

5-2021

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Stephanie Schlorke

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Undergraduate Nursing Students' Knowledge of Endometriosis:
A Pilot Study

by

Stephanie Schlorke

A Thesis
Submitted to the Honors College of
The University of Southern Mississippi
in Partial Fulfillment
of Honors Requirements

May 2021

Approved by:

Elizabeth Tinnon, Ph.D., Thesis Advisor,
School of Professional Nursing Practice

Elizabeth Tinnon, Ph.D., Director,
School of Professional Nursing Practice

Ellen Weinauer, Ph.D., Dean
Honors College

ABSTRACT

This descriptive post-test design study was conducted to assess knowledge level of undergraduate nursing students regarding risk factors, clinical manifestations, age of diagnosis, common psychiatric co-morbidities, treatment methods, and pathophysiology of endometriosis. An author-created 8 question multichoice and select all that apply questionnaire was used to collect the data. Twenty-eight students responded to the questionnaire. The results were divided to compare knowledge differences between second-semester and fifth-semester students.

It was determined that the undergraduate nursing students have a working knowledge of endometriosis, but there are knowledge gaps that need to be addressed. Fifth-semester participants scored higher than the second-semester participants overall on the questionnaire, likely due to receiving education about endometriosis during the acute conditions course, taught during the fourth-semester of the undergraduate nursing program. All fifth-semester participants and all but two second-semester participants were correctly able to identify the pathophysiology of endometriosis. Another positive finding was the knowledge of pharmacologic therapies and mental health co-morbidities. A majority of both second- and fifth-semester participants were able to identify the correct treatments, but 32.09% more fifth-semester students identified contraceptive/hormonal agents as pharmacologic therapies. All fifth-semester students and all but one second-semester students correctly identified depression as the frequent co-morbidity of endometriosis. Content areas that need to be addressed are risk factors and clinical manifestations of endometriosis. No participants in either group were able to correctly identify all of the risk factors of endometriosis, and only 16.67% of fifth-

semester students and 11.76% of second-semester students correctly identified all of the clinical manifestations. More education in undergraduate nursing programs on these topics is necessary.

Keywords: nurses, nursing, endometriosis, students, knowledge, education

DEDICATION

This project is dedicated to my ever-encouraging family, including my parents: Fiona and Detlev, and my sisters: Jessica and Julia. I am very grateful for your love, phone calls to check on me, and unwavering confidence in my ability to complete this project and nursing school.

ACKNOWLEDGMENTS

I would like to thank my thesis advisor, Dr. Elizabeth Tinnon, for her encouragement and guidance during the completion of this study. Thank you for your mentorship and patience as I learned the research process.

I would also like to thank Mrs. Maria Brown for her encouragement and support of my love for women's health nursing. Your maternal-newborn nursing course was one of the highlights of my time in nursing school.

I also want to thank one of my best friends and fellow Honors College scholars, Leah Salisbury. Experiencing nursing school and completing this project would not have been as enjoyable without you. You inspired me every day to work harder and chase my dreams.

Finally, I would like to acknowledge and thank the Honors College and the School of Professional Nursing Practice at The University of Southern Mississippi for equipping me with the knowledge and skills needed to begin my career as a registered nurse. The importance of the lessons I learned both in the classroom and in clinical practice cannot be understated. I am forever grateful for my time in this program and the experiences it has given me.

TABLE OF CONTENTS

Keywords: nurses, nursing, endometriosis, students, knowledge, education	v
LIST OF TABLES	x
LIST OF ABBREVIATIONS	xii
CHAPTER I: Introduction	1
CHAPTER II: Background	4
The Menstrual Cycle	4
What is Endometriosis?	5
Patients' Experiences with Endometriosis	6
The Role of Nurses	8
Predictions	10
Research Questions	11
CHAPTER III: Methodology	12
Research Design and Methods	12
Instrument	12
Sample and Data Collection Process	13
CHAPTER IV: Results	14
Demographics	14
Identification, Risk Factors, and Age of Diagnosis	15
Clinical Manifestations and Mental Health Co-Morbidity	18

<u>Treatment</u>	20
<u>Mean, Median, & Mode</u>	21
<u>CHAPTER V: Discussion</u>	23
<u>Areas of Strength and Deficits</u>	23
<u>Limitations</u>	25
<u>Further Areas of Study</u>	25
<u>APPENDIX A: Undergraduate Nursing Students’ Knowledge of Endometriosis - Survey</u>	27
<u>APPENDIX B: IRB Approval Letter</u>	29
<u>APPENDIX C: Email Announcements</u>	30
<u>Initial Email Announcement</u>	30
<u>Email Announcement Follow-Up</u>	31
<u>REFERENCES</u>	32

LIST OF TABLES

Table 1: Demographics	14
Table 2: Risk Factors	15
Table 3: Age of Diagnosis	16
Table 4: Clinical Manifestations	17
Table 5: Mental Health Disturbance	18
Table 6: Pharmacologic Therapies	20
Table 7: Mean, Median, Mode	21

LIST OF ABBREVIATIONS

BSN	Bachelor of Science in Nursing
IRB	Institutional Review Board
USM	The University of Southern Mississippi

CHAPTER I: Introduction

Endometriosis is a disease that has plagued millions of women throughout history. Approximately 10% of menstruating women today suffer from this condition (Grundström et al., 2018). Johns Hopkins Medicine (2020) describes endometriosis:

During a woman's regular menstrual cycle, this (endometrial) tissue builds up and is shed if she does not become pregnant. Women with endometriosis develop tissue that looks and acts like endometrial tissue outside the uterus, usually on other reproductive organs inside the pelvis or in the abdominal cavity. Each month, this misplaced tissue responds to the hormonal changes of the menstrual cycle by building up and breaking down just as the endometrium does, resulting in small bleeding inside of the pelvis. This leads to inflammation, swelling and scarring of the normal tissue surrounding the endometriosis implants. (para. 2)

Women with endometriosis commonly experience incapacitating menstrual cramps, painful urination and bowel movements, heavy periods, painful sexual intercourse, and infertility ("Symptoms of Endometriosis," 2020). The exact cause of the pain is unclear, but experts believe hormones, chemicals released by endometrial tissue, and nerve cells all play a role ("Symptoms of Endometriosis," 2020). Unfortunately, women with endometriosis tend to suffer for many years before being diagnosed with the condition (Grundström et al., 2018).

It is essential that nurses are knowledgeable about endometriosis in order to identify patients who might need further screening, which could lead to a quicker diagnosis and prevent further suffering. Prior to admission to a southeastern baccalaureate nursing program, prospective students must take an anatomy and

physiology course series, which includes information about women's reproductive processes. Once in the Bachelor of Science in Nursing (BSN) program, nursing students take a pathophysiology course in their first semester. This course provides an overview of endometriosis. In their fourth semester of the nursing program, students are enrolled in an acute conditions course. This course contains content about women's reproductive processes and the nursing approach to these conditions, including endometriosis.

The inspiration behind this project lies in the suffering many women face due to endometriosis. The average diagnosis time of this condition ranges from five years to nine years (Norton & Holloway, 2016). The day-to-day lives of these patients are drastically affected, leading to poor quality of life. There is no cure for this disease; symptom management is the primary focus. Hormonal contraceptives, analgesic agents, and surgery are care options (Norton & Holloway, 2016). Women with this condition are not just patients in obstetric and gynecologic offices; they are patients in emergency rooms, primary care offices, schools, psychiatric health facilities, and all other specialty services (Norton & Holloway, 2016). Students nurses who are not planning to pursue a career in women's health may not see the value in being able to recognize the signs and symptoms of endometriosis, yet it is almost a guarantee they will have patients with this condition. It is part of their responsibility as nurses to be knowledgeable about a disease of this magnitude.

The goal of this research was to assess undergraduate nursing students' knowledge of endometriosis and compare knowledge differences between second-semester and fifth-semester students (pre- and post-acute conditions course) using an author-created questionnaire. The questionnaire consisted of questions about basic facts

of endometriosis that can be found in two textbooks – *Brunner & Suddarth's Textbook of Medical-Surgical Nursing* (14th ed.) by Janice L. Hinkle and Kerry H. Cheever (2018) and *Pathophysiology: A Practical Approach* (3rd ed.) by Lachel Story (2018) – used during students' tenure in the BSN program. The project and questionnaire were approved by The University of Southern Mississippi's (USM) Institutional Review Board (see Appendix B). The author predicted that fifth-semester students would score higher on the questionnaire.

CHAPTER II: Background

The Menstrual Cycle

To understand the severity of this condition, one must understand what a normal menstrual cycle is. A woman's typical menstrual cycle will occur in phases over, on average, 28 days. Each cycle begins the day after a woman's last period and ends on the first day of her next period. Estrogen and progesterone play a large role in the menstrual cycle, increasing and decreasing as the cycle progresses. Follicle-stimulating hormone (FSH) and luteinizing hormone (LH) are also vital in this process; FSH plays a role in estrogen secretion, while LH affects progesterone production (Hinkle & Cheever, 2018). Hinkle and Cheever (2018) describe the menstrual cycle:

In the proliferative phase at the beginning of the cycle (just after menstruation), FSH output increases, and estrogen secretion is stimulated. This causes the endometrium to thicken and become more vascular. In the secretory phase near the middle portion of the cycle (day 14 in a 28-day cycle), LH output increases, and ovulation occurs. Under the combined stimulus of estrogen and progesterone, the endometrium reaches the peak luteal phase, in which the endometrium is thick and highly vascular...progesterone is secreted by the corpus luteum. (p. 1653-1654)

If fertilization occurs, the uterine lining will not be shed, and estrogen and progesterone will maintain their increased levels as the pregnancy process begins. If fertilization does not occur, "menstrual flow, consisting of old blood, mucus, and endometrial tissue, is discharged through the cervix and into the vagina" (Hinkle & Cheever, 2018, p. 1654).

The menstrual cycle should repeat every 28 days following menarche until menopause, around ages 45-55 years, except in times of pregnancy (Hinkle & Cheever, 2018).

It is normal for women to experience minor pain and discomfort during menstruation, but it can be difficult for women to differentiate between “normal” menstrual cramps and pelvic pain and severe, debilitating pain caused by a condition such as endometriosis.

What is Endometriosis?

Endometriosis occurs when cells of the endometrium grow outside of the uterine cavity and attach to other organs in the pelvic cavity. These growths are called lesions or adhesions and are the cause of the symptoms of endometriosis (Hinkle & Cheever, 2018). These lesions and adhesions respond to changes in hormone levels throughout a woman’s menstrual cycle, causing bleeding into the pelvic cavity and surrounding organs (Huntington & Gilmour, 2005). The exact cause of endometriosis is unknown, but it is believed to be a combination of genetics, hormonal factors, and age when bearing children. Women who have family members with endometriosis, shorter menstrual cycles, more than 7 days of menstrual flow, outflow obstruction, earlier menarche, bore children later in life or have few/no children are at an increased risk of endometriosis (Hinkle & Cheever, 2018).

Endometriosis develops in stages, which can be determined via bimanual pelvic examinations, laparoscopic examinations, ultrasonography, magnetic resonance imaging, and computed tomography scans (Hinkle & Cheever, 2018). The stages of endometriosis range in levels of severity and involvement with other organs: “In stage 1, patients have superficial or minimal lesions; stage 2, mild involvement; stage 3, moderate involvement;

and stage 4, extensive involvement and dense adhesions, with obliteration of the cul-de-sac” (Hinkle & Cheever, 2018, p. 1704).

Symptoms of endometriosis can be devastating to a woman’s life, greatly decreasing her quality of life. Patients with endometriosis may experience include dysmenorrhea, dyspareunia, pelvic pain, dyschezia, leg or back pain, depression, and infertility (Hinkle & Cheever, 2018). Absences from work and school are frequently necessary because of the debilitating pain. About 50% of patients with endometriosis suffer from infertility (Norton & Holloway, 2016). Not only do women suffer from these symptoms, but many find it difficult to articulate the dramatic impact these symptoms have had on their lives (Bullo, 2020).

Due to the normalization of menstrual pain and a lack of knowledge about endometriosis by both patients and healthcare providers, there is a diagnostic delay of 4-12 years following symptom onset (Grundström et al., 2017). There is no cure for endometriosis, but there are pharmacologic therapies and surgeries that can be done to manage symptoms. Pharmacologic therapy includes analgesic agents and hormonal therapy, such as oral contraceptives. Surgery is often performed when medication does not reduce pain; laparoscopy and laser surgery are used to remove/destroy adhesions. In severe cases, when all other methods have been exhausted, a total hysterectomy is performed (Hinkle & Cheever, 2018). Even treatment as radical as a total hysterectomy does not guarantee relief from endometriosis (Huntington & Gilmour, 2005).

Patients’ Experiences with Endometriosis

The overall experience patients have with endometriosis is negative. Not only are the symptoms life-altering, but the patients are often not met with understanding

healthcare providers. In a study conducted by Markovic, Manderson, and Warren (2008), it was discovered that two narratives were often experienced by patients with endometriosis – endurance (normalization of the severe pelvic pain experienced chronically) and contest (healthcare professionals’ disbelief/dismissal of patients’ struggles). Women in this study explained that they were not taught what “normal” pain felt like, and since they knew that many women did have some level of pain during their menstrual cycle, they assumed their experience was typical. This pain caused them to be absent from school, work, and activities with their friends and family, which they felt they simply had to endure due to their extreme menstrual pain (Markovic et al., 2008). The other major theme to emerge from this study was contest. Women were frequently told by general practitioners that their symptoms were a result of psychosomatic conditions or depression and were told to “go home and live with it,” (Markovic et al., 2008, p. 359). These women knew that the symptoms they were experiencing were more than a psychiatric diagnosis; they were experiencing physical pain as well as emotional torment from being dismissed by their healthcare providers.

Lack of sympathy from healthcare providers and personal relationships is another theme that emerged from the literature. One woman explained her experience with endometriosis, “No sympathy was issued for pain perceived as natural or my fault. These strategies included exercising and taking pain medication several days prior to the start of menstruation, not complaining about pain during menstruation, and most importantly, not behaving as though I was sick” (Wright, 2019, p. 913). This experience is typical and can be seen widely throughout literature published on this subject. Most women with endometriosis are forced to “shop around” for another general practitioner who might

provide relief for symptoms or specialist referral (Markovic et al., 2008, p. 361). Patients with endometriosis spend an unnecessarily long amount of time trying to determine the reason for their suffering and are often met with unsympathetic and dismissive healthcare providers.

The Role of Nurses

Nurses' basic roles when caring for a patient with endometriosis focus on initial examination and education throughout the care process (Hinkle & Cheever, 2018). Lengthy diagnostic procedures are necessary for the diagnosis of endometriosis, and it is vital that the nurse explains all procedures and answers any questions the patient may have. The nurse should attempt to ease the patient's anxiety and provide relevant comfort measures. When creating a care plan for patients with endometriosis, nurses need to include the following goals: pain relief (at any point during the menstrual cycle) and evasion of infertility (Hinkle & Cheever, 2018). The nurse should also educate patients on the disease process and dispel myths the patient may believe about menstruation, as well as promote a healthy environment in which the patient feels supported. It is vital that the nurse educates the patient on the possibility of infertility and, if necessary, treatment options and adoption resources (Hinkle & Cheever, 2018). Other nursing interventions include conducting a detailed initial interview about the patient's gynecological history, asking about how activities of daily living are affected by her symptoms, asking about the impact of symptoms on sexual relationships, explaining health promotion tools, and providing information about resources and support groups, such as the Endometriosis Association (Norton & Holloway, 2016).

Nurses can also help aid in a quicker endometriosis diagnosis. A systematic review conducted by Skrobanski, Ream, Poole, & Whitaker (2019) had a goal to discover if primary care nurses contribute to an early diagnosis of cancer in developed countries and if this contribution varies internationally. Included in this review was an analysis of studies that assessed registered nurses' knowledge of cancer warning signs and diagnostic procedures. The authors explained that nurses in the primary care setting often perform cancer screenings, which means they can contribute to an early diagnosis of cancer and, thus, help the patient receive treatment sooner in the disease process (Skrobranski et al., 2019). The results indicated that a low proportion of Spanish, Saudi Arabian, and American nurses had nursing school education on the topic of the nurse's role in the early diagnosis of cancer. While not directly related to endometriosis, this study demonstrated that nursing school curriculums vary greatly, and the content contained in these curriculums is of interest because it can greatly affect future patient care (Skrobanski et al., 2019).

Nurses' knowledge and opinions of endometriosis shape the way they care for patients struggling with these conditions. A study published by Bach, Risoer, Forman, and Seibaek (2016) found that while gynecological nurses strive to provide good patient care to patients with endometriosis, each nurse approaches the disease and its causes and solutions differently. For example, some nurses approach the care of patients with endometriosis believing that the severe pelvic pain is "...caused or amplified by psychological problems," (Bach et al., 2016, p. 5). This assumption can lead to less compassionate care, and consequently, alter the patient's treatment because the nurses assume the patient is benefitting from bedrest caused by the pain (Bach et al., 2016).

It is the responsibility of the nurse to remain knowledgeable about issues in their field of practice. Standard 13 of the *American Nurses' Association Scope and Standards of Practice* states, "The registered nurse uses current evidence-based knowledge, including research findings, to guide practice" (p. 77). It is irresponsible for a nurse to not actively seek new knowledge in his or her field because the best patient care cannot be provided with outdated information. Specifically, with endometriosis, new treatments are constantly being researched, and the protocol for managing this disease is not standardized; therefore, it is vital to remain updated on new breakthroughs or continuing education courses about how best to care for women suffering from this condition.

Predictions

Knowledge of endometriosis and reproductive health issues is critical when providing patient care. Through a combination of several classes – Anatomy and Physiology I and II, pathophysiology, health assessment, chronic and acute care, and childbearing families – nursing students gain knowledge of endometriosis. Second-semester students in the BSN program have taken Anatomy and Physiology I and II, pathophysiology, health assessment, and are currently enrolled in chronic care. Fifth-semester students have taken all of these courses, including acute care and childbearing families, and are enrolled in their final semester of the BSN program. The author predicted that fifth-semester students would have more knowledge and demonstrate a better understanding of endometriosis than second-semester students. The author also predicted that female students would have more knowledge of endometriosis than male students.

Research Questions

1. Do BSN students at a southeastern United States university have a working knowledge of endometriosis?
2. Do fifth-semester students demonstrate a better understanding of endometriosis than second-semester students?
3. Do female students demonstrate a better understanding of endometriosis than male students?

CHAPTER III: Methodology

Research Design and Methods

This research study followed a descriptive post-test design. This design and method was appropriate to answer the impact of endometriosis education on undergraduate nursing students.

Instrument

The questionnaire was created by the primary investigator (see Appendix A). It consisted of eight multiple-choice questions, with three select-all-that-apply questions. Select-all-that-apply questions are common practice in nursing schools' curriculums because they appear on the licensure examination. The questionnaire was created using two textbooks studied in the course of the BSN program at USM. *Brunner and Suddarth's Textbook of Medical-Surgical Nursing* (Hinkle & Cheever, 2018) is the main literature studied in the chronic and acute care courses. It contains a chapter titled "Management of Patients with Female Reproductive Disorders." The section that provides an overview of endometriosis includes the pathophysiology, clinical manifestations, assessment and diagnostic findings, medical management, and nursing management (Hinkle & Cheever, 2018). The other textbook used to create the questionnaire was *Pathophysiology: A Practical Approach* (Story, 2018), used in the pathophysiology course. The section about endometriosis provides basic facts, including the definition, theories about the cause, symptoms, diagnostic procedures, and possible treatments (Story, 2018).

Questions in the questionnaire covered basic content nursing students are expected to understand about endometriosis. The basic definition of endometriosis was

questioned as was risk factors and clinical manifestations. Another question asked participants to identify when most cases of endometriosis are diagnosed. The treatment methods and co-morbidities with endometriosis were also questioned. A maternal-newborn and inpatient obstetric nursing course instructor reviewed and approved the content of the questionnaire. The main goal of the questionnaire was to assess student's knowledge regarding endometriosis throughout the nursing program of a southeastern United States BSN program.

Sample and Data Collection Process

This project was approved by USM's Institutional Review Board; the study number was IRB-20-290 (see Appendix B). The sampling in this project was a convenience sample. An email announcement was sent to all students enrolled in their second or fifth semesters of the BSN program (see Appendix C). There are 126 students in this group, and 28 students responded. 17 participants were second-semester students, and 11 participants were fifth-semester students, yielding a return percentage of 22.22%. In the email announcement, the students were informed that their participation is completely voluntary. The email contained a link to the endometriosis questionnaire on Qualtrics. This link brought the participants to a webpage asking demographic questions – age, gender, and the semester in the program. Only those 18 years of age and older were eligible to complete the survey. Participants were asked to indicate their consent prior to beginning the questionnaire. Confidentiality and anonymity were maintained; answers to the survey questions were not connected to the respondents.

CHAPTER IV: Results

Demographics

A total of 126 students were contacted via email with the questionnaire, and 30 students responded. Two responses were not complete, leaving 28 fully completed surveys. Of these 28 students, 60.71% participants were second-semester students, and 39.29% participants were fifth-semester students. 92.86% of the participants identified as female, and 7.14% of the participants identified as male. A majority (82.14%) of the participants were in the 18-22 years of age category. 14.29% of the participants were in the 23-27 years of age category, and 3.57% participant was in the 32-35 years of age category.

Table 1: Demographics

<i>Demographic</i>	<i>Categories</i>	<i>Participants (%)</i>
<i>Age</i>	18-22	82.14
	23-27	14.29
	28-32	0
	32-35	3.57
<i>Gender</i>	Male	7.14
	Female	92.86
	Other	0
<i>Semester</i>	Second	60.71
	Fifth	39.29

Identification, Risk Factors, and Age of Diagnosis

One multiple choice-style question on the survey required participants to identify a basic definition of endometriosis. 92.86% of participants answered correctly by selecting the choice that stated, “when uterine tissue begins growing in areas outside the uterus.” The two participants who answered incorrectly were second-semester students in the BSN program.

The risk factors of endometriosis question was a select-all-that-apply-style question, requiring participants to choose multiple correct answers. No participants chose all the correct answers – early onset of menstruation, late onset of menopause, low body mass index, and having a closed hymen. 100% of second-semester participants and 90.90% of fifth-semester participants correctly chose early onset of menstruation as a risk factor for endometriosis. 41.18% of second-semester participants and 45.45% of fifth-semester participants correctly chose late onset of menopause as a risk factor for endometriosis. 52.94% of second-semester participants and 36.36% of fifth-semester participants correctly chose low body mass index as a risk factor for endometriosis. 17.65% of second-semester participants and 18.18% of fifth-semester participants correctly chose having a closed hymen as a risk factor for endometriosis. 41.18% of second-semester participants and 45.45% of fifth-semester participants incorrectly chose having many children as a risk factor for endometriosis.

Table 2: Risk Factors

<i>Population</i>	<i>Risk Factor</i>	<i>Participants (%)</i>
<i>Second semester</i>	Early onset of menstruation	100
	Late onset of menopause	41.18
	Low body mass index	52.94
	Having a closed hymen	17.65
	Having many children	41.18
<i>Fifth semester</i>	Early onset of menstruation	90.90
	Late onset of menopause	45.45
	Low body mass index	36.36
	Having a closed hymen	18.18
	Having many children	45.45

One multiple choice-style question on the survey required participants to select the age range during which endometriosis is most commonly diagnosed. 52.94% of second-semester participants and 45.45% of fifth-semester participants correctly chose the age range of 25-35 years when endometriosis is most commonly diagnosed. 41.18% of second-semester participants and 45.45% of fifth-semester participants incorrectly

chose the age range of 15-21 years when endometriosis is most commonly diagnosed. 5.88% of second-semester participants and 9.09% of fifth-semester students incorrectly chose 40-50 years of age as the age range when endometriosis is most commonly diagnosed. No participants chose the age range of 12-14 years.

Table 3: Age of Diagnosis

<i>Population</i>	<i>Age of Diagnosis</i>	<i>Participants (%)</i>
<i>Second semester</i>	Between ages 12-14 years	0
	Between ages 15-21 years	41.18
	Between 25-35 years	52.94
	Between ages 40-50 years	5.88
<i>Fifth semester</i>	Between ages 12-14 years	0
	Between ages 15-21 years	45.45
	Between ages 25-35 years	45.45
	Between ages 40-50 years	9.09

Clinical Manifestations and Mental Health Co-Morbidity

One select-all-that-apply-style question on the survey asked participants to identify the clinical manifestations of endometriosis. The correct answers were pelvic pain, pain during or after sexual intercourse, dyschezia, and menorrhagia. 100% of participants correctly chose pelvic pain and pain during or after sexual intercourse as clinical manifestations. 94.12% of second-semester participants and 100% of fifth-semester participants correctly chose menorrhagia as a clinical manifestation. 11.76% second-semester participants and 36.36% of fifth-semester participants correctly identified dyschezia as a clinical manifestation of endometriosis. 5.88% of second-semester participants and 36.36% of fifth-semester participants incorrectly chose stress incontinence as a clinical manifestation of endometriosis.

Table 4: Clinical Manifestations

<i>Population</i>	<i>Clinical Manifestations</i>	<i>Participants (%)</i>
<i>Second semester</i>	Pelvic pain	100
	Pain during or after sexual intercourse	100
	Dyschezia	11.76
	Menorrhagia	94.12
	Stress incontinence	5.88
<i>Fifth semester</i>	Pelvic pain	100
	Pain during or after sexual intercourse	100

Dyschezia	36.36
Menorrhagia	100
Stress incontinence	36.36

A true/false question on the survey stated, “Infertility is one of the most concerning symptoms of endometriosis.” 100% of fifth-semester participants correctly chose true, while 94.12% of second-semester participants chose true.

One multiple choice-style question on the survey asked participants to identify which mental health disturbance frequently occurs with endometriosis. 94.12% of second-semester participants and 100% of fifth-semester participants correctly chose depression as the mental health issue that frequently occurs with endometriosis. 5.88% of second-semester participants incorrectly chose paranoid personality disorder. No participants selected bipolar disorder or obsessive-compulsive disorder.

Table 5: Mental Health Disturbance

<i>Population</i>	<i>Mental Health Disturbance</i>	<i>Participants (%)</i>
<i>Second semester</i>	Depression	94.12
	Bipolar disorder	0

<i>Fifth semester</i>	Paranoid Personality Disorder	5.88
	Obsessive-compulsive disorder	0
	Depression	100
	Bipolar disorder	0
	Paranoid personality disorder	0
	Obsessive-compulsive disorder	0

Treatment

One multiple choice-style question asked participants to identify the goal of endometriosis treatment. The correct answer was “minimize discomfort and maximize childbearing potential,” and 100% of participants selected this choice.

One select-all-that-apply-style question asked participants to select pharmacological therapies used to manage endometriosis. The answer choices were macrolides, nonsteroidal anti-inflammatory drugs (NSAIDs), contraceptive/hormonal agents, and thiazide diuretics. The correct answers were NSAIDs and contraceptive/hormonal agents. 76.47% of second-semester participants and 72.73% of fifth-semester participants correctly chose NSAIDs, and 58.82% of second-semester participants and 90.91% of fifth-semester participants correctly chose contraceptive/hormonal agents. 46.43% of participants correctly chose both NSAIDs and contraceptive/hormonal agents. 17.65% of second-semester participants and 9.09% of

fifth-semester participants incorrectly chose macrolides as a pharmacologic therapy for endometriosis. No participants chose thiazide diuretics.

Table 6: Pharmacologic Therapies

<i>Population</i>	<i>Choices</i>	<i>Participants (%)</i>
<i>Second semester</i>	Macrolides	17.65
	NSAIDs	76.47
	Contraceptive/hormonal agents	58.82
	Thiazide diuretics	0
<i>Fifth semester</i>	Macrolides	9.09
	NSAIDs	72.73
	Contraceptive/hormonal agents	90.91
	Thiazide diuretics	0

Mean, Median, & Mode

Including all participants, the mean score was 62.53%. The mean score for second-semester students was 60.29%, and for fifth-semester students, it was 64.77%. The median score for all participants was 62.50%. The mode for fifth-semester students was 62.50%, and for second-semester students, it was 50%. The range for second-semester participants was 50, while it was 37.50 for fifth-semester students. For second-semester participants, the minimum score was 37.50%, and the maximum score was 87.50%. The minimum score for fifth-semester students was 50%, and the maximum score was 87.50%.

Table 7: Mean, Median, Mode

<i>Population</i>	<i>Mean (%)</i>	<i>Median (%)</i>	<i>Mode (%)</i>	<i>Range</i>	<i>Minimum (%)</i>	<i>Maximum (%)</i>
<i>All participants</i>	62.53	62.50	62.50	50	37.50	87.50
<i>Second semester</i>	60.29	62.5	50	50	37.50	87.50
<i>Fifth semester</i>	64.77	62.50	62.50	37.50	50	87.50

CHAPTER V: Discussion

Areas of Strength and Deficits

This research project was conducted to assess the knowledge second-semester and fifth-semester nursing students have of endometriosis. The results indicate that a majority of participants have somewhat satisfactory knowledge of endometriosis. A positive finding is that a vast majority of participants were able to identify what endometriosis is. This result is important because in order for nurses to aid in the diagnosis of endometriosis, they must first be aware of the condition. Another positive finding is that all participants but one were able to identify infertility as one of the most concerning symptoms of endometriosis. This symptom of endometriosis takes a great emotional toll on patients; therefore, it is vital that nurses are aware of the issue and are prepared to counsel patients through this problem. These results indicate that BSN students at have the beginning knowledge needed to do so.

The participants are also aware of the goal of endometriosis treatment – to minimize discomfort and maximize childbearing potential. Students were able to identify the importance of NSAIDs in therapy for endometriosis, but more fifth-semester students than second-semester students identified contraceptive/hormonal agents as a pharmacologic therapy. This difference is likely because fifth-semester students have taken the acute conditions and the obstetrics and childbearing nursing courses, so they are more aware of the role contraceptive/hormonal agents play in reproductive disorders. It is likely that more second-semester students chose NSAIDs as a pharmacologic therapy because they are currently enrolled in a pharmacology course; thus, the functions and uses of NSAIDs was learned more recently.

Of the eight questions on the survey, the select-all-that-apply questions were the ones most missed by participants. Generally, participants were able to select at least one correct answer choice but did not select all of the correct answer choices. For example, in the question of risk factors for endometriosis, almost all participants chose early onset of menstruation as a risk factor. Yet, less than half of participants chose late onset of menopause, low body mass index, and having a closed hymen as risk factors. Over one-third of participants incorrectly chose having many children as a risk factor of endometriosis. No participants chose all of the correct choices – early onset of menstruation, late onset of menopause, low body mass index, and having a closed hymen. This result means that while students are able to identify some of the risk factors, they are not fully aware of all of them. It is essential for nurses to be aware of all the risk factors in order for them to recognize which patients are vulnerable to develop endometriosis. Another select-all-that-apply question was about the clinical manifestations of endometriosis. All participants correctly chose pelvic pain and pain during or after sexual intercourse as clinical manifestations, and all but one correctly chose menorrhagia as a clinical manifestation. The most concerning finding in this category is the lack of participants who chose dyschezia as a clinical manifestation of endometriosis. Both of these findings can have a significant impact on the delay of diagnosis of endometriosis. It is important for nurses to know all of the risk factors, as well as the most commonly presenting symptoms of endometriosis in order to aid in decreasing the diagnostic timeframe and the amount of time women with endometriosis spend suffering. Many women with endometriosis present with bowel dysfunction, such as painful bowel movements, diarrhea, constipation, or nausea (Johns Hopkins Medicine, 2020). Nurses

must be aware of these symptoms because, though vague, they be key in the diagnostic process and the experience of the patient.

The author's hypothesis was correct. Overall, fifth-semester students scored higher than second-semester students. There was a difference of 4.48% between the average score of second- and fifth-semester students.

Limitations

The primary limitation in this study is that due to COVID-19 restrictions, the questionnaire had to be conducted online rather than in-person, leading to a small number of participants. Due to COVID constraints, the IRB was not approving in-person studies. If the primary investigator had been able to administer the survey in person, there would have been greater participation and greater population diversity. The lack of diversity in both age range and gender is a limitation. Participants outside of the 18-22 years of age range could have more experience with reproductive disorders, yielding different results. There were significantly more females than males who participated in the survey. Another limitation was the select-all-that-apply questions. Even though participants usually chose at least one correct answer, the entire question was counted as incorrect if they did not choose all correct choices. This limitation decreased the participants' overall scores. Another limitation of this study is that the questionnaire was created by the primary investigator; hence, there is no data on the reliability of its results.

Further Areas of Study

This project was conducted at a university in the Southern United States. It would be useful to conduct a study such as this one in other areas of the United States with more diverse age ranges and genders to see how results compare. A future longitudinal study

could also compare the retention of knowledge about endometriosis between nursing students and nurses five, ten, or fifteen years into their careers.

APPENDIX A: UNDERGRADUATE NURSING STUDENTS' KNOWLEDGE OF ENDOMETRIOSIS – SURVEY

Highlighted answers indicate correct answer choice(s).

- 1) What is endometriosis?
 - A. Descent of the uterus into the vagina
 - B. When the rectum protrudes through the posterior wall of the vagina
 - C. When uterine tissue begins growing in areas outside the uterus
 - D. A state of weakened pelvic muscles
- 2) What are risk factors of endometriosis? Select all that apply.
 - A. Early onset of menstruation
 - B. Late onset of menopause
 - C. Having many children
 - D. Low body mass index
 - E. Having a closed hymen
- 3) When are most cases of endometriosis diagnosed?
 - A. Between ages 12-14 years
 - B. Between ages 15-21 years
 - C. Between ages 25-35 years
 - D. Between ages 40-50 years
- 4) Clinical manifestations of endometriosis include: (Select all that apply.)
 - A. Pelvic pain
 - B. Pain during or after sexual intercourse
 - C. Stress incontinence

- D. Dyschezia (pain with bowel movements)
- E. Menorrhagia (abnormally heavy bleeding in a menstrual period)
- 5) Infertility is one of the most concerning symptoms of endometriosis.
- A. True
- B. False
- 6) What is the goal of endometriosis treatment?
- A. Minimize discomfort and maximize childbearing potential
- B. Decrease feeling of pelvic fullness
- C. Decrease occurrence of stress incontinence
- D. Increase strength of pelvic floor muscles
- 7) Which of the following mental health disturbances is frequently co-morbid with endometriosis?
- A. Bipolar disorder
- B. Depression
- C. Paranoid personality disorder
- D. Obsessive-compulsive disorder
- 8) Which of the following classes of pharmacologic therapies is typically prescribed for endometriosis? Select all that apply.
- A. Macrolides
- B. Nonsteroidal anti-inflammatory drugs
- C. Contraceptive/hormonal agents
- D. Thiazide diuretics

APPENDIX B: IRB APPROVAL LETTER

Office of
Research Integrity



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NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident template on Cayuse IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.
- Face-to-Face data collection may not commence without prior approval from the Vice President for Research's Office.

PROTOCOL NUMBER: IRB-20-290

PROJECT TITLE: Undergraduate Nursing Students' Knowledge of Endometriosis

SCHOOL/PROGRAM: Users loaded with unmatched Organization affiliation., School of PRNP

RESEARCHER(S): Stephanie Schlorke, Elizabeth Tinnon

IRB COMMITTEE ACTION: Exempt

CATEGORY: Exempt

Category 2.(ii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).

Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation.

APPROVED STARTING: September 3, 2020

A handwritten signature in cursive script that reads "Donald Sacco".

APPENDIX C: EMAIL ANNOUNCEMENTS

Initial Email Announcement

Hello,

My name is Stephanie Schlorke, and I am a fourth-semester student in the undergraduate nursing program at the University of Southern Mississippi (USM). I am a member of the Honors College, and I am writing a thesis titled “Undergraduate Nursing Students’ Knowledge of Endometriosis.” The purpose of my research study is to assess USM nursing students’ knowledge of endometriosis. My goal is to determine if students can recognize the signs and symptoms of endometriosis as well as demonstrate an understanding of the effects endometriosis can have on a woman’s life. I will compare the results of students in their second-semester (chronic conditions) of the nursing program to those of students in their fifth-semester (complex conditions) of the program.

The inspiration behind this project lies in the suffering many women face due to endometriosis. This disease is difficult to diagnose, and it is vital that nurses are aware of the warning signs because these patients populate every location healthcare is provided.

If you would like to participate in the study, I would greatly appreciate it. The link below will direct you to a survey. There are no known direct risks to participants. A potential benefit will be if a knowledge gap is identified, and the curriculum is adjusted to include more information about endometriosis. Results will be kept anonymous. To enter a giveaway for a \$25 Amazon gift card, send your name and email address to me after completing the survey. The winner will be contacted in December 2020. If you have any questions, please contact me via email at stephanie.schlorke@usm.edu.

By clicking the link below and participating in the survey, you indicate your willingness to serve in the study. The survey will be available until November 16, 2020. This project has been approved by USM's IRB. The IRB number for this project is IRB-20-290.

https://usmep.co1.qualtrics.com/jfe/form/SV_aXCNxTbrNJRIVRH

Thank you,

Stephanie Schlorke

Email Announcement Follow-Up

Hello!

I previously sent an email about my Honors thesis study on undergraduate nursing students' knowledge of endometriosis. If you have not had a chance to take the survey yet, the link is below:

https://usmep.co1.qualtrics.com/jfe/form/SV_aXCNxTbrNJRIVRH

If you take the survey, you are eligible to enter a giveaway for a \$25 Amazon gift card.

Email me your name to be entered; the winner will be contacted in December 2020.

This study is completely voluntary and has been approved by the IRB at USM. The IRB number for this study is IRB-20-290.

Thank you,

Stephanie Schlorke

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