropriate disposition for the patient. If the patient is stable and able to remain in obstetric triage the standard of care typically includes laboratory testing including a b-hCG, which is the pregnancy hormone level, performance of a physical exam, and an ultrasound is then performed based on those results to rule out miscarriage or an ectopic pregnancy and can also provide reassurance surrounding the pregnancy for patients.

The Importance of Midwifery Led Ultrasound Usage

Ultrasounds are a part of expanding scope of practice for CNMs and APRNs, having traditionally been seen as a skill performed by physicians; however, it is becoming more common to see midwives performing ultrasounds in certain settings (Colvin et al., 2013; AIUM, 2018). This expanding scope of practice comes with new challenges and concerns for CNMs and APRNs including increased liability exposure, in the absence of structured and standardized training, clinical support, or guidelines.

Ensuring a structured training process for CNMs and APRNs surrounding ultrasound performance is a fundamental aspect of incorporating ultrasounds into practice. Midwives with structured ultrasound training and curriculum have been shown to have a higher level of short-and long-term knowledge surrounding the performance of ultrasounds, as well as an increase in overall confidence levels and comfort surrounding ultrasound usage (Bentley et al., 2015; Shah et al., 2020).

A LEGEND score of 4a was given to (Bentley et al., 2015) due to being a quantitative prospective study with the study adding to the present evidence that demonstrates that midwives can perform adequate ultrasounds. The study did not address whether examinations performed changed clinical management overall. A LEGEND score of 1a was given to (Colvin et al., 2013) due to being a systematic review of qualitative evidence surrounding task shifting and maternal and newborn health among health care workers A LEGEND score of 4a was given to (Shah et al.,

2020) due to being a mixed-methods study. Strengths of the study included ongoing training courses and mentoring in place after the training took place to allow for continued learning that occurred during the study.

First Trimester Complications

Ectopic pregnancies are one of the most serious and life-threatening complications seen within the first trimester. Individuals often first present to obstetric triage with abdominal pain and vaginal bleeding as the first clinical signs and symptoms of an ectopic pregnancy (Po et al., 2021; Breeze, 2016). Routine ultrasounds in early pregnancy can not only provide insight into pregnancies of unknown location (PULs), which occur in about 15% of early pregnancies, but also provide better gestational age assessments, detection of multiple pregnancies, and are used to definitively identify an ectopic or intrauterine pregnancy (IUP) (Po et al., 2021). An ectopic pregnancy occurs in an estimated 1-2% of pregnancies, but accounts for 75% of deaths in the first trimester and 9% to 13% of all pregnancy-related deaths. (Po et al., 2021; Breeze, 2016). CNMs and APRNs within the obstetric triage setting commonly encounter and identify ectopic pregnancies and PULs. Ultrasound diagnosis of ectopic pregnancies requires experienced sonographers and physicians to be able to interpret results and determine plan of care after diagnosis. However, within obstetric triage it is the CNMs and APRNs who are performing POC ultrasounds and first identifying PULs and possible ectopic pregnancies (Po et al., 2021). Through expanding scope of practice surrounding ultrasonography by CNMs and APRNs, it is vital that they are provided with the additional training needed and supportive evidence-based practice guidelines within their practice or institution to be able to perform ultrasounds.

A LEGEND score of 5b was given to (Po et al., 2021) due to being an evidence-based algorithm and guideline in the management of PULs and ectopic pregnancies that allows for providers to provide the most up-to-date care for pregnant individuals experiencing an ectopic

pregnancy or PUL. The major limitation was analyses used to arrive at the summary statistic or summary findings were not discussed or described within the guidelines.

Global Impact of Ultrasound Usage by Midwives

It is common for midwives internationally to incorporate ultrasound into part of their practice. The CROss-Country Ultrasound Study (CROCUS) examined midwives' views and perceptions of ultrasound within various countries (Ahman et al., 2019; Ahman et al., 2018; Edvardsson et al., 2016; Edvardsson et al., 2015; Fagerli et al., 2018; Holmlund et al., 2020; Holmlund et al., 2017). The common themes that were derived from these qualitative studies were that ultrasound plays a central role in pregnancy management and can help to optimize outcomes through diagnosis and management of pregnancy complications. Additionally, midwives overall found ultrasounds a rewarding technical skill to be able to perform (Ahman et al., 2019; Ahman et al., 2018). While midwives felt that the performance of ultrasounds optimized care for pregnant individuals, it did present new ethical dilemmas for midwives. Particularly, surrounding delivering news to a parent(s) concerning a new finding or diagnosis of the fetus that can impact the outcome of the pregnancy (Edvardsson et al., 2016; Edvardsson et al., 2015). While the performance of ultrasounds by midwives was seen as overall positive within the CROCUS and should be an encouraged skill set supported by institutions; there must be careful consideration for education and support for midwives performing ultrasounds. Another important aspect of the CROCUS study was that it emphasized education to be shared with expectant parent(s) concerning the role and outcomes of ultrasounds. This sets realistic expectations for expectant parent(s) when receiving an ultrasound (Ahman et al., 2019; Ahman et al., 2018).

A LEGEND score of 2a was given to (Edvardsson et al., 2016; Edvardsson et al., 2015) for being qualitative phenomenological designs focus group discussions with rich discussions of

views and experiences of midwives with varying characteristics and backgrounds on their perspectives of performing ultrasounds. A LEGEND score of 2a was given to (Ahman et al., 2019; Ahman et al., 2018) due to the studies being qualitative-phenomenological in design with a major strength being the consistency in interview topics across both the interviews and focus group discussions.

Perception of Ultrasound Usage by Midwives

Ultrasounds are a highly anticipated and exciting part of prenatal care when pregnant individuals have the opportunity to see their baby. However, pregnant individuals often expect more ultrasounds than are recommended, even when there is no medical indication for ultrasound (Fagerli et al., 2018). Ultrasounds are many times used to satisfy pregnant individuals' wishes and reduce anxiety surrounding pregnancy. Midwives felt that expectations and perceptions of the pregnant individuals were not always realistic and that pregnant individuals need to be fully informed throughout the process of why they are or are not receiving an ultrasound(s). This helps to set realistic expectations of when ultrasounds should be performed. (Fagerli et al., 2018; Holmlund et al., 2020; Holmlund et al., 2017; Reiso et al., 2020).

A LEGEND score of 2b was assigned to (Fagerli et al., 2018; Reiso et al., 2020) with both being qualitative studies looking at phenomenological research and given the rating due to no saturation data, as well as a limited number of midwife sonographers in Norway. A LEGEND score of 2a rating was given to (Holmlund et al., 2020; Holmlund et al., 2017) due to being qualitative studies that looked at phenomenological research and data saturation was discussed within the study.

Recommendation of Body of Evidence

The summary of evidence within the literature review discussed the significant benefits to following evidence-based practice guidelines and recommendations when performing obstetrical

ultrasounds and the cost-effectiveness to follow guidelines and not perform unnecessary medical procedures such as ultrasounds. This evidence supports CNMs and APRNs performing medically indicated ultrasounds based on the current evidence and guidelines. The high strength of the evidence supports the recommendations and views presented within the literature review when considering implementing guidelines and examining views surrounding CNMs and APRNs using ultrasounds for this DNP project (Cincinnati Children's, 2012).

Search Strategy

To discover the available knowledge surrounding CNMs and APRNs performing ultrasounds, relevant words and terms were combined and searched in PubMed, and Google Scholar. Initial search terms included: (nurse practitioner*) "OR" (nurse clinician*) "OR" (Advanced Practice Register Nurs*) "OR" (Advanced Practice Nurs*) "OR" (Advance nurs* practice)) "AND" (obstetrics) OR (nurse midwives) "OR" (nurse midwi*) "AND" (ultraso*) "OR" (prenatal ultraso*). The inclusion criteria included humans and English within each search. Exclusion criteria were non-English articles and titles and abstracts that did not match PICOT question elements. A date range was not utilized due to overall low yields of results for articles with elements of the PICOT question. The final articles that were retained were primary and secondary sources that included elements of the PICOT question asked. When deciding which articles to include in the final literature review there was consideration for quality of the study, LEGEND rating score, elements of PICOT question demonstrated in the article, and articles that specifically discussed midwifery and ultrasound usage.

The initial PubMed search yielded 103 articles and was further narrowed by eliminating those unrelated to the PICOT question. Seven studies were retained that offered insight into midwives' experiences, views, and training on ultrasound, as well as management of ectopic

pregnancies and PULs (Ahman et al., 2019; Ahman et al., 2018; Edvardsson et al., 2015; Fagerli et al., 2018; Holmlund et al., 2017; Po et al., 2021; Shah et al., 2020). Seven articles were found, and one article retained after using the phrase “task shifting” AND “midwives” (Colvin et al., 2013). Two articles were found, and one retained after using the phrase “obstetric ultrasound curriculum” and “midwives” (Bentley et al., 2015).

Google Scholar was used due to the limited articles found using the above databases. The search term used was “prenatal ultrasound study and midwives.” A custom time range from 2016-2021 resulted in 11,300 results and then was sorted by relevance of article by Google Scholar. While this was a broad finding, the sorting by relevance allowed for the most applicable articles to be found and were presented first within the search. The three articles (Edvardsson et al., 2016; Holmlund et al., 2020; Reiso et al., 2020) were within the first fifty articles found within the Google Scholar search. Further exploration using the phrase “obstetric triage and emergency care and ultrasound,” a custom time range from 2011-2021, and sorting by relevance resulted in 8,480 results. The search was then narrowed down to find the following article in the first forty articles found within the Google Scholar search (Angelini et al., 2014).

Thirteen articles were retained for the final literature review. The articles that were included for the literature included eight qualitative studies, one quantitative prospective study, one mixed methods study, two systematic reviews and one guideline. Eight studies examined midwives’ experiences and views surrounding ultrasound (Ahman et al., 2019; Ahman et al., 2018; Edvardsson et al., 2016; Edvardsson et al., 2015; Fagerli et al., 2018; Holmlund et al., 2020; Holmlund et al., 2017; Reiso et al., 2020). Two studies reviewed the practicality and feasibility of training midwives in prenatal ultrasound (Bentley et al., 2015; Shah et al., 2020). One study examined the literature of obstetric triages over the last 15-year time frame (Angelini et al.,

2014). One article assessed facilitators and barriers in midwifery services (Colvin et al., 2013). One guideline that reviewed the management of ectopic pregnancies and PUL (Po et al., 2021).

Organizational Needs Assessment

Within the current hospital where the project site is located, there was a needs assessment examined through the performance of a gap analysis that led to the formation of the concept for this DNP project. The gap analysis was performed based on the recent feedback that the CNMs and APRNs had been getting surrounding patient concerns about inconclusive ultrasound results and the need for more follow up ultrasounds to determine the location of the pregnancy. This is due to ultrasounds being performed too early in pregnancy, as well as being performed strictly based on patient or provider preference.

Within the project site, there were no policies, procedures, or protocols in place to guide the use of ultrasounds for providers. Ultrasounds were done at the discretion of the provider based on individual clinical judgment. Many times, ultrasounds were being performed in very early pregnancy with inconclusive results and pregnancies of unknown location being reported due to early gestation. Providers may have been able to confirm that there is an intrauterine pregnancy, but it is too early to see other fetal structures, such as cardiac activity, that provides patients with reassurance (Wang et al., 2019). While ultrasounds are commonly performed in pregnancy and seen by many as harmless, many times patients are asking for ultrasounds to be performed without clinical indications present.

The organization's current lack of guidelines and the recommendations of AIUM were examined. AIUM states to be in accordance with their Standards and Guidelines for the Accreditation of Ultrasound Practice there needs to be a set of policies and procedures specifically related to ultrasound quality assurance and improvement, safety, infection control,

and equipment performance monitoring should be developed and implemented (AIUM, 2020). The AIUM Standards and Guidelines further support and underlines the need for standardized guidelines and policies. Providers performing first-trimester ultrasounds need to feel confident and supported in providing clinically indicated procedures through a set of policies, procedures, or protocols.

Theoretical Framework

The Donabedian Model for Quality of Care

Throughout the implementation of the DNP project, there must be a process that allows for an evaluation of the quality of care being provided. When thinking about quality there are numerous definitions and applicable theories. The one that most closely aligns with this DNP project is The Donabedian Model for Quality of Care. Avedis Donabedian defined quality of care as a “reflection of values and goals current in the medical care system and in the large society of which it is a part” (Donabedian, 2005). For clinical improvement projects and initiatives within hospitals it is important to have defined outcomes, specific processes and structure to evaluate the change. Each component of the Donabedian model has a specific role and plays a part in examining if the quality improvement project was successful and had its desired impact. Donabedian’s model not only evaluates care provided, but also provides the foundation to look at measurements and areas that need improvement. The three components within the model for evaluating care are: structure, process and outcomes (Donabedian, 2005).

Structure encompasses the settings that care takes place in, adequacy of facilities and equipment, qualifications of staff, administrative structure and operations. It is the assumption that with proper settings and instrumentalities, good medical care will be received. Structure can also be a reflection on care provided through provisions of care such as patient ratios and staffing perceptions.

When evaluating quality of care, structure has the advantage of being concrete and typically has easily accessible information available (Donabedian, 2005).

Process examines the care that has been provided rather than the results and outcomes. It asks the important question of has “good” medical care been applied. Process looks to see if the system allowed or prevented the desired process. It examines the appropriateness, completeness and information obtained through various assessment measures such as: clinical history, physical examination and diagnostic tests. It seeks out the justification of diagnosis and therapies, technical competence in the performance of procedures, evidence of preventive management in health and illness, coordination and continuity of care, and acceptability of care provided to patients (Donabedian, 2005).

Outcomes have often been seen as the “gold standard” for evaluating quality medical care. It is seen as the ultimate validator for quality of care provided, as it is a precise way to measure outcomes. Donabedian’s model differs in that it asks the question if outcomes truly are the most relevant measures to examine quality of care. For example, survival may be the criteria outcome, but that does not account for suboptimal health or crippling conditions that may impact individuals. Outcomes rarely give insight into strengths and weaknesses of the care provided, but by and large remains the ultimate validator for quality of care (Donabedian, 2005).

In order to evaluate quality of care for this DNP project the three components of Donabedian’s model will be examined: structure, process, and outcomes. The project will assess the impact of implementation of evidence-based practice guidelines on the utilization of first-trimester ultrasound within obstetric triage on ultrasound usage. To be able to evaluate this question through the lens of the Donabedian model, the structure of obstetric triage at the project site, such as the setting, equipment and qualifications of providers will be assessed. The process for CNMs and

APRNs appropriately performing first-trimester ultrasounds based on evidence-based practice guidelines, will be examined. Finally, the project will evaluate the impact of evidence-based practice guidelines on the number of ultrasounds performed. Donabedian's model allows for the quality of a practice change to be continually examined and evaluated to ensure the highest quality of healthcare is being practiced.

Duck's Change Curve Model

Changing a practice or implementing a new one within a healthcare setting is a large undertaking that requires buy-in to achieve the desired result. When incorporating change, such as new policies and guidelines, into healthcare there is often a long, complicated roadmap for that change to take place. Duck's Change Curve Model examines this roadmap of change for organizations and the challenges that present themselves and the process that individuals undergo within the organization during times of change. Duck's Change Curve Model looks to examine the basic changes in an organization as well as the potential areas for failure through a five-step process (Duck, 2001).

Stage I examines stagnation within an organization, whether through poor strategy, outdated technology or process, too few resources or lack of leadership. In stagnation there is no urgency for change and individuals are comfortable. This stage ends when a forceful demand for change occurs whether through internal or external initiation. An action is taken, and change begins to take shape. Such as when the problem has been identified that there is a lack of evidence-based practice guidelines to guide CNMs and APRNs to perform first-trimester ultrasounds and providers are instead using their own clinical judgment to perform first-trimester ultrasounds.

Stage II examines preparation which may see people within the organization experience anxiety, hopefulness, and/or productivity. This stage also requires "buy-in" from people who will

be participating in the change and there must be unity and communication among leaders. During this stage this will involve beginning to speak to the CNMs and APRNs within triage about the changes that will be taking place, as well as getting their input into the project.

Stage III is implementation of the change and when the journey truly begins. During implementation it is vital that leaders help people understand the overall change and motivate individuals that the plan will be successful if executed properly. Implementation of change must actively change individuals' mindsets and work practices, it cannot just be deciding to make the change and writing up a blueprint (Duck, 2001). The approach to communication during implementation is another vital part. During times of change, individuals do not flourish when communication is one sided and focused on telling people what to do; rather, through explanation and listening does real change become accomplished. There must be a fundamental change or shift in culture within an organization during the implementation stage. This involves CNMs and APRNs being ready for change in this stage and confident about making the change to increase their belief in the project.

Stage IV is determination and considered the most critical stage when implementing change because it has the biggest chance of failure in this stage. This partly due to leadership believing that the change is over and diverting attention away to other issues or concerns. It is important to continue to support the CNMs and APRNs during this time as they may begin to experience change fatigue and lose sight of the project's goals. The CNMs and APRNs must feel as though this change will lead to success in order to continue to implement the change (Duck, 2001). Within the project during this stage, it will be important to continue to support CNMs and APRNs undergoing the change and celebrate successes of the project as this is a critical time to reinforce and cement the practice changes.

The final stage V is fruition, which is when positive change and outcomes can be seen. In this stage, individuals feel confident in the change and have seen a positive impact. The practice change that has occurred needs to be celebrated and individuals rewarded so that they do not experience complacency and become stagnant after the initial change process. Fruition is the step that brings the organization and changes full circle. It is important to celebrate and acknowledge all hard work that has been put into the practice change within the DNP project (Duck, 2001).

Definition of Terms

Advanced Practice Registered Nurse (APRN): Advanced practice registered nurses (APRNs) are registered nurses educated at master's or post master's level in specific roles and patient populations. APRNs can assess, diagnose, manage patient problems, order tests and prescribe medications (NCSBN Leading Regulatory Excellence, 2021).

Certified Nurse Midwife (CNM): Certified Nurse Midwives (CNMSs) are APRNs that provide primary health care services, gynecologic care, family planning services, preconception care, prenatal and postpartum care, childbirth, and care of the newborn (NCSBN Leading Regulatory Excellence, 2021).

Ectopic Pregnancy: Ectopic pregnancies occur when a developing blastocyst implants at any site other than the uterine cavity. Clinical signs are vaginal bleeding and abdominal pain in the absence of a menstrual period (Poe et al., 2021)

Evidence-Based Practice Guidelines: Evidence-based practice guidelines are recommendations in the form of clinical practice guidelines that are used to help practitioners, patients, and administrators make appropriate healthcare decisions. These guidelines use relevant medical literature and help to guide decisions surrounding diagnostic tests to order, which treatment to

use for specific conditions, when to discharge patients, and other aspects of clinical practice (Lim et al., 2008, p. 26).

Intrauterine Pregnancy (IUP): Pregnancy located inside of the uterus that is definitively diagnosed by ultrasound (Poe et al., 2021)

Obstetric Triage: Obstetric triage began to be seen as its own specialty in the 1980s-1990s within the United States. Over the last 15 years, obstetric triage units have experienced significant changes in how triage concepts have been applied to obstetrical care. Obstetric triage services can fall under the role of obstetrical laborist, hospitalist or midwife. Triage is used to manage early, mid and late pregnancy complications and other emergent obstetric conditions. Obstetric triage units are seen as the “gatekeeper” for assessment of obstetric complaints (Angelini et al., 2014).

Pregnancy Unknown Location (PUL): PUL is when the b-hCG is positive, but an ultrasound fails to find an intrauterine pregnancy. PUL puts the patient at risk for ectopic pregnancy and requires close follow-up with diagnostic testing to determine whether the pregnancy is viable or nonviable (Poe et al., 2021).

Rationale for the DNP Project

Clinical inquiry generates questions that are challenging and thought provoking and leads to profound changes and research within the medical community and nursing profession. Standardizing guidelines and implementing protocols based on best practices and a critical review for those guidelines are key aspects necessary to improve quality and safety of care provided in obstetric triage units. There are various high-risk complications that can occur within the first trimester that are diagnosed by ultrasonography and CNMs and APRNs must be

supported by evidence-based practice guidelines that are in place within institutions to diagnose and treat these complications.

Ultrasound is an important skill that CNMs and APRNs perform. Standardized training and evidenced-based practice guidelines provide a supportive environment for CNMs and APRNs to grow and enhance their skills surrounding ultrasonography. While also empowering CNMs and APRNs to provide high quality care to pregnant individuals

PICOT Question

Through personal clinical practice and interviewing CNMs and APRNs within the obstetric triage unit at the project site, the question of improving the process of performing first-trimester fetal ultrasounds arose. A Quality Improvement (QI) project was conducted within an obstetric triage unit at a large community hospital to assess the impact of implementation of evidenced-based ultrasound guidelines on the number of first-trimester ultrasounds being performed by CNMs and APRNs in an obstetric triage unit. The QI project examined a practice change related to ultrasound utilization. The implementation of evidence-based practice guidelines were supported and approved by the hospital and were based on recommendations set forth by professional organizations.

The PICOT question being examined is: In Certified Nurse-Midwives and Advanced Practice Registered Nurses who perform ultrasounds, how does implementation of evidenced-based guidelines concerning fetal ultrasound usage in the first trimester, compared with no guidelines, affect the utilization of ultrasounds within a three-month period.

The population being evaluated is CNMs and APRNs that perform first-trimester ultrasounds within an obstetric triage unit. The intervention is the implementation of evidence-based guidelines in comparison to no established guidelines or policies. The impact of

implementing evidence-based practice guidelines on the utilization of first- trimester ultrasounds being performed over a three-month period pre-and post-implementation will be examined.

Purpose and Aims

The purpose of this quality improvement project is to assess the impact of implementation of evidence-based practice guidelines on the utilization of first-trimester ultrasound by CNMs and APRNs. The aims of this project are to identify best practices in performing first-trimester ultrasounds for CNMs and APRNs, implement policy and procedure based on evidenced-based practice guidelines for first-trimester ultrasounds in an obstetric triage unit and finally, assess effect of policy and procedure implementation on utilization of first-trimester ultrasound in obstetric triage.

Chapter II

Project Design

Obstetric triage has become one of the most critical perinatal service innovations within the last two decades to have emerged in the field of obstetrics, as it has changed how obstetrical care is both assessed and provided within the hospital setting (Angelini & Howard, 2014). CNMs and APRNs have become deeply integrated into obstetric triage units, which has led to the expansion of their roles within hospitals to be beyond labor management and deliveries. Obstetric triage units also offer important training opportunities for CNMs, APRNs, and medical students, as well as resident physicians. However, more importantly interprofessional collaboration amongst providers and healthcare workers within obstetric triages, has been associated with improved outcomes and safer care (Angelini & Howard, 2014).

Obstetric triage units are seen as the gatekeeper for assessing emergent obstetric concerns and providing high reliability perinatal care. However, there are specific liability risks associated with practicing within an obstetric triage unit (Angelini & Howard, 2014). The use of both clinical and administrative protocols minimizes liability risk for the providers as well as addresses the best evidence for care of pregnant individuals in the triage setting. Thus, lowering liability risk exposure and minimizing risk of patient harm (Angelini & Howard, 2014). CNMs and APRNs performing first-trimester ultrasounds in triage without standardized protocols or guidelines to follow, experience an increased liability and risk. Through interprofessional collaboration with Maternal Fetal Medicine physicians within the institution, a standardization of protocol for CNMs and APRNs, who provide first-trimester ultrasounds, was created based on critically reviewed guidelines and recommendations from the institution and governing bodies within obstetrics and gynecology. Through standardization of guidelines for first-trimester

ultrasounds, CNMs and APRNs will be able to provide high reliability perinatal care with a reduction in liability and risks.

Human Subject Review

Research that involves human subjects warrants careful and ethical examination. This project was examined and approved by Georgetown University's Institutional Review Board (IRB), the DNP committee, and the institution's IRB committee where the DNP project took place. The intervention for this QI project was not directly on pregnant individuals; therefore, the normal ethical considerations for pregnant people did not apply. Protecting private health information of pregnant individuals that undergo ultrasounds was a key consideration. The data will be sent from the Electronic Medical Record (EMR) to the Principal Investigator (PI) already deidentified with no patient information or identifiers present. Due to these measures taken to protect patient information, Georgetown's IRB committee deemed the project as not involving human research; therefore, not needing full IRB review and approval. A separate process for the institution's IRB committee was conducted and it was determined not to be a Human Subjects Research and did not warrant a full IRB review as well.

Setting and Population

The project implementation site was a large, community hospital located in the Midwest. In the fiscal year of 2020 the hospital had a total of 859 beds and a total of 8,840 births. Within the triage setting at the institution, OB/GYN residents, Family Medicine residents, Maternal Fetal Medicine Physicians, and Generalist OB/GYNs provide and oversee care of patients, alongside the CNMs and APRNs who staff the obstetric triage unit. Pregnant patients can be seen within obstetric triage ranging from the time of receiving a positive urine pregnancy test to two weeks postpartum. Pregnant patients come in for a wide variety of pregnancy related concerns.

Within the first trimester the most common concerns that individuals present to obstetric triage are for vaginal bleeding, abdominal pain or cramping, and nausea and vomiting.

Plan, Timeline, and Implementation

The intervention for this QI project was the implementation of evidence-based practice guidelines supported and approved by the hospital, and based on recommendations put forth by ACNM, ACOG, AWHONN and AIUM's published guidelines. Utilization of first-trimester ultrasounds over a three-month period pre-and post-implementation of the developed and approved practice guidelines was examined. The QI project took place over six months which included the collection of three months of retrospective data prior to the implementation of guidelines, staff education regarding the guidelines, and three consecutive months of data post implementation of the guidelines. Staff education and introduction of evidence-based practice guidelines occurred in November 2021 and the collection of three consecutive months of data included November 2021 – January 2022. Each CNM and APRN participated in one-on-one educational sessions and was signed off on the new guidelines. To ensure that the new guidelines were being consistently followed, a physical checklist was created. CNMs and APRNs reviewed and initialed the checklist after each first-trimester ultrasound performed. See Appendix B for the checklist used.

Data was examined retrospectively to determine a baseline for the number of ultrasounds being performed in obstetric triage prior to implementation. The number of ultrasounds being performed for three-months post-implementation was collected and the rate of first-trimester ultrasounds performed calculated. Comparing patient encounters must also be considered when examining the data as patient encounters fluctuate month to month. If in one of the months post-implementation patient encounters declined, it could have appeared that there was a reduction in

ultrasound usage; rather, than more judicious use of ultrasound due to the guidelines. However, by examining ultrasound usage each month after the implementation, it allows for the examination of whether using evidence-based practice guidelines when performing first-trimester ultrasounds, influenced providers decision making whether to perform an ultrasound or not. Our aim was to assess the impact of implementation of evidence-based practice guidelines on the utilization of first-trimester ultrasound by CNMs and APRNs.

Data Collection Procedures

The deidentified data was obtained from the Electronic Medical Record (EMR) used within the hospital system. The deidentified data collected included the number of ultrasounds being performed and gestational age and/or trimester of pregnancy. The raw data was managed within an Excel spreadsheet housed on a password protected and encrypted cloud-based storage system provided by the university that the PI and statistician had access to. The EMR ran a report for the PI on the ultrasound utilization three months post-implementation, as well as provided retrospective data on the three months prior to the implementation.

The data was protected by encryption of content when stored at rest and for transmission, controlled environment with limited access, and a wide variety of compliance and security programs. The data extracted from the EMR was deidentified to ensure no personal information was obtained and reported upon, each ultrasound was given a random number maker within the Excel sheet. The reliability of the date was dependent on how well the data was collected and obtained from the EMR.

The number of patient encounters within a given month fluctuated, which meant a power analysis was performed due to variation in the monthly numbers to determine the appropriate sample size. Using G*Power 3.1.9.7, a minimum sample size of 88 was required to achieve a

power of .80 for chi square analysis with $df = 1$, $\alpha = .05$, and medium effect size of $w = .30$. Data analyses were conducted using IBM® SPSS. The rate was determined by the number of first-trimester ultrasounds performed when compared to the number of patients seen that were within their first trimester of pregnancy. By ensuring a rigorous collection process and determining sample size we ensured validity of the data within this DNP project.

Data Analysis Plan

A two-sample test of proportions using Stata 17 (StataCorp, College Station, TX) was performed to examine if there was a statistical difference between the percentage of ultrasounds performed pre-implementation of evidence-based practice guidelines versus post-implementation. The rate of ultrasounds was calculated to compare what the rate before and after the implementation of evidence-based practice guidelines was. This quantitative method of examining the data was completed to examine if the intervention impacted how CNMs and APRNs were practicing and performing first-trimester ultrasounds.

Chapter III

This chapter describes the results of data analysis of the extracted data from the EMR of ultrasounds performed within the obstetric triage unit, specifically the number and rate of first-trimester ultrasounds were examined. The number and rate of ultrasounds along with the total number of patients seen in obstetric triage were included within the final statistics for the QI project. The statistical significance, or lack thereof, of first-trimester ultrasounds pre-and post-implementation was then discussed and summary of the findings examined.

Analysis of Data

Performance of Ultrasounds in Obstetric Triage

The data was extracted from the EMR in January 2022. The data collected was the total number of patients seen within obstetric triage, total number of ultrasounds performed across all the trimesters of pregnancy, and total first-trimester ultrasounds performed. From August 2021 through January 2022 the total number of patients seen in the obstetric triage unit at the project site was 6,027. The total per month ranged from 950 to 1034 with November being the lowest total number of patient encounters and January being the highest. A total number of 1,517 first, second and third- trimester ultrasounds were performed from August 2021-January 2022, with the lowest number being in November 2021 and highest being in August 2021. A total number of 507 first-trimester ultrasounds were performed through the six-month period with the range of 63 in January 2022 to 99 in October 2021. The rates were then calculated for the total number of ultrasounds performed and total first-trimester ultrasounds performed from August 2021 through January 2022. See Table 1 for the rates, total ultrasounds and total first-trimester ultrasounds performed for each month.

Table 1
Analysis of Data: Ultrasounds in Obstetric Triage

	Total Patients Seen in Obstetric Triage	Total Ultrasounds	Total First-Trimester Ultrasounds	Rate of Total Ultrasounds Performed	Rate of First-Trimester Ultrasounds Performed
August	1029	255	77	24.78%	7.48%
September	1023	266	95	26.00%	9.29%
October	985	247	99	25.08%	10.05%
November	950	243	80	25.58%	8.42%
December	1006	252	93	25.05%	9.24%
January	1034	254	63	24.56%	6.48%

Performance of First-Trimester Ultrasounds

A two-sample test of proportions using Stata 17 (StataCorp, College Station, TX) was performed to examine if there was a significant relationship between the rate of first-trimester ultrasounds pre- and post-implementation of evidence-based practice guidelines. The rate of first ultrasounds performed pre-implementation of evidence-based practice guidelines was 8.92% and post-implementation was 8.03%. This difference was not statistically significant with $p=0.108$ and $z=1.240$ in the number of first-trimester ultrasounds that were performed pre-implementation versus post-implementation.

Table 2
Average Rate of First-Trimester Ultrasounds Performed Pre-and Post-Implementation of Guidelines

Rate of first-trimester ultrasounds performed pre (Aug., Sept., Oct.) implementation of guidelines	Rate of first-trimester ultrasounds performed post (Nov., Dec., Jan.) implementation of guidelines
8.92%	8.03%

Summary of Findings

Overall, there was minimal impact on utilization of first-trimester ultrasounds by CNMs and APRNs after the implementation of the evidence-based practice guidelines at the unit level. Considering the volume of obstetric triage encounters did not vary greatly pre- and post-implementation; the rate of the first- trimester ultrasounds performed was not significantly impacted either. A viable explanation posed is that CNMs and APRNs performing first-trimester ultrasound in obstetric triage prior to implementation of the guidelines were relying on individual clinical judgment that closely aligned with existing professional guidelines. While the implementation of the guidelines did not necessarily impact the number of first-trimester ultrasounds being performed, it did provide a framework and identify best practices for the performance of first-trimester ultrasounds for CNMs and APRNs.

Chapter IV

This chapter will review and discuss the findings from this QI project. Strengths and limitations of the project, practice implications, and recommendations for future consideration will be examined.

Discussion of Findings

While there was no statistically significant difference on utilization of first-trimester ultrasounds there are implications for practice that arose from this QI project. Prior to the QI project, CNMs and APRNs were using clinical judgment based off lab results, clinical presentation and physical exam to determine if an ultrasound was needed in the first trimester. Through the implementation of evidence-based practice guidelines and the collection of data on first-trimester ultrasounds, it was to examine if utilization of first-trimester ultrasounds changed after the practice change. While there was a slight decrease in the rate of ultrasounds performed post-implementation of guidelines the decrease was not statistically significant.

While utilization of first-trimester ultrasounds did not change, best practices surrounding performance of first-trimester ultrasounds were established. Consistency and accuracy were established in determining which pregnant individuals received a first-trimester ultrasound. The guidelines provided a structured process for the CNMs and APRNs to follow to ensure that pregnant individuals who presented to obstetric triage received an ultrasound when needed, while also limiting the number of first-trimester ultrasounds performed due to patient or provider preference. Ultrasonography is safe for the fetus when appropriately used and performed to gain medically necessary information (ACOG, 2016). However, it is important to be judicious in performing first-trimester ultrasounds following the ALARA (as low as reasonably achievable) principle set forth by AIUM to ensure fetal safety and that an ultrasound should be performed

when a valid medication indication is present. While diagnostic ultrasounds are considered generally safe throughout pregnancy, they are not completely innocuous, and the possibility does exist of biological effects from the ultrasound energy, which may be identified in the future (AIUM, 2018; ACOG, 2016). Thus, ultrasounds should only be performed in the presence of valid medical indications and discretion should be observed when performing medical interventions or tests such as obstetric ultrasounds when there are no indications (ACOG, 2016).

Often there is a desire from the patient to have an ultrasound performed to see their baby and feel reassured, especially within the first trimester before fetal movements are felt. However, during pregnancy AIUM does not support the use of ultrasounds to provide keepsakes or memento photos, this use of ultrasound is not best practice and ultimately does not follow recommendations set forth by AIUM (AIUM, 2018). When the CNMs and APRNs are asked to perform first-trimester ultrasounds for patient reassurance they need to feel confident and supported in providing only clinically indicated ultrasounds by the support of these guidelines created within this DNP project. Ultimately obstetric ultrasounds should only be performed when medically indicated to ensure that pregnant individuals are receiving the highest quality of care that is following the most up-to-date guidelines to ensure patient and fetal safety (AIUM, 2018).

This was a practice change centering around the perceived lack of structure in guidelines for first-trimester ultrasounds and patient feedback that ultrasounds were being performed too soon and leaving patients with equivocal results that required more follow up. The implementation of guidelines for this QI project led to not only a more unified, seamless process, but also concrete support for the CNMs and APRNs within obstetric triage when discussing the reasoning and evidence behind the decision to perform an ultrasound or not.

While this project did not specifically examine the impact on quality of care being provided, it did use the Donabedian Model for Evaluating Quality of Care in order to frame the care being provided and to examine the best practices to emerge from this DNP project. Each component of the Donabedian Model is a structured process that examines the impact of quality of care on patients within healthcare (Donabedian, 2005). Using the model, it allows to explore the outcomes of this DNP project through the lens of the Donabedian Model and the impact it had on the care being provided to pregnant individuals within obstetric triage. The best practices that were established improved consistency and accuracy in ultrasound documentation, utilization of first-trimester ultrasounds based on clinical indications, and adoption of the evidenced-based protocol by the institution.

Clinical judgment of the CNMs and APRNs is not a component of care that can be disregarded within this DNP project because prior to the practice change clinical judgment was what the CNMs and APRNs were primarily using to practice. CNMs and APRNs were using their prior knowledge, skill, and experience to effectively determine the appropriate care for pregnant individuals and when it was clinically appropriate to perform a first-trimester ultrasound. The process the CNMs and APRNs were using prior to the practice change is what constitutes the usage of clinical judgment on whether to perform an ultrasound or not. With the introduction of evidence-based practice guidelines, the goal was to impact utilization and provide a more structured process for the CNMs and APRNs to provide better care based on current evidence and guidelines. It was unknown at the beginning of the QI project if utilization would be impacted or not and with the collection and analysis of data it showed that there was not a statistically significant difference. Now with the evidence-based practice guidelines in place for CNMs and APRNs, it is evident that they were using accurate and appropriate clinical judgment

prior to the practice change when performing first-trimester ultrasounds. Now, they are supported by the protocols and guidelines put into place by this DNP project.

Limitations

Within this DNP project there were multiple limitations noted throughout the implementation process and data collection. It was noted that not all ultrasounds within the pre- and post- implementation extracted data had a gestational age or trimester associated with it. This likely was due to an order for an ultrasound being placed by a provider, but no gestational age or trimester being noted within the designated diagnosis. Therefore, those ultrasounds could not be included within the final total of the number of first-trimester ultrasounds or any other trimester of ultrasounds. This left out a significant portion of ultrasounds that were performed and not included within the final data.

Throughout the project, CNMs and APRNs have different comfort levels at performing ultrasounds. There are some that are more comfortable at performing early ultrasounds themselves within obstetric triage and comfortable with determining IUPs; however, some CNMs and APRNs may have referred to the perinatal center for ultrasounds and those ultrasounds were not accounted for in the data.

The collected data did not reach the minimum sample size of 88 determined by the power analysis, there was an average of 85 patients seen a month. Therefore, being underpowered within the sample size, could have impacted results of the data not being statistically significant. However, with a p over .10 most, likely not reaching the sample size did not greatly impact the statistical significance and was not the cause of the data being statistically significant or not.

While all CNMs and APRNs were educated to record on the monitoring implementation sheet when a first-trimester ultrasounds was performed, there were documented times when a

first-trimester ultrasound was performed but not documented on the sheet. This was likely due to acuity of patients and census in triage. There were times during the implementation of this DNP process, especially with Covid-19, that census was high and nursing shortages were noted. This left the CNMs and APRNs with less time for charting, as they had a higher patient volume and filling out the implementation sheet was not completed.

Practice Implications

The importance of supporting and implementing evidence-based practice guidelines for clinical practice benefits has been showed to improve patient care and outcomes, particularly within obstetric triage units (Angelini & Howard, 2014). The first-trimester ultrasounds in obstetrical triage are now being performed using evidence-based practice guidelines that are supported by the institution. The implementation of evidence-based practice guidelines provides support and standardization to CNMs and APRNs, when performing ultrasounds. Using clinical guidelines and protocols that best address the most current evidence for caring for pregnant individuals within the obstetric triage unit also significantly reduces liability risk and exposure for CNMs and APRNs, while also minimizing harm to patients (Angelini & Howard, 2014).

It is now important to continue to use evidence-based practice guidelines for first-trimester ultrasounds within obstetric triage to provide credibility to the practice and expansion of CNMs and APRNs within obstetric triage units. Within the institution that the DNP project took place CNMs and APRNs are the main providers within the obstetric triage unit and are the cornerstone to the high level of care being provided. Therefore, CNMs and APRNs must be a part of bringing up concerns that arise in the care being provided within obstetric triage, so that they can be a part of practice changes to ensure the highest standard of care.

Through this DNP project the implementation of new evidence-based practice guidelines within a busy obstetric triage, with an already well-established culture can be accepted by providers. This is possible when done through careful consideration of feedback from providers working within the unit, reflecting on Duck's Change Curve Model as the change took place, and creating guidelines that are evidence-based and will benefit providers who are a part of the practice change. Hopefully, the practice change seen within this DNP project will lead to the creation of more evidence-based practice guidelines when a clinical issue arises. Practice changes within medicine should be commonplace, as there are always new updates on guidelines and research being published and all providers should strive to be providing the most current and clinically relevant care to patients.

Recommendations for Further Study

Within this DNP project there were multiple recommendations and follow-ups that emerged. If this practice change were to occur again or furthered studied a closer examination into specific diagnosis associated with first-trimester ultrasounds could provide a greater insight into the most common reasons that patients present to obstetric triage. Only the number of ultrasounds performed, and number of patients seen within obstetric triage were collected. Collecting data on the associated diagnoses with the first-trimester ultrasounds performed would allow obstetric triage providers to examine common themes and gaps in knowledge about common first trimester concerns. This could possibly lead to reaching out to providers' offices for there to be better education surrounding first trimester concerns at prenatal appointments.

Also, moving forward involving and educating the OB/GYN providers and triage nurses within offices on the first- trimester ultrasound guidelines could prevent patients from having to come to obstetric triage for first trimester concerns such as spotting or mild abdominal pain.

Especially, during Covid-19 surges individuals were encouraged to reach out to their providers in hopes that their concern could be addressed within an office setting and prevent a visit to obstetric triage, which would limit individuals' exposure to Covid-19. Also, if there is concerning news to be delivered such as a miscarriage, pregnant individuals often want their established OB/GYN providers to be discussing the results and plan of care moving forward, instead of providers in obstetric triage that are meeting them for the first time and delivering this news.

There is also the financial component of obstetric triage visits. An obstetric triage is seen as an emergency service and is billed similarly to an emergency room visit, which is much more than an office visit. These visits to obstetric triage can be a financial burden to patients and should be reserved for obstetric concerns and/or emergencies that are best met managed with the resources found in obstetric triage. This improves stewardship by using talents and resources of the institution to improve the patient experience, all while being responsible stewards.

Another component to emerge from this DNP project is the need for continuing ultrasound education and training for CNMs and APRNs within the obstetric triage unit. CNMs and APRNs are performing a large volume of obstetrical Point-of-Care (POC) ultrasounds, not only in the first trimester, but throughout all trimesters. Therefore, there should be an educational competency component for CNMs and APRNs working within obstetric triage to ensure that providers are staying current with practices. It is also recommended by AIUM that provider performance should be monitored through a quality assurance program to ensure that the providers skills are accurate and providing the high quality of images (AIUM, 2018).

Continuing with this project in the future could involve the exploration of provider confidence and the impact of implementation on clinical decision making. Exploring provider

confidence and clinical decision making, particularly in relation to ultrasounds, could be of use in strengthening quality and safety practices at the institution.

Conclusions

There was not a statistically significant difference in the rate of first-trimester ultrasounds being performed by CNMs and APRNs pre-versus post-implementation of evidence-based practice guidelines. Best practices were identified and include improved consistency and accuracy in ultrasound documentation, utilization of first-trimester ultrasounds based on clinical indications, and adoption of the evidenced-based protocol by the institution as part of assessing ongoing quality of care. First-trimester ultrasounds within obstetric triage are now being performed based on medical indications outlined by the guidelines that were implemented through this DNP project.

The implementation of evidence- based guidelines provides support and standardization to CNMs and APRNs, which enables practice and higher quality of patient care within obstetric triage. Standardizing guidelines and implementing evidenced-based guidelines for obstetric triage units is what leads to safer practice and higher quality of patient care all while improving patient outcomes.

Appendix A

LEGEND Table of Evidence Levels



LEGEND
Let Evidence Guide Every New Decision
Table of Evidence Levels

TABLE OF EVIDENCE LEVELS: Levels of Individual Studies by Domain, Study Design, & Quality

DOMAIN OF CLINICAL QUESTION	TYPE OF STUDY / STUDY DESIGN																			
	Systematic Review Meta-Analysis	Meta-Synthesis	RCT*	CCT*	Psychometric Study	Qualitative Study	Cohort – Prospective	Cohort – Retrospective	Case – Control	Longitudinal (Before/After, Time Series)	Cross – Sectional	Descriptive Study Epidemiology Case Series	Quality Improvement (PDSA)	Mixed Methods Study	Decision Analysis Economic Analysis Computer Simulation	Guidelines	Case Reports N-of-1 Study	Bench Study	Published Expert Opinion	Local Consensus Published Abstracts
Intervention <i>Treatment, Therapy, Prevention, Harm, Quality Improvement</i>	1a* 1b*		2a 2b	3a 3b		4a 4b	3a 3b	4a 4b	4a 4b	4a 4b	4a 4b	4a 4b	4a 4b	2a/2b 3a/3b 4a/4b	5a 5b	5a 5b	5a 5b	5a 5b	5a 5b	5
Diagnosis / Assessment	1a 1b			2a 2b	2a 2b		3a 3b	4a 4b			4a 4b	4a 4b		2a/2b 3a/3b 4a/4b	5a 5b	5a 5b	5a 5b	5a 5b	5a 5b	5
Prognosis	1a 1b						2a 2b	3a 3b	4a 4b		4a 4b	4a 4b		2/3/4 a/b	5a 5b	5a 5b	5a 5b	5a 5b	5a 5b	5
Etiology / Risk Factors	1a 1b		2a 2b	3a 3b			3a 3b	4a 4b	4a 4b		4a 4b	4a 4b		2/3/4 a/b	5a 5b	5a 5b	5a 5b	5a 5b	5a 5b	5
Incidence	1a 1b						2a 2b	3a 3b				4a 4b				5a 5b	5a 5b	5a 5b	5a 5b	5
Prevalence	1a 1b								2a 2b		3a 3b	4a 4b				5a 5b	5a 5b	5a 5b	5a 5b	5
Meaning / KAB*		1a 1b			2a 2b									2/3/4 a/b		5a 5b	5a 5b	5a 5b	5a 5b	5

* a = good quality study b = lesser quality study
* CCT = Controlled Clinical Trial KAB = Knowledge, Attitudes, and Beliefs RCT = Randomized Controlled Trial

Shaded boxes indicate study design may not be appropriate or commonly used for the domain of the clinical question.

Development for this table is based on:
1. Phillips, et al: Oxford Centre for Evidence-based Medicine Levels of Evidence, 2001. Last accessed Nov 14, 2007 from <http://www.cebm.net/index.aspx?o=1025>.
2. Fineout-Overholt and Johnston: Teaching EBP: asking searchable, answerable clinical questions. *Worldviews Evid Based Nurs*, 2(3): 157-60, 2005.

Appendix B

Monitoring Implementation Sheet

Monitoring Implementation Sheet	Date & Initials	Date & Initials	Date & Initials	Date & Initials	Date & Initials	Date & Initials	Date & Initials	Date & Initials	Date & Initials
Chooses correct transducer									
Determines cardiac activity									
Identified appropriate landmarks (Gestational sac, yolk sac, fetal pole)									
Crown Rump Length (CRL)									
Estimated Gestational Age (EGA)									
Diagnosis documented in charges									
Appropriate documentation within Epic									

Appendix C

Frist-Trimester Ultrasound Guidelines

I. PURPOSE

- a. Confirmation of intrauterine pregnancy
- b. Defining cause of vaginal bleeding
- c. Evaluation for suspected ectopic pregnancy
- d. Evaluation of pelvic pain and/or abdominal pain
- e. Estimation of gestational age
- f. Confirm cardiac activity and other fetal landmarks including, but not limited to gestational sac, yolk sac, fetal pole, and crown rump length

II. DEFINITIONS

1st Trimester Ultrasound – abdominal and/or transvaginal ultrasound performed prior to 14 weeks gestation

ALARA (as low as reasonably achievable)- the lowest possible ultrasonic exposure setting should be used to gain the necessary diagnostic information (AIUM, 2018)

Ectopic Pregnancy (EP) – products of conception implanted outside of the endometrial cavity, most commonly occurring in the fallopian tubes

Intrauterine pregnancy (IUP) – Intrauterine gestational sac seen by ultrasound with a yolk sac and/or embryo present

Limited obstetric ultrasound – performed to answer a specific, acute clinical question that may have an immediate impact on the management of an individual’s care. May be performed if time or other constraints make a standard ultrasound examination impractical or unnecessary (AIUM, 2018)

Pain assessment – per policy the numeric scale to ask pregnant patients about their pain. I.e. on a scale of 0 to 10, 0 being no pain and 10 being the worst pain you have ever experienced, what is your pain level right now?

Pain severity – Commonly used numeric scale classifying pain intensity on a 0–10 scale as Mild, Moderate, and Severe. Classically pain intensity within the 0–4 range as is described as “None”, “Very Mild” or “Mild”, pain intensity in the 5–6 range as “Moderate” and pain intensity in the 7–10 range as “Severe” or “Very Severe (Jensen et al., 2017)

Point-of-Care ultrasound – the usage of ultrasound to complement physical examination to aid in diagnosis (AIUM, 2019)

Obstetrical triage (OB) – is used to manage early, mid and late pregnancy complications and other emergent obstetric conditions (Angelini & Howard, 2014)

Pregnancy unknown location (PUL) – the location of a pregnancy cannot be definitively determined

III. POLICY

- a. The Obstetric Triage (OB) provider will provide timely Point-of-Care (POC) sonographic imaging for any pregnant patient who presents to OB Triage with a pregnancy concern that warrants an ultrasound.
- b. Diagnostic ultrasounds should be performed only for a valid medical indication and adhere to the ALARA principle (as low as reasonably achievable)
- c. OB Triage provider will order a Beta hCG if one has not been previously drawn or is documented in the EMR and is available for the provider
- d. Patient must be medically and hemodynamically stable
 - i. Minimal to moderate abdominal pain
 - ii. Severe acute abdominal pain or hemodynamically unstable requires notification of in-house OB/GYN hospitalist and/or private attending and shared decision making concerning appropriate disposition of patient
- e. If a PUL is suspected the OB/GYN hospitalist or private attending should be notified
 - i. If during the hours of operation for the Perinatal Center (PNC), the patient should be sent for a confirmation ultrasound
 - ii. If after hours or on the weekend the OB/GYN hospitalist or attending should be called to perform an ultrasound to confirm PUL. The OB/GYN attending should then notify the Maternal Fetal Medicine physician on-call, so that the on-call sonographer can be called in to perform an ultrasound if needed.
 - iii. If free fluid is identified on limited obstetric ultrasound, the disposition of the patient will need to be determined with the attending physician based on significance of free fluid present (i.e. going to the operating room immediately or need for formal scan)
- f. A standard obstetric sonogram in the 1st trimester includes evaluation of the presence or absence of gestational sac(s); size, location and number of gestational sac(s).
- g. When embryo/fetus is detected, it should be measured, and cardiac activity recorded with a fetal heart rate if possible. M-mode ultrasound is the recommended technique for assessing fetal heart rate in the first trimester.
- h. This exam may require both abdominal and/or transvaginal ultrasound

- i. An ultrasound order should be placed by the ordering provider within OB Triage

IV. PROCEDURE

- a. An OB Triage provider explains the procedure
- b. Patient positioning
 - i. Abdominal ultrasound
 - 1. The patient is placed in semi-fowlers position with the head of bed elevated 30 degrees
 - 2. The abdomen is draped, preserving patient privacy, and aquasonic gel is applied to the abdomen
 - ii. Transvaginal ultrasound
 - 1. Patient should empty bladder prior to procedure
 - 2. Patient is placed in lithotomy position with the head of bed elevated
 - 3. Preserve patient privacy as much as possible
 - 4. Based on patient preference, probe may be guided internally by sonographer or patient

V. DOCUMENTATION

- a. Presence of intrauterine pregnancy
- b. Measurements of sac, or crown-rump length
- c. Presence or absence of fetus, yolk sac, gestational sac, cardiac activity
- d. If multiple gestations are seen
- e. The presence of free fluid if visualized
- f. For proper documentation within OB Triage, photos should be taken of the exam and printed to be scanned into the EMR or the provider should ensure photos are electronically documented in the EMR within the Images section.

VI. FOLLOW-UP

- a. OB/GYN attending, or OB Triage provider will make recommendations for follow-up testing or procedures based on clinical situation, ultrasound report and/or fetal findings

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