

Gardner-Webb University

## Digital Commons @ Gardner-Webb University

---

Master of Science in Nursing Theses and  
Projects

Hunt School of Nursing

---

Spring 2021

### Yearly Endometriosis Education for Reproductive Nurses

Jessica Boyer

Follow this and additional works at: <https://digitalcommons.gardner-webb.edu/nursing-msn>



Part of the [Nursing Commons](#)

---

#### Recommended Citation

Boyer, Jessica, "Yearly Endometriosis Education for Reproductive Nurses" (2021). *Master of Science in Nursing Theses and Projects*. 15.

<https://digitalcommons.gardner-webb.edu/nursing-msn/15>

This Project is brought to you for free and open access by the Hunt School of Nursing at Digital Commons @ Gardner-Webb University. It has been accepted for inclusion in Master of Science in Nursing Theses and Projects by an authorized administrator of Digital Commons @ Gardner-Webb University. For more information, please see [Copyright and Publishing Info](#).

## **Yearly Endometriosis Education for Reproductive Nurses**

by

Jessica S. Boyer

A project submitted to the faculty of  
Gardner-Webb University Hunt School of Nursing  
in partial fulfillment of the requirements for the  
Master of Science in Nursing Degree

Boiling Springs, North Carolina

2021

Submitted by:

---

Jessica Boyer

---

3/25/2021

Date

Approved by:

---

Abby Garlock, DNP, RN, LCCE

---

03/27/2021

Date

### **Abstract**

Reproductive and infertility nursing is an ever-growing subspecialty of women's health where education and nursing resources are often limited and these nurses learn the majority of their skills through experience. Endometriosis is an increasingly common disease that reproductive nurses are encountering in growing numbers. A thorough literary analysis discovered the importance of early diagnosis to aid in a patient's overall prognosis and long-term success with symptom management. A continuing education curriculum was created and implemented in a reproductive clinic in the South Eastern United States as a yearly learning opportunity for reproductive nurses in an effort to review the fundamentals of endometriosis and discuss the importance of early diagnosis and management.

*Keywords:* endometriosis diagnosis, Knowles adult learning theory, endometriosis markers, nursing education, and endometriosis and unexplained infertility

### **Acknowledgments**

I would like to take this opportunity to thank my wonderful husband, my children Cassidy and Levi, as well as my beautiful mother for supporting me throughout this process. It was never easy to share my time with you and this project, but please know that your encouragement, support, and love made all the difference and it will all be worth it soon. I love you all.

Also, a special thank you to my project chair for her support and suggestions throughout this process. It has been a pleasure to work alongside you to finally complete this process.

## Table of Contents

### CHAPTER I: INTRODUCTION

|                             |    |
|-----------------------------|----|
| Introduction.....           | 8  |
| Problem Statement .....     | 8  |
| Significance.....           | 8  |
| Purpose.....                | 9  |
| Theoretical Framework ..... | 9  |
| Definition of Terms.....    | 10 |
| Conclusion .....            | 11 |

### CHAPTER II: LITERATURE REVIEW

|                                 |    |
|---------------------------------|----|
| Literature Review.....          | 12 |
| Review of Literature .....      | 13 |
| Diagnostic Importance .....     | 13 |
| Endometriosis Effects .....     | 18 |
| Theoretical Framework.....      | 24 |
| Strengths and Limitations ..... | 26 |
| Conclusion .....                | 27 |

### CHAPTER III: NEEDS ASSESSMENT

|                                    |    |
|------------------------------------|----|
| Needs Assessment.....              | 28 |
| Target Population and Setting..... | 29 |
| Sponsors and Stakeholders .....    | 29 |
| SWOT Analysis .....                | 30 |
| Available Resources.....           | 32 |
| Desired Outcomes .....             | 33 |

|                                      |    |
|--------------------------------------|----|
| Team Members .....                   | 34 |
| Cost-Benefit Analysis .....          | 34 |
| Conclusion .....                     | 35 |
| CHAPTER IV: PROJECT DESIGN           |    |
| Project Design.....                  | 36 |
| Goal and Objectives .....            | 36 |
| Plan and Material Development.....   | 37 |
| Timeline .....                       | 38 |
| Budget.....                          | 39 |
| Evaluation Plan .....                | 40 |
| Conclusion .....                     | 40 |
| CHAPTER V: DISSMENATION              |    |
| Dissemination .....                  | 41 |
| Limitations .....                    | 41 |
| Implications for Nursing .....       | 42 |
| Recommendations.....                 | 42 |
| Conclusion .....                     | 43 |
| REFERENCES .....                     | 44 |
| APPENDICES                           |    |
| A: Endometriosis Teaching Aide.....  | 49 |
| B: Teaching Aide Script.....         | 52 |
| C: Pre-and Post-Test Evaluation..... | 57 |

### **List of Figures**

|  |    |
|--|----|
| Figure 1: Conceptual-Theoretical-Empirical Diagram ..... | 10 |
| Figure 2: SWOT Analysis.....                             | 32 |
| Figure 3: Project Timeline .....                         | 38 |

## List of Tables

|   |    |
|---|----|
| Table 1: Project Budget Estimates ..... | 39 |
|---|----|



## **CHAPTER I**

### **Introduction**

In the opinion of the author, the world of reproductive endocrinology and infertility is often viewed as a very specialized nursing discipline and many may not consider or learn about it during their nursing school careers. As our nation's infertility rates continue to increase, the opportunities for nurses to thrive in this field of medicine also continue to rise; though due to its specialty, most learning is done through specific on the job training and practice. Reproductive diseases and the menstrual cycle should be taught in most nursing curriculums, but the in-depth understanding and recognition of certain conditions in this field cannot always be easily taught and are often acquired through real world and real patient experience.

### **Problem Statement**

The early screening and recognition of endometriosis is an important task to master as a reproductive nurse in an effort to treat or slow the progression of the disease as well as protecting the patient's current or future fertility.

### **Significance**

Unexplained infertility is the leading "cause" of infertility in women who have been trying to conceive for at least six months or more, and whose workup or evaluation has not led to a specific diagnosis for the lack of conception. Asymptomatic or silent endometriosis can occur in 25 to 50% of these patients with unexplained infertility, and could be the true cause of their fertility struggles (Bullett et al., 2010). According to Miller et al. (2017), "endometriosis is a chronic, inflammatory, estrogen dependent disease that is characterized by the growth of endometrial tissue outside of the uterine

cavity” (p. 7138). This disease creates a staggering economic impact on the healthcare industry of “over \$22 billion per year in the United States” and remains misunderstood, misdiagnosed, and ineffectively treated as a whole (Miller et al., 2017, p. 7138). Because of its elusiveness and misunderstanding, endometriosis can create a heavy emotional burden on those that suffer with it, therefore, the ability to recognize or detect subtle signs of endometriosis is becoming increasingly important in the patient workup and assessment phase of reproductive nursing to assist patients in accomplishing personal goals of conception and delivery of a healthy baby.

### **Purpose**

The purpose of this project was to explore and develop a teaching curriculum or learning module that would be reviewed by reproductive nurses upon new hire training and then yearly as a refresher to build on their current practice and knowledge base.

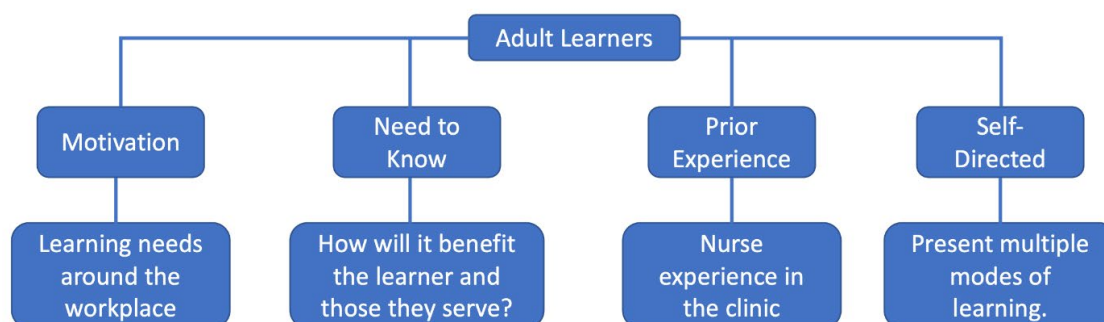
### **Theoretical Framework**

The drive to continuously grow and learn is fundamental to human development and is especially important to those within the healthcare community. Malcolm Knowles was an American educator who gained notoriety through his work in adult learning concepts, and eventually the development of the Knowles’ adult learning theory. Knowles discussed that adult learning is based on six key elements in order for optimal learning to occur; these six key elements include: the need to know, the learner’s self-concept, the role of the learner’s experience, the readiness to learn, orientation to learning, and motivation (Halpern & Tucker, 2015). These six elements may not always occur together, but it is important to consider each one when developing a teaching plan or evaluating the successfulness of a curriculum. Adult learning can be very complex, so

it is presented in often-unique learning environments in an effort to create curriculums that will successfully address important topics as well as address the different learning needs of each individual learner. Online learning has become a more prominent and preferred part of most curriculums and this growth poses even more obstacles that the educator must overcome. However, is possible if one focuses and remembers the six main elements that are unique to adult learning. Knowles emphasized that educators should focus on three main key points when creating a curriculum plan that follows his learning theory: create a safe, active, and collaborative learning environment; engage prior experiences as well as employing ongoing reflection; and focus not on the evaluation but instead on assessment that improves focus (Clapper, 2010). The theoretical and conceptual variables that will be focused on for this project are presented below in Figure 1.

**Figure 1**

*Conceptual-Theoretical-Empirical Diagram*



### Definition of Terms

For the purpose of this project, unexplained fertility is defined as the lack of conception after at least 6-months or more of unprotected intercourse that has led to a negative evaluation and workup by a reproductive endocrinologist.

## **Conclusion**

Unexplained infertility places women in a tough position as it often takes them through severe ups and downs emotionally, especially in instances where an evaluation and workup does not lead to a definitive diagnosis or explanation for the problem.

Patients rely and trust nurses to assist them and guide them to what will ultimately lead to meeting personal goals of care; if nurses are undertrained or undereducated, this trust can be lost very quickly. The purpose of this project was to explore and develop a teaching curriculum that will assist reproductive nurses to build on their current practice and knowledge base, specifically in regards to endometriosis and its early detection and treatment in an effort to slow progression and protect the patient's current or future fertility.

## **CHAPTER II**

### **Literature Review**

Unexplained infertility is often considered a diagnosis of exclusion, once obvious tests and workups have come back with no clear indication for the lack of conception; only then is the diagnosis of “unexplained” given to patients. It is estimated that between 44-73% of couples will seek consultation from a fertility specialist. Of those, one-third of all cases can be linked to female factors, another third to male factors, and the remaining third due to some unexplained combination. However, the incidence of unexplained fertility is highly dependent on reporting criteria, clinician skill, and their understanding of what “unexplained” truly means (Anderson, 2018). One disease process that can often become obscured by a diagnosis of unexplained infertility is endometriosis, which can often also be referred to as “subtle endometriosis”, because these patients often do not present with the classic symptoms and therefore are not properly evaluated for the presence of the disease.

Due to its elusiveness, the early screening and recognition of endometriosis is an important task to master as a reproductive nurse in order to treat or slow the progression of the disease, as well as to protect the patient’s current and future fertility. This project and subsequent literature review were undertaken in an effort to explore and develop a teaching curriculum or learning module for reproductive nurses to review upon new-hire, and subsequently every year, to build on current practice and knowledge base as more evidence-based literature and research is released.

## **Review of Literature**

Prior to the development of this project, a thorough literature review was conducted in an effort to identify strengths and weaknesses in current research, specifically as it pertains to the role of identifying endometriosis in cases of unexplained fertility, as well as the importance of continuing education to promote best practice. Sources utilized for this review included 20 peer reviewed medical journal articles ranging from the year 2004-2020, with most of these falling between the years 2015-2020, that were found through Cumulative Index for Nursing and Allied Health Literature (CINAHL) and PubMed databases. Keywords to aid in article identification included “endometriosis diagnosis,” “endometriosis markers,” “endometriosis and unexplained infertility,” “Knowles learning theory,” and “nursing education.” Through these keyword searches, three main themes seemed to emerge within the research. These three themes included the importance of accurate endometriosis diagnosis, short-term and long-term effects of endometriosis on a patient’s well-being and pregnancy outcomes, and the importance of creating continuing education that is tailored to the adult learner and presented in ways that will foster success. Each article is summarized and discussed below as it pertains to each of these three main themes.

### **Diagnostic Importance**

Grundstrom et al. (2017) utilized a qualitative, interpretive, phenomenological approach to identify and describe the experiences of healthcare encounters among women with endometriosis. During their research period beginning in 2013 and continuing until 2015, the authors interviewed nine women between the ages of 23-55 years old that had laparoscopically confirmed endometriosis; these interviews were recorded and

transcribed verbatim with two main themes emerging which included the feelings of being treated with ignorance, as well as feeling acknowledged and confirmed once a diagnosis was made. These patients overwhelming felt that they were treated with ignorance as they had to struggle with exposing intimate details of their lives and were undergoing multiple repeated gynecological examinations by numerous healthcare professionals before they were given a proper diagnosis and explanation for how they had been feeling. On the other hand, once a diagnosis was finally made, the women spoke of feeling that they had finally been acknowledged and felt confirmed and visible. Though the study was limited to only nine specific patients, the research highlighted the importance of knowledge in the healthcare profession so that women feel empowered in their concerns, and Grundstrom et al. (2017) presented findings that demonstrate the psychological and practical aspects that can be used to create constructive experiences among these patients.

Scioscia et al. (2019) set out to provide practical suggestions for sonographic differential diagnosis of endometriosis with suspected bowel involvement. A retrospective review of ultrasound images and operative notes from endometriosis cases between the years 2015-2018 were evaluated. During this period, there were over 5,000 scans and 20 selected operative cases reviewed; all of which were patients who were referred for secondary endometriosis. After review, the authors report emphasized that “knowledge and awareness of the ultrasound features of endometriosis and other sonographically similar diseases can serve as an important means to prevent physician misinterpretations of a condition that could have otherwise been properly treated (Scioscia et al., 2019). Through their extensive research, Scioscia et al. (2019) were able

to discuss endometriosis and its bowel involvement in depth, which also provided thorough evidence supporting the importance of operator skill when it came to ultrasonography and the diagnosis of endometriosis.

A prospective observational cohort study and statistical analysis was utilized by Indrielle-Kelly et al. (2020) to investigate the accuracy of transvaginal ultrasound (TVUS) and magnetic resonance imaging (MRI) in the mapping of pelvic endometriosis. The study ran from 2016-2018 with 111 women initially approached to consider participation, and 51 of those women agreeing to participate. At the time this study was being completed, there were no other studies of its kind that specifically looked into comparing the accuracy of TVUS and MRI. Indrielle-Kelly et al. (2020) found that there were no significant differences in the diagnostic accuracy between TVUS and MRI ( $p < 0.001$ ) except in cases of endometriosis involving the uterosacral ligaments ( $p = 0.04$ ) in which MRI was significantly more accurate. Due to being the first of its kind, this study provided significant evidence that further research is needed to better assess the accuracy of the different methods of endometriosis mapping to determine if simple and cheaper diagnostic options are appropriate and accurate in diagnosis to guide proper patient care. While the findings were beneficial, Indrielle-Kelly et al. (2020) did acknowledge a weakness in their research in that they had poor participation with the number of women who agreed to participate, which may have led to selection bias.

Eisenberg et al. (2017) set out to determine the prevalence of ultrasound features of adenomyosis (a form of endometriosis affecting the uterus) in women undergoing surgery for endometriosis were compared to a control group of women without the disease. Eisenberg et al. (2017) utilized a retrospective case-control study comparing 94



women needing surgery for endometriosis to 60 women of reproductive age in a control group who had come in for a general medical screening with TVUS as a part of that screening. All 154 patients in the study were referred to the clinic between 2011-2013. The study found that the presence of any sonographic feature of adenomyosis was more prevalent in the study group and that women in the study group had more than a threefold risk of suffering from infertility ( $p=0.015$ ). A strength seen within this study was through the fact that a single operator was specifically dedicated to endometriosis evaluation and this operator performed all of the TVUS examinations. Additionally, the operator also performed evaluation for multiple features of adenomyosis to increase the accuracy of the results and overcome potential bias. A weakness found in the study was seen in the retrospective design, as well as the limited availability of histological confirmation, as the participants were mostly young women seeking fertility which influenced low hysterectomy rates. Even with the weaknesses mentioned, the findings of this particular study support “the improved resolution of TVUS probes enables a detailed and thorough assessment of the uterine structure and detection of endometriosis and adenomyosis features, which have not been previously seen” (Eisenberg et al., 2017, p. 1-2).

Zannoni et al. (2017) provided a detailed report comparing the diagnostic accuracy of TVUS and computed tomography-colonography (CTCU) in the preoperative detection of deep endometriosis. Forty-seven patients with clinical suspicion of endometriosis underwent both TVUS and CTCU, and the image data was compared with histopathologic analysis. Zannoni et al. (2017) found that in cases of the diagnosis of ureteral endometriosis, TVUS and CTCU had a sensitivity of 10 and 60%, specificity of 94.8 and 70.2% on the right, and sensitivity of 28.5 and 57.1%, specificity of 96.3 and

76.9% in the left respectively. One problematic element of the study was related to the high prevalence of deep endometriosis as a whole in the study population, but the findings are consistent at noting that TVUS should be regarded as an accurate, radiation-free first-line diagnostic tool for patients with suspicion of endometriosis.

Jing et al. (2020) utilized a logistic regression analysis in an effort to find the most useful marker of endometriosis related infertility and evaluate the predictive and diagnostic values of inflammatory response markers in these patients. Jing et al. (2020) analyzed 662 women who had undergone laparoscopic surgery and had pathologically confirmed endometriosis and 82 patients who had pathologically confirmed benign ovarian tumors. Related inflammatory factors in endometriosis were analyzed and found that neutrophil: lymphocyte ratio (NLR) was significantly lower in infertile endometriosis patients ( $p=0.032$ ), which was an independent factor associated with infertility that had not previously been reported. These findings are of great importance, as inflammatory factors can reduce motility of sperm, as well as decrease the rates of fertilized egg implantation showing embryo toxicity, which are all key factors that must be addressed to achieve a successful and healthy pregnancy (Jing et al., 2020). One weakness noted in this study was the fact that Jing et al. (2020) evaluated and discussed multiple variables and markers which made the discussion and results hard to follow at times, but the findings related to NLR are very valuable in the realm of endometriosis care.

Anderson (2018) found that there was a lack of consistent and standardized diagnostic protocols for couples that are trying to conceive, which often leads to inappropriate treatment and loss of valuable time. Because of this, the author set out to explore unexplained infertility from an integrative perspective with the goal of providing

an accurate diagnostic approach and treatment plan for practitioners who wish to help these patients. Anderson (2018) explored multiple factors that often fall under the category of unexplained fertility, including subtle endometriosis. Anderson (2018) found that typical diagnostic modalities and treatments are limited, costly, and frequently ineffective, but the key to successful outcomes begins with “evaluating and treating unexplained infertility from an integrative perspective which requires finesse and diagnostic prowess” (p. 54).

Leonardi and Condous (2020) utilized combined medical knowledge and research exploration to create a guide that discusses how TVUS is an important first-line non-invasive diagnostic tool for detecting endometriosis. Leonardi and Condous (2020) completed a systematic review and meta-analysis on the diagnostic accuracy of TVUS and found this diagnostic tool to have a sensitivity of 93% and specificity of 96% in cases of ovarian endometriomas and sensitivity of 79% and specificity of 94% in the cases of deep endometriosis. Leonardi and Condous (2020) were able to provide specific tools and assessment criteria for the practitioner to master to accurately diagnosis endometriosis in its early stages and found that results could often be affected by differences in operator technique and experience levels as well as a lack of consistent education. A limitation of this study was that it was conducted through a systematic review of the literature rather than specific observations over a period of time.

### **Endometriosis Effects**

Prescott et al. (2016) set out to explore if there was a temporal relationship between endometriosis and infertility using a self-administered questionnaire, which was then evaluated using statistical analysis. The authors collected data from 58,427 married

premenopausal females under the age of 40 from the years 1989-2005. Compared to women without endometriosis, it was found that women that had been laparoscopically diagnosed with endometriosis had a 2-fold increased risk of infertility after adjusting for factors such as age at menarche, cycle length, BMI, physical activity, and tobacco use ( $p < 0.0001$ ). This study had numerous strengths including, the longitudinal study design in which risk factors and medical conditions were regularly updated over a span of 16 years through follow ups. Prescott et al. (2016) were also able to demonstrate the extent to which diagnostic bias may influence the association between endometriosis and infertility.

De Graaff et al. (2013) were interested in evaluating to what extent the management of endometriosis and the symptoms that remain after treatment affect the quality of life in women who have the disease. In order to do this, De Graaff et al. (2013) utilized an international cross-sectional survey among 931 women with endometriosis who were treated in 12 tertiary care centers in 10 different countries. Questions for a questionnaire were obtained from the World Endometriosis Research Foundation. Three-thousand, two-hundred and sixteen women were originally approached to participate in the study and of those, 1,450 provided informed consent and 931 actually returned the questionnaire at the completion of the research time period. Data was collected independently by each reporting center and it was found that endometriosis affected 51% of the women's work life, 50% of their relationships, and the overall quality of life was decreased when compared to norm-based scores from a general US population ( $p < 0.01$ ). A weakness found in these findings can be seen in the low response rate of only 29% of the original study sample. Even with the small response rate, these findings provide

significant insight into what it is like to have endometriosis and shows that this disease affects more than only a woman's ability to conceive. This valuable knowledge will support improving care for these patients.

Young et al. (2018) utilized a cross-sectional survey among 1,543 women in Australia to compare and examine fertility experiences of women reporting endometriosis vs women without the disease in a population-based survey. Women between the ages of 18-50 years old were randomly selected and mailed an anonymous 91 fixed-choice question survey and were sent a reminder letter 3-weeks after the delivery of the questionnaire. These questionnaires found that women with endometriosis were three times more likely to report infertility, with 39.7% of these being classified as unexplained ( $p < 0.001$ ). Women with endometriosis were also six times more likely to take greater than 12-months to conceive ( $p < 0.001$ ). Although these findings support the need for healthcare and information that addresses all aspects of fertility management, a limitation of the research was the inability to verify the accuracy of results as it pertains to the specific diagnosis, as it is difficult to determine through an anonymous survey whether the diagnosis of endometriosis had been confirmed or it was just suspected.

Grogan et al. (2018) also used a questionnaire through a U.K. based endometriosis charity website and then analyzed the results utilizing thematic analysis to understand women's experiences of coping with endometriosis and the impact it had on their lives. Thirty-four women, between the ages of 22-56 with medically-diagnosed endometriosis, responded to the questionnaire. Grogan et al. (2018) found these women constantly struggled with long-term pain, had limited faith in healthcare workers, avoided social events to conserve energy, felt socially isolated, and felt that it was a struggle to

obtain an accurate diagnosis. Weaknesses of this study mostly pertained to the relatively small number of women who responded to the survey, as well as the fact that 30 out of the 34 participants were of Caucasian race. Therefore, the results do not provide much insight into the differences of feelings within various races or ethnic groups. Even with its small size, the findings of this study help support the notion that early diagnosis and listening to patients is important in initial workups with healthcare providers so that a diagnosis can be made early to prevent extended patient suffering.

In an effort to examine the frequency, severity, interference with daily life, and symptom distress associated with endometriosis, Lemaire (2004) utilized a descriptive cross-sectional correlational study with a convenience sample of 298 women attending an educational program at an endometriosis conference. Endometriosis symptoms, symptoms distress, emotional distress, and adequacy of information was assessed using author-developed scales. Through these scales, it was discovered that women's overall symptom distress was positively correlated with uncertainty ( $p < 0.001$ ). This study had several limitations as the findings are limited to describing the sample at a fixed point in time, and therefore may not reflect the experiences of women in various races, socioeconomic statuses, treatment settings, or the women's responses to the illness over time. A second limitation noted lies in the fact that reported symptoms may not be representative of either group of women with the disease. Even with its limitations, the findings of this study allowed the author to discuss important nursing implications that would allow healthcare staff to reduce the undue stress and suffering associated with this disease process. Nurses should focus their care on assisting women to identify effective

pain control methods, assist with minimizing fatigue, as well as taking an active role in educating women about reproduction and the normal menstrual cycle (Lemaire, 2004).

Rush and Misajon (2018) utilized thematic analysis to explore the subjective wellbeing and health-related quality of life in women with endometriosis. Five-hundred women between the ages of 18-63 years old with a confirmed endometriosis diagnosis completed a questionnaire combining the Personal Wellbeing Index tool, the Endometriosis Health Profile tool, and various open-ended questions. The relationship between general wellbeing, endometriosis-related quality of life, and health status was then measured through bivariate correlations. Rush and Misajon (2018) found that there was a strong negative relationship between wellbeing and quality of life ( $p < 0.001$ ), and that there was a significant correlation between health status and wellbeing ( $p < 0.001$ ). These findings, similar to previous research, shed an important light on the negative impact that endometriosis can have on a women's social life, relationships, future plans, and overall quality of life.

Benaglia et al. (2016) were interested in investigating if women with endometriosis who conceive using in-vitro fertilization (IVF) were at an increased risk of preterm birth or other pregnancy related complications. Benaglia et al. (2016) used a retrospective case-control study of women who had progressed beyond 12-weeks of pregnancy from a singleton IVF cycle from two different clinics. These women that were followed had either a history of surgery for endometriosis or a sonographic diagnosis at the time of the IVF cycle; there were a total of 239 women with endometriosis compared to 239 control group women. The study found that the rate of pre-term birth was actually similar between the two groups with 14% of both groups giving birth prematurely

( $p=0.89$ ). Although Benaglia et al. (2016) found that the risk of preterm birth was similar, they did discover that the risk of placenta previa was more common in the endometriosis women with 6% of them experiencing the condition compared to only 1% of the control women ( $p=0.006$ ). This study was able to bring light to some valuable information about how endometriosis can affect a woman even after they have conceived. However, Benaglia et al. (2016) did acknowledge that the role of adenomyosis could not be fully assessed as a factor, as well as voicing difficulties in the selection of control participants, because some affected asymptomatic women could have been erroneously included in this group.

Another study interested in how pregnancy complications and endometriosis are related was undertaken by Glavind et al. (2017). A population-based study was used to specifically evaluate the association between endometriosis and the risk of pre-eclampsia, c-section rates, post-partum hemorrhage, and preterm birth, all while taking the use of fertility treatment into account. A total population of 82,793 women with singleton pregnancies were studied between 1989-2013; of these, endometriosis affected 1,719 of the women. Glavind et al. (2017) found that endometriosis increased the risk of preterm birth at an adjusted odds ratio (AOR) of 1.67 with a 95% confidence level, increased the risk of pre-eclampsia at an AOR of 1.37 at 95% confidence, and increased the risk of requiring a c-section at an AOR of 1.83 at a 95% confidence level. There was no specific association between endometriosis and the risk of post-partum hemorrhage. The use of assisted reproductive technology did not explain these findings, again shedding light on how endometriosis affects women in all stages of reproduction.



Bezerra de Souza et al. (2019) set out to analyze the importance of nursing in relation to women with endometriosis who are also affected by depression related to their disease. The authors of this study utilized a bibliographical study evaluating 230 articles written between the years 2008-2018 and ultimately ending with eight articles that were selected for analysis. Through extensive evaluation, Bezerra de Souza et al. (2019) determined the importance of nurses in the care of endometriosis patients was again supported. The articles analyzed found that nurses must have thorough knowledge of endometriosis to help patients through their symptoms as well as providing empowerment so that overall suffering is reduced.

### **Theoretical Framework**

Cadorin et al. (2017) utilized a psychometric-systematic review to identify instruments for the assessment of self-directed learning (SDL) abilities, evaluate methodological studies quality, and compare psychometric properties of available SDL instruments. To obtain their findings, Cadorin et al. (2017) utilized multiple databases and evaluated primary studies involving nursing students or nurses that aimed at evaluating SDL assessment tools. Through their search, they found 11 primary studies and four tools based on Knowles learning theory emerged: (1) the Self-Directed Learning Readiness Scale, (2) the Self-Directed Learning Readiness Scale for Nursing Education, (3) the Self-Rating Scale of Self-Directed Learning, and (4) the Self-Directed Learning Instrument (Cadorin et al., 2017). The findings shed light on the importance of monitoring and assessment of learning throughout adult learning situations which will allow educators to adjust their teaching methods and learning objectives to better meet the needs of the students they are educating at that time (Cadorin et al., 2017). A

limitation that may have affected the findings of this research lie in the fact the review was focused on nursing studies where the population included were typically female, therefore applying these findings to the male gender should be done with caution.

Taxtsoglou et al. (2020) were interested into evaluating the degree of nursing satisfaction of nurses working in hospitals arising from their participation in lifelong learning programs. To do this, Taxtsoglou et al. (2020) used a statistical analysis and a 20-question questionnaire that was given to 137 participants between the ages of 25-60 who had at least 1-year of nursing experience between January-March 2019. Taxtsoglou et al. (2020) found that there was an overall strong desire for life-long learning programs, and that participation in such programs improved nursing care, decreased costs, increased productivity, minimized errors, as well as decreased the level of work stress felt by nurses. Taxtsoglou et al. (2020) also found that the highest degree of satisfaction depended on the relevance of the material of the training programs to the professional environment in which the nurse worked. The findings of this particular study stressed the need and importance for employers to provide their staff with life-long learning opportunities that are geared for their specific specialty which will not only benefit patients but the staff and company as a whole. A limitation seen with this study was in the small sample size, but it does place emphasis on the need for further studies that are broader in nature to further validate the importance of life-long learning needs.

Halpern and Tucker (2015) examined the application of adult learning theories to online tutorials. Through this research, Halpern and Tucker (2015) found that by building from Knowles' adult learning theory, online tutorials that are informed by adult-centered strategies can be powerful tools for engaging with adult learners. Like many studies

before, this study provided the readers with specific examples of how learning theories can be implemented in online tutorials as this method of learning is becoming increasingly utilized as it is often the most assessable way to reach a wider audience. Halpern and Tucker (2015) also suggested concrete ways in which to incorporate an adult-centered approach to digital learning that provides the readers with ways to create successful online learning environments geared towards different learning styles of the adult learner.

### **Strengths and Limitations**

Although research has been growing in recent years, there are still gaps that exist in the evaluation of effects that endometriosis has on infertility. There are limited studies currently that specifically link endometriosis and unexplained infertility, which leads many to question that in these cases, the incidence of endometriosis may be over reported due to the fact that some cases may have gone undiagnosed had the women not been seeking assistance with conception. Furthermore, available studies are largely compromised of small sample sizes, which can also pose some difficulty in connecting endometriosis and unexplained infertility. Although limited, researchers are coming forward to help the healthcare industry better understand endometriosis as a whole, which in turn can help to strengthen the link to unexplained infertility.

In the realm of nursing education, information is abundant, and overwhelmingly shows the importance of staying up-to-date on best practice in an effort to improve quality care in all realms of nursing. Even with the overwhelming evidence, it is important to strive to create learning environments that are supportive in nature and focus

on the needs of the learners in that particular circumstance in order to be considered useful and successful for both the educator and the learner.

### **Conclusion**

After thorough review, the importance of the diagnostic skill levels of reproductive nurses and their drive for life-long learning has proven to play an important role in successful outcomes for the patients they encounter. Recent literature places emphasis on increasing awareness and improving education on ultrasonography mapping as the first-line diagnostic tool. By knowing what subtle signs to look for in initial workups, the reproductive nurse often becomes the first-line to a specific diagnosis for their patients, as well as ultimately assisting their patients in meeting goals in a timely manner. Developing and maintaining training programs based on real needs is essential and helps to improve nursing care, reduce costs, increase productivity, minimize accidents and errors, and reduces overall work stress (Taxtsoglou et al., 2020).

## CHAPTER III

### Needs Assessment

Endometriosis is a disease that has been growing in incidence levels over the last decade, but the question remains whether this is based on growing numbers of cases or if it could be attributed to better diagnostic capabilities and better disease understanding. In either instance, we know that endometriosis is a significant part of many women's lives and effects many different aspects of daily life, as well as their reproductive outlook.

Endometriosis often presents with symptoms such as abdominal/pelvic pain, dysmenorrhea, menstrual abnormalities, constipation, dysuria, dyspareunia, and urinary frequency or urgency (Surrey et al., 2020). Research into endometriosis is becoming increasingly focused on simpler and more cost-effective diagnostic methods to allow practitioners to diagnosis and treat these patients quicker and more effectively. Surrey et al. (2020) discussed endometriosis diagnosis often presents as a challenge for practitioners due to the fact that symptoms are often nonspecific and overlap with other gynecologic, urologic, and gastrointestinal issues, which often leads to diagnostic delays. These delays in diagnosis not only cause treatment delay but often longer periods of suffering for these patients, therefore specifically in the realm of reproductive and gynecologic nursing, the early recognition of endometriosis is an important skill to master in an effort to fast track these patients to the care that they desire and need. This project and needs assessment were developed in an effort to develop a teaching curriculum for reproductive nurses to assist them in building on their current endometriosis knowledge and practice to assist in preventing diagnostic delays in patient care.

### **Target Population and Setting**

Reproductive clinics whose sole focus is in the management of infertility and its associated diseases are limited throughout the United States, but the number of available clinics is growing as the acknowledgement of the effects of infertility are growing more popular in the mainstream. The target population for the development of this project were reproductive nurses who assist in the treatment of patients seeking conception assistance as evidenced by the referral to a reproductive endocrinologist and infertility practice, as well as patients who are referred from their gynecologist for the treatment and management of suspected endometriosis.

The current setting for development and implementation is in a privately-owned reproductive endocrinology and infertility practice in the Southeastern region of the United States. The practice is broken into five separate clinics that work closely together to educate, empower, and encourage patients in their fertility journeys and celebrate in their success, as well as support them through the obstacles and opportunities they may face on their journeys.

### **Sponsors and Stakeholders**

Stakeholders in the development of this project include the nursing staff and patients who will benefit from the increased knowledge that will be gained to aid the staff in timely diagnosis of underlying endometriosis. Sponsors include the practice Chief Financial Officer (CFO) and a practice partner/physician. The CFO is responsible for aiding in time management in the development of this project and for the staff reimbursement portion of the education that will be provided. A second sponsor in the development of this project is one of the three practice partners and physicians who is

known for his skill in the management and treatment of endometriosis. The development of this project will benefit the physician/practice partner in endometriosis diagnosis as the nursing staff is often who performs the diagnostic work ups after the initial medical consultation with the physician, and this sponsor will also provide assistance and review in the development of the educational material for project development to assure accuracy.

### **SWOT Analysis**

When developing and implementing an evidence-based, quality improvement project, it is important to develop and evaluate the strengths, weaknesses, opportunities, and threats (SWOT) involved with the project. The SWOT developed for the implementation of this project is presented in Figure 2.

To begin a SWOT analysis, it is important to assess the strengths and weaknesses of the target population, which in this case is a small reproductive practice. Strengths for this practice include a dedicated and patient-oriented staff, as well as low turnover rates which will benefit the project leader/designer as we can assume most, if not all, staff will be excited and receptive about the knowledge presented to them. This practice also is fortunate in the fact that they have a physician on staff who is known area-wide for his knowledge and expertise in endometriosis, which gains the practice numerous referrals from outside providers. Leadership is also very supportive and encourages its staff in educational growth. Weaknesses of the practice are seen in the fact that the staff only have access and training in transvaginal and abdominal ultrasonography, which has been shown to be an increasingly accurate diagnostic tool. Although rare, if further diagnostic studies are needed, staff would need to again refer the patient elsewhere. A second

weakness noted during this assessment involves the overall cost of the services provided by this practice. Services for a reproductive practice are often only partially covered or sometimes not covered at all if these services are coded as infertility in any way.

Therefore, depending on the circumstances, patients may not always follow through with the recommended evaluation workup due to the cost and often lack of insurance support.

The second step in the development of a SWOT analysis involves the assessment of the opportunities and threats to the practice both internally, as well as externally.

Opportunities discovered during this evaluation included the fact that the target practice involved is one of the only specialty clinics located within the area of a 60-mile radius which benefits the practice as they see high numbers of patients. A second opportunity is in the fact that this practice has a high level of trust from local providers in the management of their patients and therefore receive high levels of referrals. In project development, it is also important to evaluate threats to the implementation of the project in an effort to prevent them from happening or creating situations in which will render your project ineffective. Threats discovered for this project included a time aspect as the practice has five main locations that are spread out throughout North and South Carolina, so the project developer must determine when and how would be the most effective way to train staff in all the locations while minimizing the cost associated for the sponsors and stakeholders. A second and final threat noted in this evaluation includes the ever-changing research that is being done that will require frequent monitoring and evaluation to update learning objectives and material to accurately portray the information presented.



By developing and assessing the factors noted in this SWOT analysis, the project leader is better situated to manage problems that may appear, as well as, using the practice strengths and opportunities to their benefit to develop a successful learning curriculum that will benefit both the staff and patients alike.

**Figure 2**

*SWOT Analysis*

|          | Strengths   | Weaknesses  |
|----------|---|---|
| Internal | <ul style="list-style-type: none"> <li>-Internal physician known in surrounding area for his expertise in endometriosis management and treatment</li> <li>-Dedicated and patient oriented staff</li> <li>-Supportive leadership</li> <li>-Encouragement in educational growth</li> <li>-Long-term staff/low RN turnover rate</li> </ul> | <ul style="list-style-type: none"> <li>-Access limited in office to transvaginal ultrasound as possible diagnostic tool</li> <li>-Patient care costs: low rates of insurance coverage in infertility as well as high rate of uninsured or self-pay patients</li> </ul>                            |
| External | <ul style="list-style-type: none"> <li>-Only specialty clinic within 60+ mile radius</li> <li>-Trust from local OBGYN's and primary care physicians in the management of their patients.</li> </ul>   | <ul style="list-style-type: none"> <li>-Time: when/how to train all staff in the five different locations</li> <li>-Patient's willingness/receptiveness to possible diagnosis</li> <li>-Changing research requiring evaluation and monitoring to update learning materials accordingly</li> </ul> |

### Available Resources

Resources needed for this project were minimal. Current resources available to the project developer included physician support and agreement to oversee and provide needed knowledge to assure accuracy in presented information.

Needed resources for project development included an educational space to present the training to nursing staff. The practice which served as the project setting had five locations spread out over North and South Carolina, with 24 nursing staff members

between those locations. It will need to be determined if the project material will be presented in one location for all staff or if multiple sessions in each location would be of beneficial impact. A second needed resource includes financial support and approval for the educational session in the form of hourly pay for staff that will be attending. A third and final needed resource includes the materials for project development such as ultrasound images or videos to reference as an aide for nursing staff to review which will allow them the opportunity to evaluate normal findings versus questionable or subtle diagnostic features of endometriosis.

### **Desired Outcomes**

The desired outcome for the development of this project includes increased staff knowledge of the subtle signs of endometriosis which will lead to early recognition and acknowledgement of the disease resulting in expedited management and treatment for the patient. Research has shown that delays in endometriosis treatment causes longer periods of suffering for the patients whether it be due to the symptoms of endometriosis or the psychological effects that endometriosis and its subsequent subfertility places on the patients and their partners. Surrey et al. (2020) found that patients with intermediate or long-term diagnostic delays had consistently more endometriosis-related emergency visits and hospitalizations in the pre-diagnosis phase than patients who were diagnosed early. Providing staff with the needed education for early diagnosis will benefit their overall nursing knowledge, as well as the patients they interact with daily as they work together to meet the patient's particular goals.

Outcome evaluation will be determined through the use of pre/post tests for the nursing staff to review their current knowledge prior to project presentation as well as

after their educational session. Another evaluation that will be utilized will be through patient satisfaction as evidenced by their practice reviews which are posted on social media sites as well as google. The practice also monitors and reports pregnancy rates to the Society of Artificial Reproductive Technology and through this reporting, are able to monitor success overall, specifically the rate of pregnancy in endometriosis patients for their particular clinic. This reporting can also serve as an evaluative tool of long-term success to evaluate if there appears to be an increase in endometriosis recognition and management, and therefore increased pregnancy rates post treatment of the disease.

### **Team Members**

Much like needed resources, needed team members were limited. The project leader will develop the needed educational materials as well as to present the information to practice staff. Other team members include the physician, who will provide reference and review of material for accuracy, and the CFO, who will provide monetary approval and support. Both the physician and CFO will also serve as sponsors in the development of this project.

### **Cost-Benefit Analysis**

Endometriosis as a whole creates a surprisingly staggering economic impact of an estimated \$22 billion dollars per year in the United States, as it remains often misdiagnosed, misunderstood, and ineffectively treated (Miller et al., 2017). The development of this project, though small, will allow staff in the target practice to be better equipped to diagnose and manage these patients, which will not only benefit the patient, but may make a small dent in the staggering burden endometriosis places on our country's healthcare system. The only cost associated for the development and

implementation of this project would be the hourly wages that would be needed for staff participation in the learning module or session, therefore, the cost-benefit analysis would prove to be of a beneficial expense for the target population, and the sponsors and stakeholders involved.

### **Conclusion**

Unfortunately, it does not seem that endometriosis is going anywhere, anytime soon. Research has repeatedly shown that the importance of early diagnosis and management is a key to treatment of these patients, especially in the field of reproductive nursing. Endometriosis is known to create a substantial economic burden on not only the patients, but also the healthcare system as a whole as well as causing often debilitating symptoms both physically and emotionally on sufferers and their families. The implementation of this project will allow a small number of reproductive nurses to gain valuable knowledge in an effort to provide these patients with timely and proper care that they so desperately need.

## **CHAPTER IV**

### **Project Design**

Over the last decade, endometriosis has become a more prominent diagnosis seen within women's health. A delay in diagnosis and treatment often puts a patient through undue stress and pain as well as being costly to the healthcare system as a whole. Soliman et al. (2016) discussed that the direct and indirect costs of endometriosis in the United States is about \$78.05 billion per year. In an effort to decrease the burden of endometriosis, reproductive nurses play a pivotal role in aiding in the early detection and management of this disease. To do this, proper training is essential. This project was developed in an effort to aide with this role to provide a learning module for reproductive nurses that is reviewed upon hire, as well as yearly to discuss the importance of their roles and aide them in building on their current knowledge base to recognize the early signs of this disease.

### **Goal and Objectives**

The goal of this project was to develop a teaching curriculum that would be provided to reproductive nurses within a reproductive clinic in the South East United States. This project would initially be presented upon completion and reviewed by the project sponsor for accuracy and completeness. After initial review and approval, education would take place either in person or via online webinar in an effort to reach all five locations within the same timeframe. After initial teaching takes place, subsequent lessons will occur yearly to emphasize the importance of staying up to date in skills and knowledge to better aid endometriosis patients.

As a result of implementing this educational session, the staff at the reproductive clinic will be able to discuss and understand endometriosis, the importance of transvaginal ultrasound (TVUS) in the diagnosis of endometriosis, as well as discuss and understand their roles in the management of these patients.

### **Plan and Material Development**

Adult learners are very complex and often need different methods of teaching in order to successfully gain the required knowledge on a particular subject; because of this, the teaching aide for the presentation of this project is very important. The first step in project development included thorough research into effective teaching methods, as well as endometriosis as a whole to provide adequate and up-to-date information. A PowerPoint presentation (Appendix A) was created discussing endometriosis including its prevalence, risk factors, clinical presentation, TVUS importance and findings, treatment options, nursing implications, and online resources for patients. This PowerPoint presentation will be utilized as the main teaching aide during the educational session and will also be provided to each participant as a reference. A transcript was also created for the presenter to follow to ensure that the information presented was similar at each session (Appendix B).

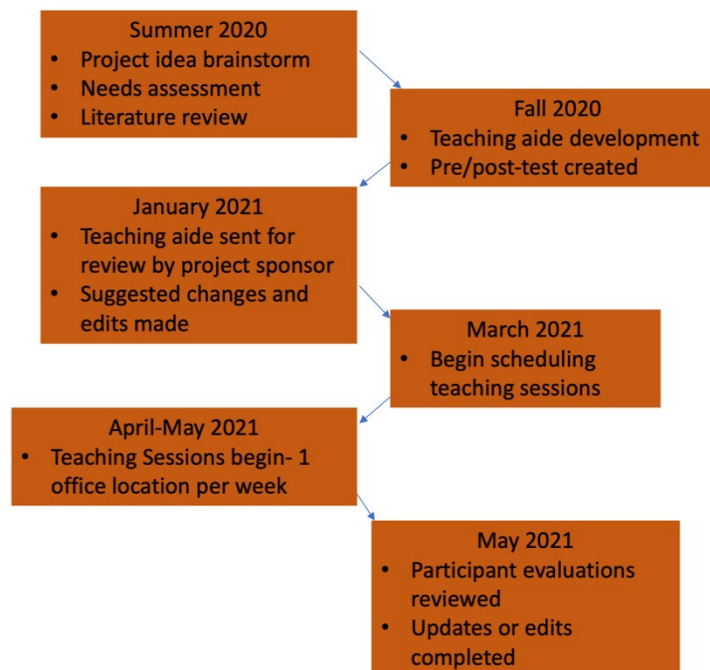
In an effort to ensure an effective learning experience, a pre/posttest (Appendix C) was also created for participants to complete. This tool allows the project developer to evaluate pre-session knowledge in comparison to the knowledge gleaned from the session. Questions in the pre-test are the same as the post-test, but three opinion questions were added to the latter to allow participants to voice any changes they feel need to be addressed, so that materials could be updated accordingly for further sessions.

## Timeline

The project timeline is presented in Figure 3 below. Research began in summer 2020 with a needs assessment and a thorough literature review. After research was completed, the teaching aide and participant evaluations were developed and completed in the fall of 2020 prior to the implementation of this project and was distributed in January 2021 for review by the project sponsor and stakeholder to evaluate for accuracy. Once reviewed and the appropriate changes were made, teaching sessions were scheduled in March 2021 with one office location participating in the session each week beginning in April and concluding in May. Participant evaluations will then be reviewed and edits will be made to the teaching materials based on participant comments.

**Figure 3**

### *Project Timeline*



## Budget

The overall project cost remains minimal to both the developer, as well as the project stakeholders. The highest direct cost for the stakeholder includes the hourly wages that will be needed for each employee attending the sessions. There was a total of 22 participants spread out between five separate office locations. Each employee makes an estimated hourly wage of about \$27.00 per hour. The educational session ideally should only last for a total of 1-hour, therefore the budgeted cost for hourly wages for the initial session was \$600.00.

Due to COVID-19 restrictions, the sessions were scheduled via a Zoom meeting. The Zoom platform offers a basic membership at a cost of \$150.00 per year, which allows the presenter to host unlimited sessions with up to 100 participants as well as up to 1GB of cloud recording.

The final budgeted item is for materials. The project developer will distribute a printout of Appendix A to each participant to provide them with reference materials as a way to take notes throughout the session. The pre- and post-tests will be provided via email so they will not be required to be physically printed. The estimated budget for these materials is \$100 to account for the paper and ink requirements needed. Key budget estimates are presented below in Table 1.

**Table 1**

*Project Budget Estimates*

| Project Budget Estimates |               |
|--------------------------|---------------|
| Participant Wages        | \$600.00      |
| Meeting Software         | \$150.00/year |



| Project Budget Estimates     |          |
|------------------------------|----------|
| Materials                    | \$100.00 |
| Total Budgeted Cost Estimate | \$850.00 |

### **Evaluation Plan**

Because adult learning can be so complex, it is important to evaluate the thoughts and feelings of those who are participating in the educational session in an effort to measure success and also find weaknesses within the project. To accomplish this, the pre- and post-test will be utilized to evaluate if there was a change in the level of knowledge for the participants before versus after the session. There is also an area located on the post-test for participants to write in any comments they have, including any thoughts on changes that need to be made to the presentation or educational material.

### **Conclusion**

Endometriosis diagnoses continue to be on the rise, especially in those who are trying to conceive. Often, endometriosis can present itself in the obvious manner, making it easy to diagnose, but as its incidence is increasing, so too is its elusiveness. It is important for nurses in reproductive medicine as well as gynecology to be able to identify early signs of this disease in an effort to aid their patients with early treatment which decreases its long-term effects. This project hopes to provide these nurses with the basic knowledge of endometriosis as well as the importance of TVUS skills so that they can enter each patient room with the knowledge and confidence needed to provide support, education, and treatment options to these patients.

## **CHAPTER V**

### **Dissemination**

Reproductive and infertility nursing is a specialized subset of women's health nursing that many may not know about or fully understand. The need for continuing education is important in every nursing specialty, but resources for reproductive nurses are limited and these nurses are often left to learn and build their practice skills independently. This project was developed in an attempt to provide these nurses with relevant educational material specifically relating to endometriosis including its incidence, diagnostic features, management, and nursing implications for patients.

The initial project is being implemented into a small reproductive endocrinology practice located in the Southeastern United States, though if successful, the ultimate goal for the project is to be shared and implemented throughout other clinics in the country. Results of the project will be shared initially with the project sponsors and stakeholders through an oral dissemination where results from the staff pre- and post-tests will be discussed, including the staff's opinions of the educational material. Finally, with approval from the sponsors and stakeholders, the results of the project will then be presented as a poster presentation at the annual American Society for Reproductive Medicine (ASRM) conference, as this is one of the only conferences with representatives from reproductive clinics all over the country who network together in order to learn and grow in their practices.

### **Limitations**

Limitations of this project mainly lie in discerning the best methods for distributing the educational material outside of the initial practice setting as this may

involve the project developer traveling to present the information or creating a recorded session that can then be shared via social media or other networking sites. This limitation may also pose a threat to the level of staff engagement as it can often be difficult for nurses to willingly find time to devote to an educational session outside of their normal working hours. Other limitations to this project involve not only the developer's time to share the material, but also the time it will take to continually research and follow evidenced based studies to ensure that the material presented remains accurate and up to date.

### **Implications for Nursing**

This project presents three main nursing implications for nurses who choose to participate or for those that chose to take the information presented and create their own educational material to provide to their staff. These implications include an opportunity to identify at risk patients early in their treatment so they can be properly managed, improving the understanding of endometriosis on infertility, and finally it presents a continuing education opportunity for reproductive nurses to aide them in maintaining and growing their knowledge base.

### **Recommendations**

Projects similar to this one could be valuable additions to the orientation process for newly hired reproductive nurses throughout the country. Because resources and support can be minimal, it is important for clinics to create broad educational materials to discuss reproductive nursing and what theses nurses may encounter in the field. It is also important to evaluate for specific learning needs within their practice and hone in on those topics for in-depth and continual education opportunities for their nurses. Providing

regular educational opportunities for their staff will not only benefit their specific practices but will also benefit their patient population.

### **Conclusion**

As previously discussed, continuing education is an important aspect in all areas of nursing, and this is especially true for topics that may not be widely known or have as many resources that are readily available. The goal of this project was to provide reproductive nurses with the knowledge needed to prepare them to accurately diagnose and manage patients with endometriosis in an effort to lessen the burden that this disease has on the healthcare economy as well as the burden these patients suffer with daily.

## References

- Anderson, K. A. (2018). An integrative approach to diagnosing and treating unexplained infertility. *Journal of Chinese Medicine*, 118, 49-57.  
<https://web.b.ebscohost.com.ezproxy.gardner-webb.edu/ehost/pdfviewer/pdfviewer?vid=11&sid=31730c14-2ebf-4a7b-a4ed-ae28450bcf79%40sessionmgr103>
- Benaglia, L., Candotti, G., Papaleo, E., Pagliardini, L., Leonardi, M., Reschini, M., Quaranta, L., Munaretto, M., Vigano, P., Candiani, M., Vercellini, P., & Somigliana, E. (2016). Pregnancy outcomes in women with endometriosis achieving pregnancy with IVF. *Human Reproduction*, 31(12), 2730-2736.  
<http://resolver.ebscohost.com.ezproxy.gardner-webb.edu/openurl?sid=EBSCO%3accm&genre=article&issn=02681161&ISBN=&volume=31&issue=12&date=20161201&spage=2730&pages=2730-2736&title=Human+Reproduction&atitle=Pregnancy+outcome+in+women+with+endometriosis+achieving+pregnancy+with+IVF.&aulast=Benaglia%2c+Laura&id=DOI%3a10.1093%2fhumrep%2fdew210&site=ftf-live>
- Bezerra de Souza, T.S., Almeida Santos, N.P., Sousa Mota, J.L., Vibelly da Silva, M., Franca daSilva, N., & Bezerra dos Santos, R. (2019). Role of nursing in relation to endometriosis and depression carriers. *Journal of Nursing*, 13(3), 811-818.  
<https://doi.org/10.5205/1981-8963-v12i03a238506p811-818-2019>
- Bulletti, C., Coccia, M. E., Battistoni, S., & Borini, A. (2010). Endometriosis and infertility. *Journal of Assisted Reproduction and Genetics*, 27(8), 441-447.  
<https://doi.org/10.1007/s10815-010-9436-1>

- Cadorin, L., Bressan, V., & Palese A. (2017). Instruments evaluating the self-directed learning abilities among nursing students and nurses: a systematic review of psychometric properties. *BMC Medical Education*, 17, 229-241.  
<https://bmcmmededuc.biomedcentral.com/articles/10.1186/s12909-017-1072-3>
- Clapper, T. C. (2010). Beyond Knowles: What those conducting simulation need to know about adult learning theory. *Clinical Simulation in Nursing*, 6(1), e7-e14.  
<https://doi.org/10.1016/j.ecns.2009.07.003>
- De Graaff, A. A., D'Hooghe, T. M., Dunselman, G. A., Dirksen, C. D., Hummelshoj, L., & Simoens, S. (2013). The significant effect of endometriosis on physical, mental, and social wellbeing: Results from an international cross-sectional survey. *Human Reproduction*, 28(10), 2677-2685. <https://doi.org/10.1093/humrep/det284>
- Eisenberg, V. H., Arbib, N., Schiff, E., Goldenberg, M., Seidman, D. S., & Soriano, D. (2017). Sonographic signs of adenomyosis are prevalent in women undergoing surgery for endometriosis and may suggest a higher risk of infertility. *Biomed Research International*, 1-9. <https://doi.org/10.1155/2017/8967803>
- Glavind, M. T., Forman, A., Arendt, L. H., Nielsen, K., & Henriksen, T. B. (2017). Endometriosis and pregnancy complications: A Danish cohort study. *Fertility and Sterility*, 107(1), 160-166.
- Grogan, S., Turley, E., & Cole, J. (2018). So many women suffer in silence: A thematic analysis of women's written accounts of coping with endometriosis. *Psychology & Health*, 33(11), 1364-1378. <https://doi.org/10.1080/08870446.2018.1496252>

- Grundstrom, H., Alehagen, S., Kjolhede, P., & Bertero, C. (2017). The double-edged experience of healthcare encounters among women with endometriosis: A qualitative study. *Journal of Clinical Nursing*, 27, 205-211.  
<https://doi.org/10.1111/jocn.13872>
- Halpern, R., & Tucker, C. (2015). Leveraging adult learning theory with online tutorials. *Reference Services Review*, 43(1), 112-124. <https://doi.org/10.1108/RSR-10-2014-0042>
- Indrielle-Kelly, T., Fruhauf, F., Fanta, M., Burgetova, A., Lavu, D., Dundr, P., Cibula, D., & Fischerova, D. (2020). Diagnostic accuracy of ultrasound and MRI in the mapping of deep pelvic endometriosis using the international deep endometriosis analysis (IDEA) consensus. *Biomed Research International*, 1-11.
- Jing, X., Li, C., Sun, J., Peng, J., Dou, Y., Xu, X., Ma, C., Dong, Z., Liu, Y., Zhang, H., Shao, Q., Wang, L., Zhang, Y., & Qu, X. (2020). Systematic inflammatory response markers associated with infertility and endometrioma or uterine leiomyoma in endometriosis. *Therapeutics and Clinical Risk Management*, 16, 403-412. <https://doi.org/10.2147/TCRM.S232849>
- Lemaire, G.S. (2004). More than just menstrual cramps: Symptoms and uncertainty among women with endometriosis. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 33, 71-79. <https://doi.org/10.1177/0884217503261085>

Leonardi, M., & Condous, G. (2020). Noninvasive ultrasound diagnosis of endometriosis. *Contemporary OBGYN*, 16-23.

<https://www.contemporaryobgyn.net/view/noninvasive-ultrasound-diagnosis-endometriosis>

Miller, J. E., Ahn, S. H., Monsanto, S. P., Khalaj, K., Koti, M., & Tayade, C. (2017).

Implications of immune dysfunction on endometriosis associated infertility.

*Oncotarget*, 8(4), 7138-7147.

Prescott, J., Farland, L.V., Tobias, D. K., Gaskins, A. J., Spiegelman, D., Chavarro, J. E.,

Rich-Edwards, J. W., Barbieri, R. L., & Missmer, S. A. (2016). A prospective cohort study of endometriosis and subsequent risk of infertility. *Human*

*Reproduction*, 31(7), 1475-1482. <https://doi.org/10.1093/humrep/dew085>

Rush, G., & Misajon, R. (2018). Examining subjective wellbeing and health-related

quality of life in women with endometriosis. *Healthcare for Women International*, 39(3), 303-321. <https://doi.org/10.1080/07399332.2017.1397671>

Scioscia, M., Orlandi, S., Trivella, G., Portuese, A., Bettocchi, S., Pontrelli, G., Bocus, P.,

& Virgilio, B. A. (2019). Sonographic differential diagnosis in deep infiltrating endometriosis: The bowel. *Biomed Research International*, (1), 1-9.

<https://doi.org/10.1155/2019/5958402>

Soliman, A. M., Yang, H., Du, E. X., Kelley, C., & Winkel, C. (2016). The direct and

indirect costs associated with endometriosis: A systematic literature review.

*Human Reproduction*, 31(4), 712-722. <https://doi.org/10.1093/humrep/dev335>



Surrey, E., Soliman, A. M., Trenz, H., Blauer-Peterson, C., & Sluis, A. (2020). Impact of endometriosis diagnostic delays on healthcare resource utilization and costs.

*Advances in Therapy*, 37, 1087-1099. [https://doi.org/10.1007/s12325-019-01215-](https://doi.org/10.1007/s12325-019-01215-x)

[x](#)

Taxtsoglou, K., Lera, M., Iliadis, C., Frantzana, A., Ouzounakis, P., & Kourkouta, L.

(2020). Life long learning programmes in the nursing context and nurses' satisfaction. *International Journal of Caring Sciences*, 13(1), 563-572.

<http://web.b.ebscohost.com.ezproxy.gardner->

[webb.edu/ehost/pdfviewer/pdfviewer?vid=7&sid=31730c14-2ebf-4a7b-a4ed-ae28450bcf79%40sessionmgr103](http://webb.edu/ehost/pdfviewer/pdfviewer?vid=7&sid=31730c14-2ebf-4a7b-a4ed-ae28450bcf79%40sessionmgr103)

Young, K., Kirkman, M., Holton, S., Rowe, H., & Fisher, J. (2018). Fertility experiences

in women reporting endometriosis: Findings from the understanding fertility management in contemporary Australia survey. *The European Journal of*

*Contraception & Reproductive Health Care*, 23(6), 434-440.

<https://doi.org/10.1080/13625187.2018.1539163>

Zannoni, L., Del Forno, S., Coppola, F., Papadopoulos, D., Valerio, D., Golfieri, R.,

Caprara, G., Paradisi, R., & Seracchioli, R. (2017). Comparison of transvaginal sonography and computed tomography-colonography with contrast media and urographic phase for diagnosing deep infiltrating endometriosis of the posterior

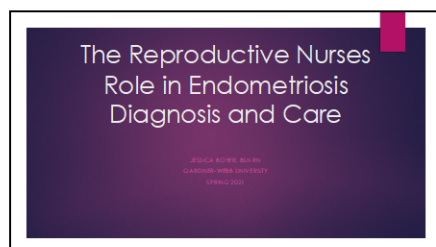
compartment of the pelvis: A pilot study. *Japan Radiological Society*, 35, 546-

554. <https://doi.org/10.1007/s11604-017-0665-4>

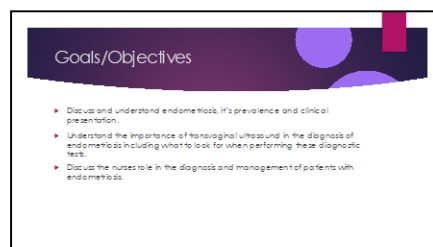
## Appendix A

### Endometriosis Teaching Aide

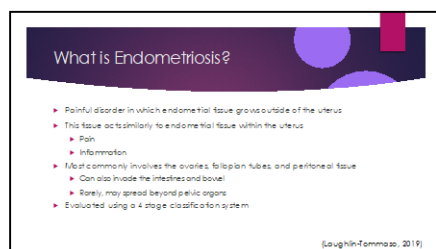
3/7/21



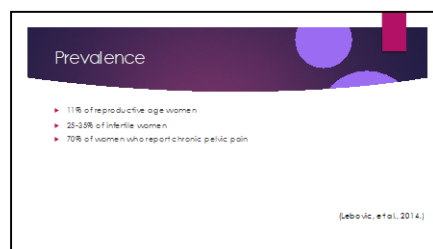
1



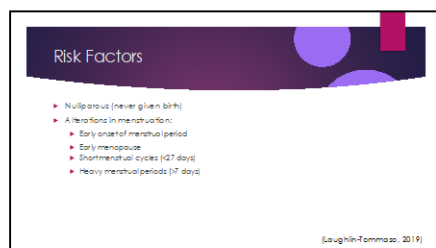
2



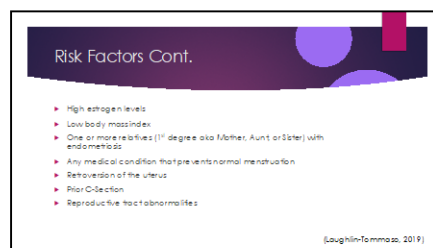
3



4



5



6

3/7/21

### Clinical Presentation

- Dysmenorrhea (painful periods) that is often worse in the days leading up to the period
- Dyspareunia (pain with intercourse)
- Pain with bowel movements or urination, especially during menstruation
- Excessive bleeding, or bleeding between periods
- Infertility
- Other:
  - Fatigue
  - Nausea
  - Diarrhea
  - Constipation

(Loughlin-Tammaso, 2019)

7

### Importance of Transvaginal Ultrasound (TVUS)

- Highly accurate in diagnosing endometriosis
- No significant differences in the diagnostic accuracy between TVUS and MR ( $p=0.03$ ) in the case of endometriosis involving the uterine ligaments ( $p=0.04$ ) in which MR was significantly more accurate (Probst-Felix et al., 2020)
- To save patient time and money
- No right way to ultra sound!
- Must be done thoroughly and systematically (Leonard & Candous, 2009)
- Accuracy increases with experience

8

### TVUS Diagnostic Findings

- Endometriosis with insertion or manipulation of probe (Loughlin-Tammaso, 2019)
- "Floating Ovaries" (Leonard & Candous, 2009)
- Ovarian cyst on one or both ovaries
  - Can vary in size
  - "Ground glass" appearance
  - Can appear similar in appearance to follicular cyst
  - Often called "chocolate cyst" due to the thick brown appearance of the fluid within the cyst (Leonard & Candous, 2009)
- Signs of pelvic adhesions
- Identify side the transducer back and forth against the cervix, organs should slide freely over each other (Chamie et al., 2011)

9

### TVUS Diagnostic Findings




"Ground Glass" endometrioma

(Endometriosis, transvaginal ultrasound). (January 23, 2020).

10

### TVUS Diagnostic Findings



Appears similar to follicular cyst but was present on multiple TVUS examinations and patient with reports of severe tenderness and pain on the left side suggestive of endometrioma.

(Endometriosis, transvaginal ultrasound). (October 24, 2019).

11

### Treatment Options

- Highly dependent on patient age, severity of disease, as well as patient goals.
- Conservative surgery usually done laparoscopically
- Progestins
  - Norethindrone
  - Medroxyprogesterone Acetate
  - IUD
- Combined Contraceptives (OCP's)
- Usually taken continuously (skip placebo)

(Lebbvie et al., 2014)

12



## **Appendix B**

### **Teaching Aide Script**

#### The Reproductive Nurses Role in Endometriosis Diagnosis and Care Transcript

Slide 1:

“Welcome everyone! I have created this presentation and educational PowerPoint as part of my thesis/project course towards my Masters of Science in Nursing Administration! I hope the information will be helpful to you in your patient encounters and everyday nursing practice. I have handed out a pre-test to each of you just to get a basic understanding of what you already know and what areas may be lacking. A posttest will also be sent to you via email at the completion of the session to evaluate if the goals and objectives of this presentation were met.”

Slide 2:

“My goals for this presentation are to discuss and help you better understand endometriosis, discuss the importance of transvaginal ultrasound (TVUS), and to explain the role you play in aiding with diagnosis and management of these patients.”

Slide 3:

“So, what exactly is endometriosis? This is a painful condition in which endometrial tissue grows in areas outside of the uterus. This tissue acts similarly to the endometrial tissue within the uterus in the sense that it thickens, breaks down, and bleeds but it has no way to exit the body which causes inflammation, pain, and eventually can cause pelvic adhesions and scar tissue build up. While this tissue can and has been seen beyond the pelvic organs, it is most commonly seen on the ovaries, fallopian tubes, peritoneal tissues, intestines and bowel. Endometriosis severity is evaluated using a classification system created by the American Society of Reproductive Medicine which is based on multiple factors including organ involvement, size and depth of invasion, and the presence or lack of adhesions. There are four main stages with stage 1 being the least invasive and stage 4 being the worst. Management of this disease will be discussed in a later slide but it is highly dependent on the severity and staging of the patient’s disease.”

Slide 4:

“We see endometriosis in 11% of all reproductive aged women, 25-35% of infertile women, and 70% of women who report chronic pelvic pain. Endometriosis can be illusive, often milder forms of the disease are only discovered because reproductive aged women have been trying to conceive and haven’t been successful and therefore seek

guidance from their OBGYN or are referred to an infertility specialist who makes the discovery based on findings during their initial workups. This is why a basic understanding of endometriosis and its presentation is important for us as reproductive nurses, as we are often the first line in the initial workup process may be the ones who catch these subtle signs.”

Slide 5:

“What puts someone at a higher risk or suspicion for endometriosis?

This disease can happen to anyone but we see it most often in women who have never given birth, patients with alterations in their menstruation such as early onset of menstrual periods or early menopause, as well as those with short cycles lasting less than 27 days or heavy cycles with heavy bleeding that lasts longer than 7 days at a time.”

Slide 6:

“We also see it in women who have naturally occurring high estrogen levels, a low BMI, patients with one or more close relatives with endometriosis, any medical condition that prevents normal menstruation, patients with a retroverted uterus, as well as any reproductive tract abnormalities.”

Slide 7:

“Because of its range in severity, endometriosis can present differently in every patient which only adds to its elusiveness. The most common symptoms include dysmenorrhea (especially in the days leading up to their period), dyspareunia, painful bowel movements or urination, excessive bleeding during their periods or bleeding between periods, infertility, fatigue, nausea, diarrhea, as well as constipation. In severe cases, the symptoms a patient can experience often takes a toll on their emotional well-being and mental health and can also affect their relationships both personally and professionally which is why we play an important role of support to these patients.”

Slide 8:

“As reproductive nurses, our focus should be on paying close attention to the patients reports when it comes to their cycles as well as performing a thorough assessment and spending ample time in their baseline ultrasounds. TVUS has been found to be highly accurate in diagnosing endometriosis and there have been no significant differences found in the accuracy versus an MRI except in cases that involve the uterosacral ligaments in which MRI was shown to be the most accurate diagnostic test. There is no “right” way to ultrasound someone but accuracy increases with experience and we must make sure they are done thoroughly and systematically in order to make

sure we are doing what is best for these patients and also trying to save them time and money by diagnosing and treating early to help them meet their personal goals!”

Slide 9:

“What are some things that you may see or notice when scanning these patients that would make you suspect some underlying endometriosis? Ideal evaluation should be done at baseline or somewhere between cycle days 3-7 of the patients cycles as this is the time of their cycles when things should be at their quietest—evidenced by thin uterine lining and no developing follicles on the ovaries. You may notice tenderness or even pain during the insertion or manipulation of the ultrasound probe—this should be your first alert that something might be amiss. The ultrasound should be performed in a timely manner but carefully evaluate all perineal structures closely. Often, the uterus will not have any indications that would alert you to endometriosis but notice, what do the ovaries look like? Are they sitting right next each other almost like they are “kissing?” Are there cysts noted that shouldn’t be there? Endometriosis collections can present on the ovaries in various ways but commonly they appear similar in appearance to a follicular cyst that is persistent for multiple cycles. They also can have a “ground glass” appearance. These cysts are filled with thick brown old blood or fluid which often coins them the name of “chocolate cysts.” During the ultrasound, you want to also evaluate for signs of pelvic adhesions which would be suggestive of long-term or extensive disease. To do this, you would just gently slide the probe back and forth against the cervix and you should notice if the ovaries and uterus move freely over/beside each other independently. If they move together as if they are one organ, this would be important to note and notify their physician as it does suggest the presence of some adhesions or long-standing damage.”

Slide 10:

“Here you can see an example of an endometrioma that has the ground glass appearance. You can clearly see defining margins of the cyst that differentiates it from healthy ovary as well as note that it also has some free fluid within it as well. ”

Slide 11:

“This particular patient is an example in which the cyst presented similar to a follicular cyst. This patient had done multiple rounds of ovulation induction with midcycle ultrasounds where it was noted that this large cyst was present at each scan along with her follicles for that cycle. She also reported pain on her left side leading up to her periods as well as around the time of ovulation. Due to multiple failed cycles and this persistent cyst, further evaluation was warranted and the patient proceeded to laparoscopy for endometriosis removal and later did conceive and deliver.”

Slide 12:

“What can we do for these patients? As previously mentioned, deciding on a treatment is highly dependent on the severity of the disease, the patients age, and their specific goals in regards to pregnancy. If their ultimate goal is to conceive then through discussion should be done with the physician and depending on severity, suggestive treatment would be laparoscopic surgery to try and remove as much disease as possible to increase their chances on conception.

If the patient’s main goal is symptom control, then the first line treatment (depending on severity) would be medications to stop or minimize the patients cycles since endometriosis feeds off of the estrogen produced early in a woman’s cycle which is when the pain seems to be at its worst. Pharmaceutical options include oral birth controls that are taken continuously by skipping the placebos and progestins such as norethindrone, medroxyprogesterone acetate, and/or an IUD such as Mirena or Paragard.”

Slide 13:

“Other pharmaceutical options include aromatase inhibitors and gonadotropin releasing hormone agonists such as Lupron injection which is often given during the midluteal phase of a cycle and can last up to 3 months at a time. In our field, Lupron is most commonly used as a precursor to IVF treatment in an attempt to somewhat “silence” the endometriosis long enough to allow an embryo to implant and grow, but it can also be used in situations prior to surgical intervention to lower the patients pain while they wait for their surgery date.”

Slide 14:

“Lebovic et al., (2014) provided this treatment algorithm to create a visualization to the different routes one may take to treat this condition and where to go if one method fails.”

Slide 15:

“Once endometriosis is diagnosed, the treatment plan is usually developed and monitored by the physician, so what exactly can reproductive nurses do to help these patients?

First and foremost, our role is one of support! This disease can be both emotionally and physically distressing to patients, especially ones who are trying to conceive as this is seen as a barrier and can lessen their chances of success.

Another important role for us as nurses is in the diagnosis phase– we are often the staff performing the ultrasounds, so that is why taking your time and thoroughly



assessing what you see is so detrimental so that a diagnosis can be made early and management can begin!

A third important role we play is in education! We want to discuss endometriosis with these patients as well as helping the physicians in reviewing their fertility outlook, and reviewing the different options of treatment with each individual patient so they can be educated to make a decision that they feel is most appropriate for them.”

Slide 16:

“The internet can be a wonderful aide or supplement to your education so why not use it to your advantage?? This slide presents some of the resources out there for your patients. All three of these sites provide a wealth of information that the patient can access to help them better understand endometriosis and also help them find the support they need.”

Slide 17:

“That is all I have! Thank you for taking the time to participate in this learning session. I hope you found the information helpful to your nursing practice! Are there any questions?”

## Appendix C

### Pre-and Post-Test Evaluation

#### Endometriosis Pre-Test

Name: \_\_\_\_\_

- 1) Endometriosis can affect which of the following organs? Select all that apply.
  - a. Ovaries
  - b. Fallopian tubes
  - c. Peritoneal tissue
  - d. Intestines
  - e. Lungs
- 2) What percentage of infertile women does endometriosis affect?
  - a. 11%
  - b. 25-35%
  - c. 70%
  - d. 100%
- 3) Women who have never given birth (nulliparous) are at an increased risk of having endometriosis.
  - a. True
  - b. False
- 4) All women who have been diagnosed with endometriosis suffer with pain.
  - a. True
  - b. False
- 5) The only way to treat endometriosis is through surgery.
  - a. True
  - b. False
- 6) Which patient has the highest risk of endometriosis?
  - a. A 45-year-old nuclear physicist that has been overexposed to radiation
  - b. A 35-year-old woman with abdominal cramps that has 2 cousins who suffer from endometriosis
  - c. A 13-year-old girl with a retroverted uterus and painful periods whose mother has struggled with endometriosis
  - d. A 50-year-old woman with a total hysterectomy
- 7) Symptoms that should alert you to a possible endometriosis diagnosis include:
  - a. Dysmenorrhea
  - b. Dyspareunia
  - c. Pain with bowel movements that is worse during menstruation

- d. Pain that often favors one side of the pelvis
  - e. All of the above
- 8) Endometriosis is an infection of the inner lining of the uterus.
- a. True
  - b. False
- 9) Why does endometriosis cause pain as the most common symptom?
- a. Endometrial tissue cannot leave the body
  - b. Endometriosis makes chemicals that irritate the pelvic tissue
  - c. Endometriosis produces chemicals that are known to trigger pain
  - d. All of the above
- 10) Transvaginal ultrasound is a useful and cost-effective method of diagnosis endometriosis.
- a. True
  - b. False

### Endometriosis Post-Test

Name: \_\_\_\_\_

- 1) Endometriosis can affect which of the following organs? Select all that apply.
  - a. Ovaries
  - b. Fallopian tubes
  - c. Peritoneal tissue
  - d. Intestines
  - e. Lungs
- 2) What percentage of infertile women does endometriosis affect?
  - a. 11%
  - b. 25-35%
  - c. 70%
  - d. 100%
- 3) Women who have never given birth (nulliparous) are at an increased risk of having endometriosis.
  - a. True
  - b. False
- 4) All women who have been diagnosed with endometriosis suffer with pain.
  - a. True
  - b. False
- 5) The only way to treat endometriosis is through surgery.
  - a. True
  - b. False
- 6) Which patient has the highest risk of endometriosis?
  - a. A 45-year-old nuclear physicist that has been overexposed to radiation
  - b. A 35-year-old woman with abdominal cramps that has 2 cousins who suffer from endometriosis
  - c. A 13-year-old girl with a retroverted uterus and painful periods whose mother has struggled with endometriosis
  - d. A 50-year-old woman with a total hysterectomy
- 7) Symptoms that should alert you to a possible endometriosis diagnosis include:
  - a. Dysmenorrhea
  - b. Dyspareunia
  - c. Pain with bowel movements that is worse during menstruation
  - d. Pain that often favors one side of the pelvis
  - e. All of the above

- 8) Endometriosis is an infection of the inner lining of the uterus.
  - a. True
  - b. False
  
- 9) Why does endometriosis cause pain as the most common symptom?
  - a. Endometrial tissue cannot leave the body
  - b. Endometriosis makes chemicals that irritate the pelvic tissue
  - c. Endometriosis produces chemicals that are known to trigger pain
  - d. All of the above
  
- 10) Transvaginal ultrasound is a useful and cost-effective method of diagnosis endometriosis.
  - a. True
  - b. False

Opinion Questions:

- 1) Did you find this learning session/module useful for your nursing practice?
  - a. Yes
  - b. No
  
- 2) As a result of this learning session/module, I feel more confident in my endometriosis knowledge and ultra-sounding skills.
  - a. True
  - b. False
  
- 3) Do you have any comments or suggestions on how this session could be improved upon?

---

---

---

---

---