

NURSE PRACTITIONER STUDENT PERCEPTIONS AND KNOWLEDGE
ON POLYCYSTIC OVARIAN SYNDROME: A QUALITY
IMPROVEMENT PROJECT

by

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As members of the DNP Project Committee, we certify that we have read the DNP project prepared by Kimberly Kelechukwu Onwuzurumba, titled Nurse Practitioner Student Perceptions and Knowledge on Polycystic Ovarian Syndrome: A Quality Improvement Project and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.



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
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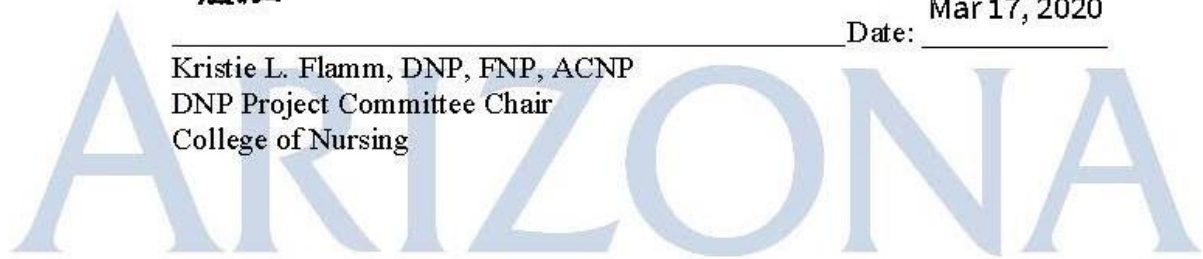
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Final approval and acceptance of this DNP project is contingent upon the candidate's submission of the final copies of the DNP project to the Graduate College.

I hereby certify that I have read this DNP project prepared under my direction and recommend that it be accepted as fulfilling the DNP project requirement.



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DEDICATION

To the women of the world with Polycystic Ovarian Syndrome.

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ABSTRACT

The purpose of this doctor of nursing practice (DNP) project was to examine family nurse practitioner (FNP) students' knowledge and perceptions of polycystic ovarian syndrome (PCOS), intent to screen, and confidence in starting treatment before and after education on the topic. There is a great deal of variability in the diagnosis and recurrent dissatisfaction amongst women with PCOS regarding their diagnosis experience (Cee-Green, 2017). There are established criteria for the diagnosis of PCOS, however many women see multiple providers over an extended period of time before their diagnosis and receive poor information regarding the condition and treatment options (Gibson-Helm, 2014). Additionally, many women with PCOS expressed dissatisfaction with the information they were given by their provider regarding the condition (Gibson-Helm, 2014; Gibson-Helm, 2017). However, there have been no studies to evaluate the knowledge base of primary care provider students' before they enter practice.

The design of this project was a pre-/post-test design with participants from the University of Arizona' family nurse practitioner (FNP) program and was essentially a case study of one group of students prior to entering practice. This project was conducted to assess baseline knowledge, provide education on PCOS, and assess improvements in knowledge of PCOS, its long-term complications, treatment options and intent to screen after the education. The impact of this project was assessed through pre- and post-surveys utilizing Likert and multiple-choice questions, analyzing any differences. This project utilized online platforms for the surveys and education.

Descriptive statistics were used to analyze the data. Surveys were assessed for frequency of responses and percentages. The responses from the pre-test and the post-test were compared to assess changes in knowledge and perception of PCOS.

INTRODUCTION

A condition affecting females from adolescence to menopause, polycystic ovarian syndrome (PCOS) has gained the attention of academia and individuals alike in recent decades. First observed by gynecologists Stein and Leventhal in 1935, a prominent sign of the condition was polycystic ovaries noted on ultrasound, which produced the name of the condition (Lundy, 2017). While the exact mechanism of PCOS is not known, androgen excess, menstrual irregularities, and polycystic ovaries are often found in this condition, resulting in various symptoms (Lundy, 2017; Jin & Xie, 2018). Plaguing women with symptoms such as infertility and menstrual irregularities, cardiac abnormalities, hirsutism, diabetes/insulin resistance, depression and anxiety, its wide array of symptoms present many challenges (Sirmans & Pate, 2014). While PCOS is a condition that affects roughly 7 to 10 million American women, great barriers remain in its diagnosis (Brady, Mousa, & Mousa, 2009). Some estimates of PCOS prevalence are 6 to 20% of women worldwide and the range of prevalence can be explained by the missing statistics of the women who were not accurately diagnosed (CDC, 2018; Vidya Bharathi et al., 2017). In 2010, \$1.16 billion dollars were spent in health care costs associated with PCOS including infertility treatment, obesity, and initial evaluation, highlighting the need for further study (Jason, 2011).

Background Knowledge

The most widely accepted criteria for PCOS diagnosis has been the Rotterdam criteria (Wang & Mol, 2017) which includes three characteristics: polycystic ovaries (assessed with ultrasound), menstrual irregularities, as well as high levels of androgen hormones (Legro et al, 2013; Wang & Mol, 2017). This guideline is also recommended by the Endocrine Society

guideline (Azziz et al, 2009). For a diagnosis to be made a woman should have two of the three characteristics. Subsequent research has determined that PCOS is an endocrine disorder and many women do not display androgen excess in the form of cysts on the ovaries. Cysts are defined as fluid-filled sacs and can be developed by women with PCOS because of unfertilized eggs not being released from the body (PCOS Awareness Association, 2017). When there is anovulation, these cysts can make the androgen hormone, which is often seen in excess in women with PCOS (John Hopkins, n.d.). The ambiguity of the PCOS manifestations and the presence or lack of ovarian cysts poses additional difficulty when using the Rotterdam criteria (Wang & Mol, 2017). There are two other organizations that have developed criteria used to assess for PCOS including the Androgen Excess and PCOS Society, and the National Institute of Health (NIH) (NIH, 2012). The Androgen Excess and PCOS Society has three criteria for PCOS that include hyperandrogenism, ovarian dysfunction (oligo-anovulation and/or polycystic ovaries), and exclusion of other androgen excess or related disorders (Azizz et al, 2009). In the Androgen Excess and PCOS Society criteria, patients must have polycystic ovaries in addition to having either hyperandrogenism or oligomenorrhea disorders to be diagnosed (Azizz et al., 2009). Again, women who do not have polycystic ovaries would not be diagnosed using this criterion, further feeding the range in the prevalence statistics. Some similarity can be seen in the comparison of Androgen Excess and PCOS Society, and Rotterdam's criteria; however, there is not exclusion of other causes of androgenism in Rotterdam's criteria (Wang & Mol, 2017; Lujan, Chizen, & Pierson, 2008). National Institute of Health's criteria consist of merely hyperandrogenism and chronic anovulation (Lujan, Chizen, & Pierson, 2008). The variations and pitfalls of each criteria have not aided in timely diagnosis of patients due to its various phenotype

displays (Lujan, Chizen, & Pierson, 2008). See Table 1 for comparison of the three sets of criteria.

TABLE 1. *Criteria for diagnosis of PCOS.*

Clinical Symptoms	Rotterdam Criteria (2003)	National Institutes of Health Criteria (1990)	Androgen Excess and PCOS Society (2009)
	<i>Two of the three symptoms must be present</i>	<i>These two symptoms below must be present</i>	<i>Must have A with either B or C.</i>
Polycystic Ovaries	x	x	A
Hyperandrogenism	x	x	B
Oligomenorrhea	x		C

(Williams, Mortada, & Porter, 2016, modified)

Problem

Studies have shown that women presenting with the symptoms of PCOS often had to see greater than three providers and required 12 months or longer before receiving their diagnosis (Gibson-Helm, Lucas, Boyle, & Teede, 2014). It should be noted that this study, and many like it, include women who were persistent enough to pursue a diagnosis of some sort for their symptoms (Gibson-Helm, Lucas, Boyle, & Teede, 2014). These statistics do not account for the many women who became frustrated and sought no further diagnosis or care. Currently, research is not available for the prevalence of PCOS at the local level.

The frustration and dissatisfaction of women with PCOS and their diagnosis and initial care is a worldwide problem (Cree-Green, 2017). Patients may initially present to providers with dermatologic or psychiatric concerns, which may not prompt a provider to consider screening further for other PCOS symptoms (Cree-Green, 2017).

Patients with PCOS have stated they felt a lack of empathy and assertiveness from their providers, which may allude to a lack of knowledge of providers about the severity of long-term

complications of PCOS (Gibson-Helm, Lucas, Boyle, & Teede, 2014). In addition, research has illustrated a lack of knowledge among North American providers. In a survey amongst reproductive medicine providers and reproductive endocrinologists assessing knowledge of diagnostic criteria, 27.7% did not know the criteria for PCOS diagnosis (Anuja et al., 2017). This is concerning given that these are the individuals that patients should be referred to when experiencing symptoms of PCOS. Due to the wide array of manifestations, recognition of the signs and symptoms of PCOS may pose challenges on its own. That factor coupled with the complexity of a multifaceted condition are the major reasons for delayed diagnosis (Gibson-Helm, Lucas, Boyle, & Teede, 2014).

Studies have shown that longer times taken to receive a diagnosis of PCOS is associated with poor psychological functioning (Deeks, Gibson-Helm, Paul, & Teede, 2011). The long-term implications can cover three aspects of health: reproductive, metabolic, and psychological. Reproductive implications include infertility, hirsutism, and hyperandrogenism. While metabolic implications can include insulin resistance and impaired glucose tolerance (Teede, Deeks, & Moran, 2010). Lastly the psychological implications are comprised of anxiety, depression, and perception of lower quality of life (Teede, Deeks, & Moran, 2010).

While there is need for appropriate diagnosis, with the increase in public awareness of PCOS there has been an increase in the misdiagnosis of PCOS in place of other conditions (Meek, Bravis, Don, & Kaplan, 2013). Additionally, there is new evidence that for some women, clinical manifestations of PCOS may be only temporary (Zhuang et al., 2015). When PCOS was first described it was associated with polycystic ovaries and menstrual irregularities, but it later became evident that not all women have menstrual irregularities (Meek, Bravis, Don, & Kaplan,

2013). Some patients with menstrual irregularities, hirsutism, and obesity mimic PCOS pattern but lack polycystic ovaries. There are other conditions that can mimic some of the presentations of PCOS such as hyperprolactinemia, thyroid disorders, androgen secreting tumors, Cushing's syndrome and non-classic congenital adrenal hyperplasia (Papadakis et al., 2019; Meek, Bravis, Don, & Kaplan, 2013).

With current knowledge regarding this issue and its complications in diagnosis, solutions should be approached from every angle to improve PCOS practices for healthcare providers. Research has shown that current providers have a lack of knowledge related to this condition as previously stated. However, it is important to educate the future generations of providers to improve PCOS care. No current research has been found assessing NP students' knowledge on this and little research can be found assessing other groups of students. For this DNP project, focus was placed upon family nurse practitioner (NP) students as 52% of nurse practitioners work in primary care where most patients seek care for PCOS symptoms (AHRQ, 2012; Pfeiffer, 2019). Previously, specialists managed the condition but with increasing prevalence, there is a need for NPs to increase their knowledge base for the condition (Pfeiffer, 2019).

Patients often present to their primary care provider with various symptoms such as hirsutism, acne, obesity, infertility, and acne (Lua, How, & King, 2018). These are the signs and symptoms a primary care provider should be cognizant as potential manifestations of PCOS. Accordingly, a primary care provider would be apt to have basic knowledge of the evaluation, diagnostics, and treatment for potential health implications of PCOS, such as diabetes, cardiovascular disease, infertility and psychiatric related complications such as anxiety and depression (Lua, How, & King, 2018). Literature and PCOS guidelines support diagnosis and

management of PCOS within primary care and provide guidelines on when to refer patients to a specialist (Lua, How, & King, 2018). Guidelines also support the ruling out of other conditions that may mimic aspects of PCOS as well as the screening for other conditions associated with PCOS such as vitamin D deficiency, prolactin levels, and glucose intolerance (Lua, How, & King, 2018), all within the purview of primary care. Reviewing these facts places importance on current and future NP's to enhance knowledge of PCOS, its long-term complications and treatment options, and prevalence in primary care.

Local Problem

The statistics regarding PCOS range due to the variance in the diagnosis rates. Furthermore, this makes it difficult to find statistics at the local level. Although very limited, some effort has been made to assess prevalence rates and various phenotypes of PCOS by regions within the United States, in one study. The highest prevalence for PCOS was found to be in the southern region at 47.5%, while 18.7% in the western region (Okoroh et al., 2012; Wolf, Wattick, Kinkade, & Olfert, 2018). While specific data has not been obtained for the state of Arizona or the southwest, reviewing the trends for the general area of the south and of the west only highlight the need to focus on this problem at the local level as well.

Purpose

Due to the prevalence and consequences of this condition, steps must be taken to prevent further delay of care for PCOS patients by the upcoming generations of providers. The prolonged diagnosis period, detriment to patients' health and mental well-being, and preventable costs of care has prompted this project. The purpose of this DNP project was to examine family nurse practitioner students' knowledge and perceptions of PCOS, intent to treat, and confidence in

starting treatment before and after education on the topic. The knowledge assessed consisted of diagnosis criteria, treatment options, and long-term implications. This project was carried out with the University of Arizona family nurse practitioner (FNP) students after completion of their women's health course, which includes PCOS in its curriculum content. These DNP students were in the final semester of their program. Stakeholders in this project included students and university faculty. Primarily, this project focused on NP students as the stakeholders. Engagement produced through the disclaimer, invited participants to become more knowledgeable about PCOS diagnosis and treatment and the potential for better patient/provider rapport (Laycock et al, 2019). Engagement of faculty obtained through discussion and project review before the start of this project, presented the potential to better equip their students about a prevalent health condition.

Project Question

Among family nurse practitioner students, does education on polycystic ovarian syndrome (PCOS) increase understanding of the disease process, baseline knowledge of diagnosis, treatment options and long-term implications, likelihood of screening, and confidence in starting treatment compared to prior educational intervention?

Theory

Ajzen (1991) proposed the *theory of planned behavior* (TPB), a theory that deals with the prediction and explanation of behavior in specific contexts. TPB draws its roots from the *theory of reasoned action* (TRA), developed by Ajzen and Fishbein in 1980, and was developed to address the previous models limits such as the behaviors over which an individual may not have complete control (Ajzen, 1991). TPB's central ideal focuses upon several types of beliefs:

behavioral, normative, and control. The model examines the intention of the individual to perform a behavior with the influencing factors of attitude toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). As Ajzen describes in his work, the resources and opportunities that are available to an individual will to some extent dictate whether a behavior is achieved. In the same way, the application of this aspect of the theory to PCOS screening will depend upon the beliefs of providers/future providers and understanding of PCOS long-term complications. In this project, resources regarding PCOS were provided in the form of an education intervention. This project assessed baseline beliefs before and after receiving this education on PCOS.

Concepts

TPB summarizes human action as guided by three concepts: beliefs about the outcomes of a behavior, subjective norms of others and willingness to comply with those expectations, and beliefs about facilitators or barriers to the performance of a behavior (Javadi et al., 2013; Ajzen, 1991). Behavioral beliefs can negatively or positively affect attitude toward behavior and what is perceived to be normal can apply social pressure towards performing the behavior (Javadi et al., 2013). In the case of this project, if the norm behavior is screening for PCOS (where appropriate) the threshold to screen is assumed to be lower than if the condition is thought to be a minor or negligible condition. Ajzen explains that beliefs regarding a consequence of behavior determines attitudes toward the behavior (Ajzen, 1991).

The control beliefs aspect of this theory has an important application to this project. The perceived behavioral control is dependent upon control beliefs and perceived power to perform (Javadi et al., 2013). Perceived behavioral control refers to the individual's perception of the

difficulty or ease in executing a behavior and the individual's confidence level in their ability to perform it (Ajzen, 1991). In the case of this project, the behavior was screening for PCOS.

Applying Ajzen's theory to this project, NP students who are equipped with adequate knowledge will have increased perceived power regarding when to further assess a patient for PCOS based upon presenting symptoms and begin treatment.

Normative beliefs revolve around the probability that important individuals approve the performing of a behavior (Ajzen, 1991). Furthermore, the strength or power of each normative belief is in relation to the person's motivation to comply (Ajzen, 1991). The normative beliefs aspect of the theory can be applied to this project in assessing what are the current beliefs of NP students regarding the need to screen for PCOS. Ajzen (1991) suggests that to measure subjective norms respondents are to rate the degree to which an important individual would approve or disapprove a behavior. In this case, this project assessed the beliefs NP students have regarding PCOS long-term implications, the appropriate times to consider PCOS screening, and the likelihood their peers or superiors would screen for PCOS. This in turn gaged what emphasis has been placed upon this syndrome from the content learned in course work related to this subject. This also measured what social pressures have been applied to the NP students to be cognizant of PCOS symptoms when assessing women's symptoms in future practice.

Figure 1 illustrates all the aspects of TPB as applied to this project. The model illustrates the interconnections and how they lead to a behavior. In all three major components of the TPB theory applied to this project there is overlap and the interconnectedness of knowledge and motivation as they play a role in individuals' likelihood to perform screening for PCOS and consider treatment. The model is presented from the perspective of the NP student. The TPB

theory is applicable to this DNP project and aided in the assessment of NP students' current motivations and knowledge gained from their education that may influence their screening of patients with PCOS and consideration for starting treatment as a provider.

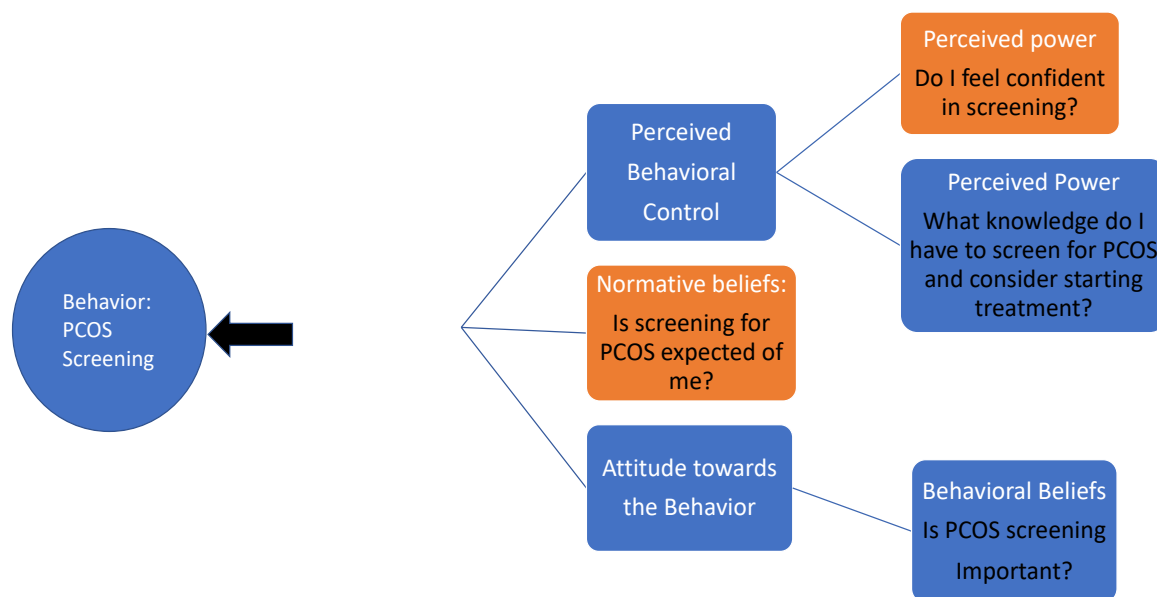


FIGURE 1. Modified schematic of Ajzen's (2019) theory of planned behavior.

Synthesis of Evidence

A literature review was conducted utilizing the PubMed and CINAHL databases. Keywords used for searching both databases included: Nurse practitioner, PCOS or polycystic ovarian syndrome, PCOS diagnosis, PCOS provider, provider knowledge, treatment, and lack of diagnosis. Limitations placed upon the search were articles within 10 years and human subjects. Ten articles were retained from this search. The reference lists of the articles found, and authors' previous and subsequent studies were reviewed, and an additional four articles were identified. In total, 15 studies were reviewed and can be found in Appendix A.

Diagnosis and Treatment

Difficulty in diagnosing PCOS has been primarily attributed to the varying presentations of the disease (Meek, Bravis, Don, & Kaplan, 2013). New evidence is emerging identifying that provider knowledge and understanding of the condition may be a contributing factor (Dokras et al., 2017; Carron, Simon, Gilman-Kehrer, & Boyle, 2018). PCOS is diagnosed with the assessment of at least two fundamental clinical findings: menstrual irregularities, androgen excess and/or polycystic ovaries (Legro et al., 2013; Wang & Mol, 2017). While the most common criteria for diagnosis has been the Rotterdam criteria (Wang & Mol, 2017) and is recommended by the Endocrine Society, other criteria utilized by providers include NIH criteria and AE-PCOS criteria (Legro et al., 2013; Williams, Mortada, & Porter, 2016). Estimates of the prevalence of PCOS is in relation to the criteria used (Sirmans & Pate, 2014). The prevalence of PCOS using all three criteria has been found to be as low as 1.6%, while utilizing Rotterdam's criteria (Wang & Mol, 2017) yielded prevalence of as high as 18% (Wolf, Wattick, Kinkade, & Olfert, 2018). Other studies have shown that Rotterdam criteria (Wang & Mol, 2017) has resulted in 1.5 times larger PCOS diagnosis group than in comparison to the NIH criteria (Wolf, Wattick, Kinkade, & Olfert, 2018). While much can be said regarding the under/over diagnosis of PCOS depending on the diagnostic criteria, this project will focus on the Rotterdam criteria (Wang & Mol, 2017) endorsed by the Endocrine Society.

It is the Endocrine Society's recommendation that Rotterdam criteria (Wang & Mol, 2017) be used for the diagnosing of PCOS, and a key aspect of the criteria, hyperandrogenism, is central for provider identification in adolescents (Legro et al., 2013). It is also recommended that diagnostics for PCOS should exclude other potential disorders that mimic PCOS. Specifically,

patients should be evaluated for risks of mood disorders, diabetes, and cardiovascular disease. Treatment recommendations from the Endocrine Society are curtailed to the particular aspect of PCOS that is being treated (infertility, acne, menstrual irregularity). Furthermore, treatment is individualized to treat each patients' phenotype and their desire for pregnancy (Lua, How, & King, 2018).

Another part of the difficulty with gathering statistics relative to PCOS is the delay in diagnosis or missed diagnosis. It is difficult to collect surrounding data on patients who are not known to have the syndrome. A systematic review found insufficient evidence to fully assess whether varying definitions of clinical manifestations attribute to significant differences in prevalence rates by criteria used and thus diagnosis of PCOS (Skiba, Islam, Bell, & Davis, 2018). The different criteria utilized for the diagnosis of PCOS may contribute to ambiguity of the prevalence of PCOS and other related statistics. Primarily, Rotterdam's criteria (Wang & Mol, 2017) are used for diagnosis. However, outside of the use of the Rotterdam criteria, there are other clinical, familial, and biochemical features of the disease such as family history of late-onset diabetes, premature balding of male relatives, and increasing luteinizing hormone and testosterone levels (Hakim, Elsamawal, & Wardle, 2010).

While no cure exists for PCOS, the literature review has provided treatment options to include lifestyle management (specifically weight loss), and pharmacological therapy with antiandrogens such as spironolactone, and metformin (Hakim, Elsamawal, & Wardle, 2010; Moran, Hutchison, Norman, & Teede, 2011). Treatment of PCOS treatment can vary depending upon the goal of the patient such as the desire of pregnancy. However, metformin has been shown to provide reduction in BMI that is statistically significant and is the firstline treatment for

metabolic manifestations of PCOS such as insulin resistance (Williams, Mortada, & Porter, 2016; Nieuwenhuis-Ruifrok, Kuchenbecker, Hoek, Middleton, & Norman, 2009). Metformin is a commonly prescribed medication in primary care that is used in prediabetes and diabetes management.

Patient Dissatisfaction and Outcomes

Research has shown there to be a large amount of dissatisfaction from women with PCOS concerning diagnosis and treatment of the syndrome (Gibson-Helm, Tassone, Teede, Dokras, & Garad, 2018; Gibson-Helm, Teede, Dunaif, & Dokras, 2017; Huffman, Brackney, & Martin, 2017; Jeanes et al., 2017; Lin et al., 2018). Patients' perceptions of care surrounding PCOS are negative in comparison to general health concerns (Lin et al., 2018). More specifically patients felt their primary care provider was less apt to manage PCOS, felt they received inadequate information at the time of diagnosis, and were dissatisfied by the emotional support from their providers (Lin et al., 2018). Patients often seek greater than five providers and over two years for diagnosis/care for symptoms (Crete & Adamshick, 2011; Gibson-Helm et al., 2017). The most common theme among PCOS patients was frustration due to the lengthy diagnosis periods and lack of information (Crete & Adamshick, 2011; Gibson-Helm et al., 2017; Lin et al., 2018).

Utilizing questionnaires and participant interviews, these studies were able to identify common themes among participants. In addition to frustration, patients were also found to have feelings of confusion and the need to search for their own methods of management (Crete & Adamshick, 2011). This has led to some patients developing distrust in providers' opinions in respects to PCOS and the belief that providers were less qualified to manage PCOS symptoms than general health issues, as mentioned (Lin et al., 2018). Studies have shown that women

benefited from participation in a clinical research study by increased knowledge, better lifestyle practices, improved health care satisfaction, and empowerment to be involved in the management of their PCOS care (Colwell, Lujan, Lawson, Pierson, & Chizen, 2010). On the contrary, distrust of providers and lack of monitoring for this condition has been shown to be associated with hospitalizations for serious medical problems including diabetes, hypertensive disorder, ischemic heart disease, asthma, and mortality (Gilbert, Tay, Hiam, Teede, & Moran, 2018; Hart & Doherty, 2015). Untreated and undiagnosed PCOS leads to larger implications for patients' health. A study conducted by Hart and Doherty (2015) found that women with PCOS had twice as many hospital admissions in comparison to women without PCOS, four times higher rates of type II diabetes from admissions, unfavorable cardiovascular risk profile related to diabetes and uncontrolled lipid panels, and greater risks for emotional distress, depression, and self-harm (Hart & Doherty, 2015).

Provider Knowledge

This DNP project focused on FNP students' knowledge as future providers in primary care. There is a lack of information assessing the likelihood of current providers to screen for PCOS and limited information was found assessing current providers' knowledge on this topic regarding symptoms and knowledge of long-term implications. In reviewing studies assessing patient's experiences of their diagnosis, lack of provider knowledge, inconsistencies with medications, and lack of awareness of long-term implications such as diabetes were among the themes found from the patients' perception (Tomlinson et al., 2017).

There has been shown to be a lower level of understanding and comfort in addressing PCOS among physicians when compared to nurse practitioners (Huffman et al., 2017). Of the

research found, rural nurse practitioners had low recognition of PCOS symptoms, long-term implications, and management of the disease (Carron, Simon, Gilman-Kehrer, & Boyle, 2018). Additional education of this group has proven to be effective in increasing nurse practitioner knowledge of symptoms, long-term implications and management of PCOS but exploration of likelihood to screen post-education was not found (Carron et al., 2018). In a study conducted by Carron et al. (2018), NP knowledge on PCOS was improved through use of a continuing education effort (Carron et al., 2018). The education consisted of a 45-minute program given by certified nurse midwife (CNM) or FNP with expertise in PCOS with information given including NP roles in diagnosis, pharmacological and non-pharmacological management, and long-term outcomes (Carron et al., 2018). This study consisted of a pretest/posttest design and was shown to have statistically significant ($p=.000$) improvement in providers knowledge in the areas of assessing, diagnosing, and managing PCOS (Carron et al., 2018).

Strengths, Gaps, and Weaknesses

Strengths of the literature include identification of clinical screening tools that can be utilized in the diagnosis of PCOS, utilizing the criteria mentioned above. Despite paucity of literature, the search yielded two systematic reviews, multiple cross-sectional studies and survey, and retrospective cohort study. As mentioned, the search further highlighted patient concerns with timely diagnosis due to lack of provider knowledge and ability to recognize various symptom manifestations of PCOS to arrive at diagnosis. The prevalence of this theme within the literature further strengthens the need for this project and its assessment of a potential improvement intervention.

Weaknesses in the literature show the need for better understanding of current barriers providers face to appropriate and timely diagnosis. The review also lacks evidence of interventions to improve or overcome those barriers. Furthermore, there are very few studies assessing an education intervention for providers or students and the likelihood of screening post-education. Only one study was found utilizing an education intervention (Carron et al., 2018).

Gaps in research showed lack of assessment for the likelihood to screen regardless of the provider's background. Provider thoughts and perceptions of the importance of the condition were not found. This leaves much to be desired, when patients have reported lack of empathy and education at the time of diagnosis. In addition, methods for improvement for any of the barriers to screening and diagnosis have not been suggested or well-studied.

METHODS

Design

The design of this project was pre-test and post-test with an intervention to explore the impact of education on perception of and screening behaviors for PCOS, knowledge base, and confidence in starting treatment. FNP students were chosen as the focus of this project as the availability of a willing clinical site to implement this project was not found. Students within the University of Arizona FNP program completed their women's health course in the summer before the conduction of this project (approximately five months later). The course content related to PCOS had the student objectives of defining PCOS (among other menstrual disorders), identifying a defining characteristic, and identifying one treatment intervention. Assigned readings included a women's health textbook and a Cochrane review regarding the effectiveness

of lifestyle changes for women with PCOS and its potential impact on some aspects of PCOS like free androgen, weight and, body mass index (Moran, Hutchison, Norman, & Teede, 2011).

A separate education intervention was chosen because of the time constraints of the course. The need for this single women's health course to cover the variety of topics related to women's health may not have allowed students to study PCOS in-depth. This in turn may affect the student's preparedness for entry into practice on this topic.

The project is essentially a case study in the preparedness of one group of family nurse practitioner students, prior to starting practice. Using the theory of planned behavior (TPB) as a guide, a survey was constructed to assess whether an education intervention will increase the perception of PCOS, knowledge base of disease diagnosis, treatment, long-term implications, confidence in screening, and the likelihood of screening among NP students at the University of Arizona. The survey consisted of multiple-choice questions to assess knowledge and Likert style questions to assess beliefs, likelihood of screening for PCOS in addition to confidence levels surrounding other aspects of PCOS. Demographics collected included age, sex, highest education level, whether they are an already practicing provider (obtaining a DNP after a master's NP program) and intended geographical area of future practice. Participants through selection of one option answered the demographic questions from multiple-choice style questions. In addition, participants were asked if they themselves have PCOS or personally know someone with PCOS, as this may affect their baseline knowledge of its presentation and/or manifestation. Surveys were anonymous and kept confidential. They were used only to analyze possible impact of an education intervention on knowledge. The use of Qualtrics as survey platform assisted in keeping all surveys confidential. No additional identifiers were included within the survey.

A pre-test via survey was given prior to the education provided in this project on PCOS. The pre-test survey was given through an online link sent via a recruiting email and conducted through Qualtrics. The pre-test survey including demographic questions is located in Appendix B. This online education was conducted through a pre-recorded video via Zoom. The presentation outline can be found in Appendix C. The education encompassed presenting manifestations of PCOS, prevalence and relevance to primary care, diagnosis criteria, long-term complications, and a brief overview of treatment options. Resources utilized for composing this education primarily come from the Endocrine Society's practice guidelines.

Following the PCOS education provided in this project, a re-assessment was given using the same survey questions, excluding demographic questions, and was accessed via a link that was included in the initial email to participants. The post-test survey is located in Appendix D. For ease of analysis and accessibility for students, Qualtrics was utilized to conduct the post survey as well. Using Qualtrics for surveys protected the participant's information and data. This method was inexpensive and kept the cost of the project low and feasibility high. To analyze the data obtained, descriptive statistics in Qualtrics was utilized. Pre- and post-survey questions were assessed for changes in perception, knowledge base, intent to screen and confidence in beginning treatment.

Setting

The setting of the intervention of this project was conducted through a pre-recorded Zoom video. Zoom provides remote conferencing services using cloud computing that facilitate online meeting, collaborations, and presentations. This Zoom recording could be accessed via tablet, computer, or smart phone with the provided Zoom link that brought individuals to the

video presentation. Due to the online nature of the courses in the University of Arizona's FNP program, a physical location was not feasible. The Zoom platform was chosen due to ease of access for all participants and familiarity of students utilizing this platform.

Participants

Since participants were recruited from the University of Arizona's FNP students, student email addresses were collected from the College of Nursing, with permission from the director of the FNP program (Appendix F). The cohort of FNP students who have completed the women's health course were 37 in total. The aim was to have 15 participants to participate in the project. Participant criteria include: 1) DNP student at the University of Arizona, 2) enrolled in the family nurse practitioner (FNP) specialty, and 3) having completed the women's health course within the program. The FNP students were chosen based upon current research showing most PCOS diagnoses occur within primary care and that family nurse practitioners predominantly work in primary care (AHRQ, 2012; Pfieffer, 2019). Exclusion criteria included non-DNP University of Arizona students who are not within family nursing practice specialty track and have not taken the required women's health course. This convenience sampling enabled a low cost of implementation for this project.

A participant disclosure was provided to all potential participants via email utilizing Qualtrics Mailer (Appendix G). This email contained the disclosure and instructions with links for pre- and post-survey, and for Zoom pre-recorded presentation. A second email was sent as a reminder to all participants with the same information, two weeks after the initial email (Appendix H). A third email (a repeat of the second reminder) was sent out three weeks after the

initial email (Appendix H). The disclosure reviewed information about this project and included that participation was at free will and that no foreseen harm would result from participation.

Data Collection

Data was collected from participants via Qualtrics survey. The link for the Qualtrics survey was emailed as stated and could be completed via computer, tablet, or smart phone. Data collection for this project included the demographic information about participants (Appendix B). The same survey was conducted before and after the education with exception of the demographic information. The comparison of both surveys assesses enhancements in knowledge, beliefs, intent to screen and confidence in starting therapy. Participant emails were entered into Qualtrics to enable the system to send reminder emails to those who had not responded to the initial email containing their individual link. The use of an individual link decreases the anonymity of the responses but was only be used within the Qualtrics system to promote adequate response to the surveys. The individual link allowed Qualtrics to monitor who had responded and send the reminder email to those who have not.

Data Analysis

The descriptive statistics assessed for this project were frequency and percentages. Participants are described using frequency of responses to each question. Answers to other multiple-choice questions, identifying PCOS symptoms, long-term implications and confidence in starting treatment, were determined based on frequency for which each option was chosen. Each multiple-choice question from the pre- and post-survey were evaluated, assessing for change in recognition of appropriate symptoms and knowledge of long-term complications, and treatment options. The recognized symptoms were grouped together as well as symptoms that

were missed to review trends. Each Likert style question was analyzed for the mean response to the question. The mean of each question pre- and post-survey was compared for changes.

Ethical Considerations

Before implementation of this project, approval was obtained from the Institutional Review Board of the University of Arizona. The Internal Review Board (IRB) approval (Appendix E) helped to ensure that all ethical principles were upheld throughout the execution of this project.

There are three ethical principles that should be utilized with research with human subjects involved: respect for persons, beneficence, and justice. These principles enable research to be performed through safe and ethical means, while enhancing knowledge.

Respect for Persons

This ethical principle upholds the participants' autonomy and their ability to make decisions regarding participation in this project, withdrawing from the project at any time, and the rights to ask questions or choose not to answer survey questions (Polit & Beck, 2012). Participants of this project are adults and assumed to be autonomous. A disclaimer given prior to the start of the project explained the purpose, benefits of the project, possible risks, and their rights regarding participation in the project.

Beneficence

The definition of beneficence is centered upon doing good in form of an act of charity, mercy, or kindness (Kinsinger, 2010). It is vital when conducting a project involving human participants to maximize the benefits of the study while minimizing possible risk and harm. This is an important ethical principle to this project, as I gathered information that may be used to

further educate future and current providers in the topic of PCOS and ultimately improve practice in this area.

Justice

All participants had the right to equal treatment and respect. Those who conduct a study have the obligation to treat all with equal treatment and respect regardless of an individual's participation or decision to withdraw from a study (Polit & Beck, 2012). Recruitment for the project targeted the population who will benefit from this research, future providers. The recruitment of the target population was done fairly, and the inclusion and exclusion criteria utilized a field of providers who are most applicable to the diagnosis of PCOS - that is those who are most likely to see symptoms of PCOS, screen for the condition, or refer to other specialties. All students received the same opportunity to respond to the survey and received the same survey.

RESULTS

Potential participants emails were obtained from the University of Arizona and participants were recruited for the project via email. Over the course of this project, eight participants completed the pre-survey and six of those completed both the pre- and post-survey (66% return rate).

Demographics were provided by participants on the pre-survey. The participants all identified themselves as female with age ranges that fell within three of the options given in the survey. The groups consisted of ages 20-30 (n=2, 25%), ages 31-40 (n=5, 62.5%), ages 41-50 (n=1, 12.5%). The participants had either a bachelors or master's degree, at 62.5% and 37.5%, respectively. A large group of participants (62.5%) responded that they had or personally knew

someone who had PCOS. None of these participants have previously practiced as an NP but intend to practice in the geographical areas of the northeast, northwest, and southwest at 25%, 12.5%, and 62.5% respectively.

Missing Responses

As mentioned, of the eight initial participants, six fully completed the project. This sample size fell short of the initial goal sample size of 15 of the potential 37 students. Emails were sent out as described with disclaimers and instructions to all potential participants yet only 16% of potential participants were obtained. The participants who completed the first survey but not the second may have affected the results due to the data that was missing from those responses. The pre- and post-surveys did not have any matching identifiers, so all pre-surveys were analyzed as it could not be determined which participants dropped out of the study. The six post-surveys were also analyzed. Because of the incomplete data, it is difficult to draw assumptions in changes in the key factors.

Knowledge of Signs, Symptoms, and Diagnostic Criteria

In the pre- and post-survey, participants were given three options to identify as part of Rotterdam's criteria (Wang & Mol, 2017) for diagnosing PCOS in a 'select all that apply' format. Table 2 illustrates the percentage of correct responses from participants regarding the criterion included in the Rotterdam criteria (Wang & Mol, 2017). In the pre-survey, 'polycystic ovaries' was selected eight times (100%), 'hypoandrogenism' was selected three times (37.5%), and 'oligomenorrhea/menstrual irregularities' was selected seven times (87.5%). Hypoandrogenism was an incorrect selection for this question as the diagnostic criteria requires *hyper*androgenism. In contrast, the post-survey showed 'polycystic ovaries' was selected six

times (100%), 'hypoandrogenism' was selected four times (66.7%), and 'oligomenorrhea/ menstrual irregularities' was selected six times (100%).

The participants were given a list of signs/symptoms to correctly identify those associated with PCOS. Figure 2 and Table 2 shows the differences between the pre- and post-survey for each sign/symptom. The top three signs/symptoms recognized in the pre-survey included 'irregular menstruation,' 'cystic ovaries,' and 'infertility' at 100%, 100%, and 87.5% of participants respectively. There was minimal difference seen in knowledge of signs/symptoms of PCOS in the post-education survey. 'Obesity and trouble losing weight' and 'hirsutism' were among those that increased in the post-survey, 25% and 8.3% respectively. Incorrect selections of 'weight loss' and 'increased urination' also increased in the post-survey at 12.5% each. Post-survey, there was a decline in the percentage of responses for the top three correct answers, 'irregular menstruation,' 'cystic ovaries' and 'infertility,' selected in the pre-survey. The loss of participants may have contributed to this result.

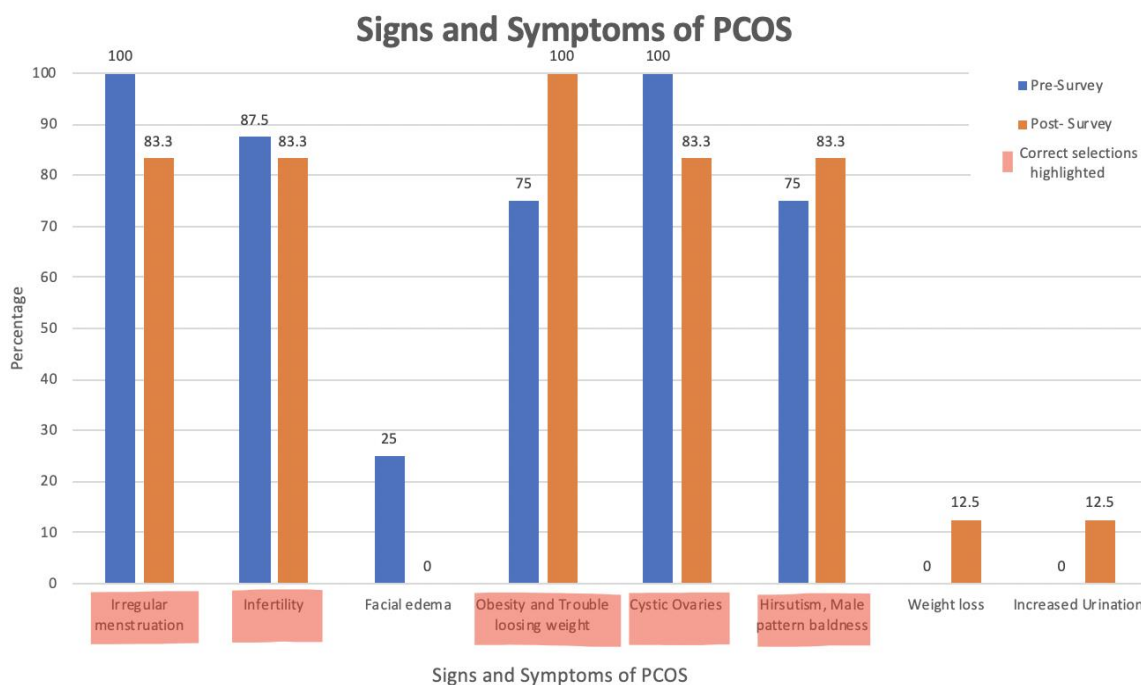


FIGURE 2. Pre- and post-test results for signs and symptoms of PCOS.

Importance of PCOS Screening

When questioned about their belief that it is important to screen for PCOS in the pre-survey, four participants (50%) ‘strongly agree,’ two (25%) ‘agree,’ and two (25%) selected ‘neither agree nor disagree.’ These percentages also coincided with participants selections regarding whether they would likely screen for PCOS in their future practices - four participants (50%) ‘strongly agree,’ two (25%) ‘agree,’ and two (25%) selected ‘neither agree nor disagree.’ After the education session, these percentages for the importance of screening for PCOS in primary care shifted three participants, so that half (50%) ‘strongly agree’ (50%) and three ‘agree’ (50%). This resulted in a 25% increase in those who ‘agree’ and no change in those who ‘strongly agree’ in the post-survey (Figure 4). When surveyed on their likelihood of screening

for PCOS in their future practices in the post-survey, three participants selected ‘strongly agree’ (50%), two selected ‘agree’ (33.33%), and one selected ‘neither agree nor disagree’ (16.67%). These results demonstrate an increase in number of participants who ‘agree’ with the statement and a decrease in those who ‘neither agree nor disagree.’

Participants were surveyed about their belief that their peers and superiors would screen for PCOS. Pre-survey responses showed four participants (50%) agree with this statement, three (37.5%) ‘neither agree nor disagree,’ and one (12.5%) participant ‘disagree.’ Responses for this statement were evenly distributed in the post-survey between ‘strongly agree,’ ‘agree,’ and ‘neither agree nor disagree’ at 33.3% each (two participants each). This result demonstrated that a greater percentage of participants who ‘strongly agree’ with this statement and a decrease in those who ‘disagree.’

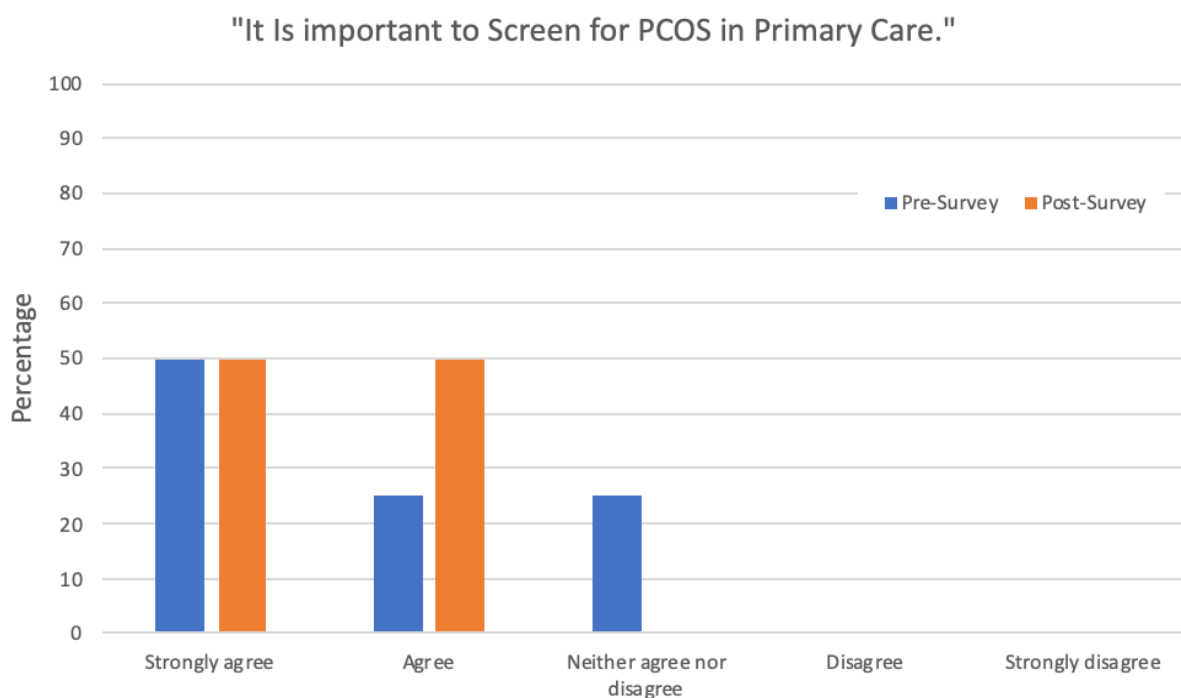


FIGURE 3. Pre- and post-test results for the importance of PCOS screening.

Knowledge of Long-term Complications

The options of cardiovascular disease, infertility, weight loss, type 2 diabetes, increased risk for endometrial cancer, and ovarian cancer were given to participants in both the pre- and post-survey as potential long-term complications. While assessing long-term complications of PCOS, type II diabetes was recognized with highest frequency (n=6, 75%) among participants as a complication of PCOS in the pre-survey. Interestingly, only 50% identified cardiovascular disease as a potential complication in the pre-survey. The second highest recognized complication was infertility at 62.5%, followed by increased risk for ovarian cancer at 50%. Several of the correct long-term implications of PCOS increased after the education including risk of ovarian cancer, which increased by 33.3%, infertility increased by 20.8%, cardiovascular disease by 16.6%, and type 2 diabetes increased 8.3%. Selection of increased risk for endometrial cancer, a correct selection, decreased by 8.3% in comparison. The comparison of the answers selected pre and post survey for long-term implications can be found in Figure 3 and Table 2.

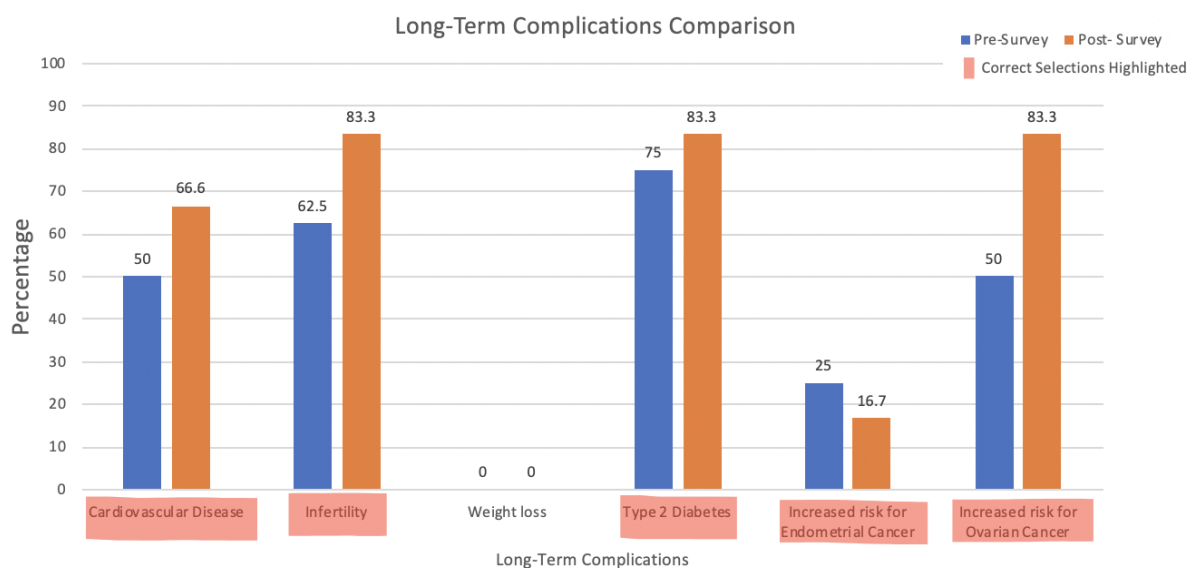


FIGURE 4. Pre- and post-test results for long-term complication of PCOS.

Treatment

Participants were given options for treatment of PCOS as well as options as to what they would consider *firstline* treatment. Table 2 shows the correct responses and the percentages of the pre- and post-survey. Oral contraception was recognized by most participants (87.5%) in the pre-survey, followed by metformin (62.5%) and spironolactone (62.5%) as options for treatment. All of the responses in the pre-survey recognized lifestyle modification as treatment of PCOS, while 12.5 (n=1) recognized dapagliflozin as a treatment option, an incorrect choice. In the post-survey, all correct choices of treatment options for PCOS increased, while the incorrect choices were not selected at all ('dapagliflozin' and 'no treatment available'). More specifically, 100% choose oral contraception, 83.3% chose metformin, 100% chose spironolactone, and 100% choose lifestyle modifications in the post-survey. In the pre-survey, there was a wide variance of selections regarding treatment options (Figure 4). Contrarily, less variance was found when

surveyed on which treatment should be firstline for PCOS as oral contraception had the highest frequency (n=3) at 37.5%. This was followed by metformin at 25% (n=2), spironolactone at 25% (n=2), and lifestyle modifications (25%, n=2). This is a large contrast to what can be seen in the post-survey, which shows all participants only selected lifestyle modifications - the correct firstline treatment (Figure 5).

Participants were also surveyed on their confidence in beginning treatment for PCOS in the pre- and post-survey. The statement: 'I feel confident in my understanding for the diagnostic criteria for PCOS' was provided. Responses from the pre-survey showed 62.5% (n=5) 'disagree,' 25% (n=2) 'neither agree nor disagree,' and 12.5% (n=1) 'strongly disagree' with this statement. This contrasts the results of the post-survey which showed, no one disagreed or agreed, 33.3% (n=2) 'agree,' and 66.6% (n=4) 'strongly agree' - showing an improvement in confidence.

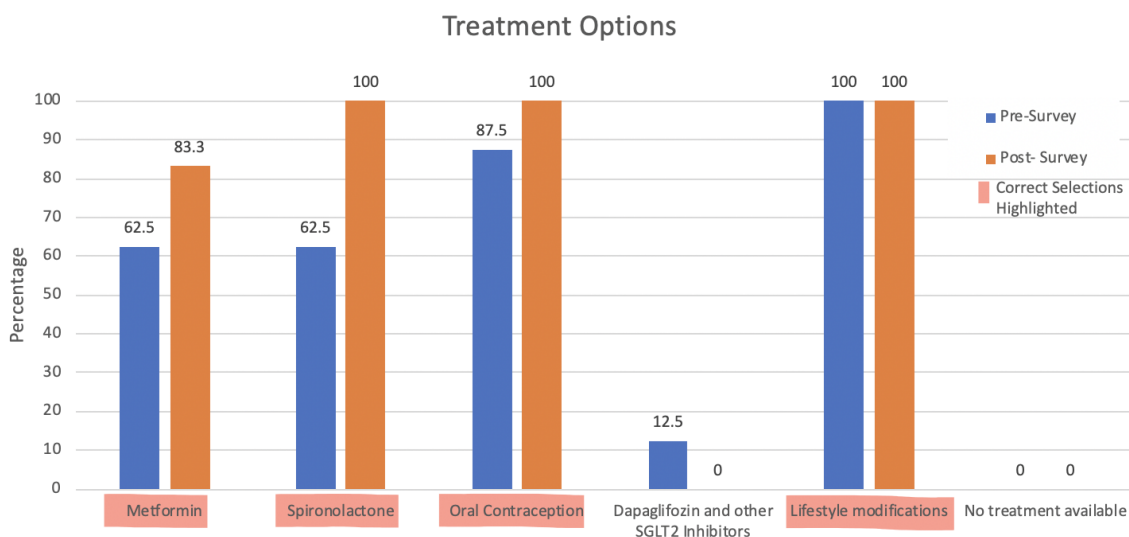


FIGURE 5. Pre- and post-test results for treatment options for PCOS.

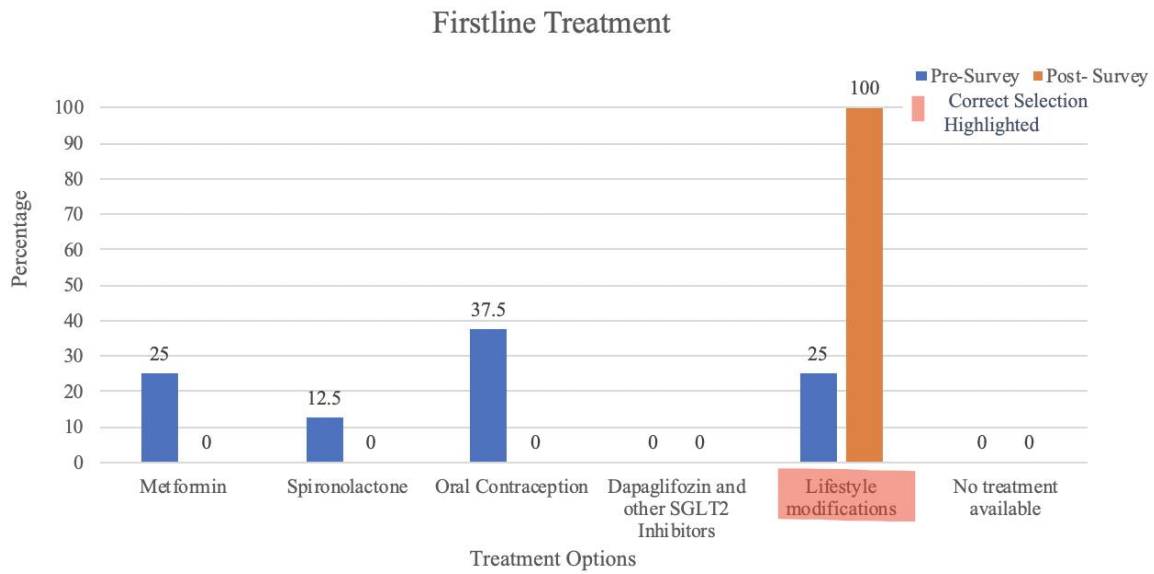


FIGURE 6. Pre- and post-test results for firstline treatment options for PCOS.

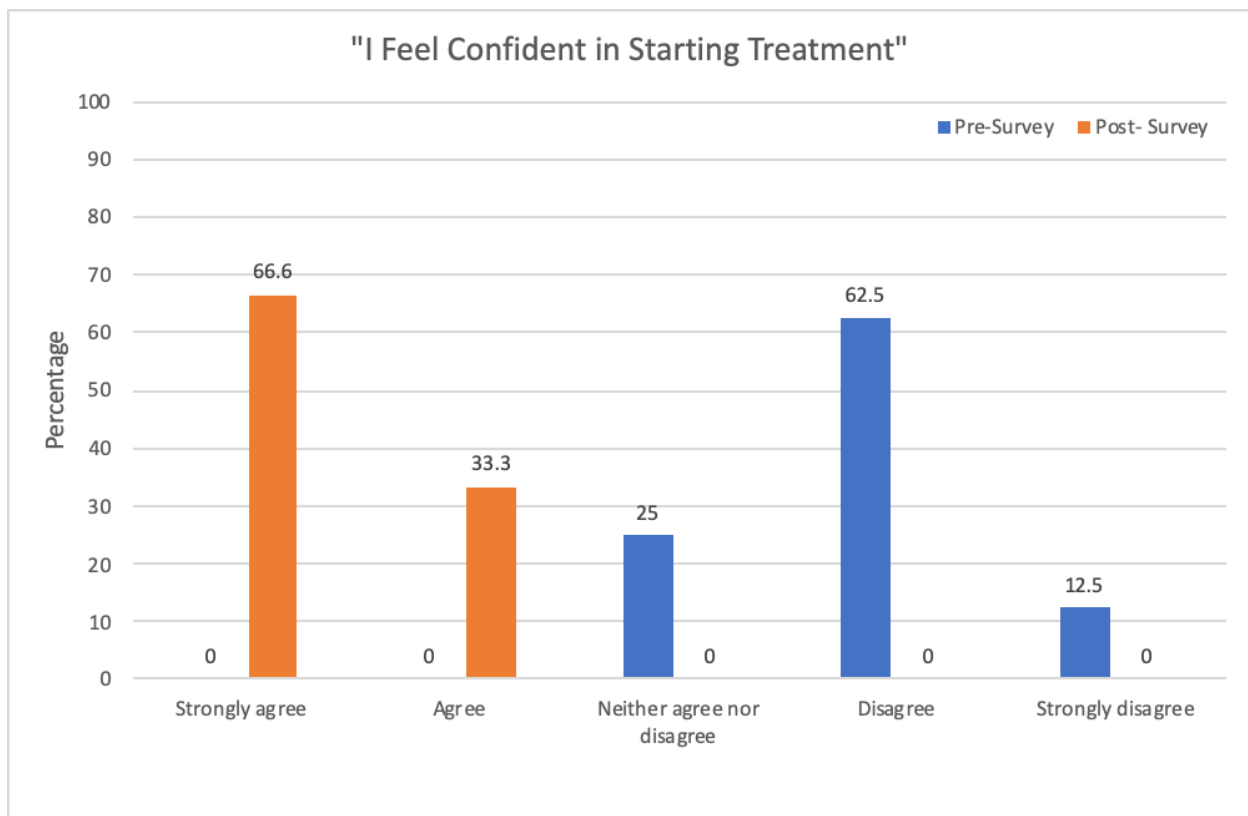


FIGURE 7. Pre- and post-test results for confidence in starting treatment for PCOS.

TABLE 2. *Pre- and post-survey responses for diagnostic criteria, long-term consequences, and treatment.*

Category	Pre-Test % (n=8)	Post-Test % (n=6)
Rotterdam Criteria		
Polycystic Ovaries	100	100
Oligomenorrhea/Menstrual irregularities	87.5	100
Signs/Symptoms		
Irregular menstruation	100	83.3
Infertility	87.5	83.3
Obesity/ Trouble losing weight	75	100
Cystic Ovaries	100	83.3
Hirsutism	75	83.3
Long-term Complications		
Cardiovascular Disease	50	66.6
Infertility	62.5	83.3
Type II Diabetes	75	83.3
Increased risk for Endometrial Cancer	25	16.7
Increased risk for Ovarian Cancer	50	83.3
Treatment		
Metformin	62.5	83.3
Spirolactone	62.5	100
Oral Contraceptive	87.5	100
Lifestyle Modifications	100	100

DISCUSSION

Assessing the Project Question

The intention of this project was to assess the impact of an education on knowledge of presenting manifestations of PCOS, diagnosis criteria, long-term complications, treatment options, and confidence in starting treatment for FNP students at the University of Arizona. While it is difficult to draw conclusions from the results due to participant drop out, varying degrees of improvement can be seen in some aspects of the study including knowledge of long-term complications, knowledge of treatment options, and confidence in starting treatment. Areas that showed minimal or no improvement include knowledge of signs/symptoms of PCOS and diagnostic criteria.

Knowledge of Signs, Symptoms, and Diagnostic Criteria

The percentage of those either having or knowing someone with PCOS may account for higher levels of baseline knowledge regarding the symptoms. Notwithstanding the potential for increased baseline knowledge, 62.5% of participants also disagree that they felt confident in their understanding of diagnostic criteria. The education did appear to have a positive impact on diagnostic knowledge, though small. More specifically, the education appeared to increase recognition of the oligomenorrhea/irregular menstruation aspect of Rotterdam criteria (Wang & Mol, 2017). The sign/symptom ‘polycystic ovaries’ was recognized by all participants in both the pre- and post-survey. While concrete conclusions may not be obtained, the similarity of the symptom name and the name of the condition may give the participant context to answer this question. An incorrect identification of ‘hypoandrogenism’ also increased in the post-survey. There may have been miss-sight of the term ‘hypoandrogenism’ versus ‘*hyperandrogenism*’ by the participant.

Even with the education, knowledge of the signs/symptoms of PCOS generally did not show improvement when compared from the pre- and post- survey. The exceptions were ‘obesity and trouble losing weight’ and ‘hirsutism,’ which were correct selections that increased. Incorrect selections of ‘weight loss’ and ‘increased urination’ unfortunately increased in the post-survey but were not selected by any participant in the pre-survey.

Importance of PCOS Screening

Despite results of the pre-survey showing 62.5% either having or knowing someone with PCOS, only 50% ‘strongly agree’ that it’s important to screen for the syndrome. This may shed more light on the attitudes toward this condition. Furthermore, there was a strong association

between the respondents' view of the importance of screening for PCOS and their likelihood to screen for PCOS in the pre-survey. This may lead one to think that importance must be placed on a condition in order to screen for it.

Knowledge of Long-term Complications

Baseline knowledge of these NP students showed the recognition of infertility and type 2 diabetes were among the highest of the long-term complications provided in the survey. Infertility and type 2 diabetes remained amongst the highest recognized long-term complications, while 'increased risk for endometrial cancer' was the lowest recognized in both the pre- and post-surveys. All the correct long-term complications were seen to have an increase in knowledge when compared in the pre- and post- survey except 'increased risk for endometrial cancer.' Cardiovascular disease was not selected as a complication as much as type 2 diabetes, although there is a strong correlation between the two.

Treatment

Throughout this project the participants knowledge of all treatment options given in surveys and of firstline treatment for PCOS increased. Moreover, all participants were able to correctly identify the firstline treatment option for PCOS, while each correct treatment options saw increases in the post-survey. The majority of participants disagreed when assessed on confidence of diagnostic criteria and confidence in starting treatment in the pre-survey versus the majority that selected 'agree' regarding confidence in diagnostic criteria and 'strongly agree' regarding confidence to start treatment in the post-survey. This education appears to have increased confidence levels of participants

Correlation to Literature

A study done by Huffman, Brackney, and Martin (2017) showed that provider comfort and perception of patient willingness to engage in lifestyle management may vary based on the training, and specialty, and location. In the pre-survey, only 25% recognized lifestyle modifications as firstline for PCOS, versus 100% in the post-survey who recognized it as firstline treatment. The increase in confidence in starting treatment seen in this project may suggest that additional training or education results in this increase.

In assessing the impact of education, a similar study conducted by Carron, Simon, Gilman-Kehrer, and Boyle (2018) demonstrated an increase in nurse practitioner's knowledge about PCOS after an education intervention. There are key differences in this project in comparison. This project was conducted online, which may have affected the participant retention rate. The study conducted by Carron et al (2018) provided an in-depth 45-minute presentation, in person with participants who attended a regional NP conference. The education intervention given in the project was brief in comparison to that Carron et al (2018) and given in an online format.

Theory of Planned Behavior

Several aspects of Ajzen's TPB were examined throughout this project. The components included attitude towards the behavior, normative beliefs, and perceived control related to the project question (Figure 1). Ajzen's (1991) TPB suggests that behavioral beliefs may ultimately affect the intention to perform a behavior. In this case, the belief of the importance of screening affects the participants' likelihood of performing the behavior: PCOS screening (Figure 1). Initially in the pre-survey, participants responses ranged across 'strongly agree,' 'agree,' and

‘neither agree nor disagree’ selections on whether it is important to screen for PCOS. The education resulted in an increase in those who agreed and a decrease in those who were neutral. Another aspect of Azjen’s TPB, perceived behavioral control, is affected by the knowledge and confidence the participant has. These factors combined also affect the potential of the behavior being performed (Ajzen, 1991). In regard to the confidence participants had in their knowledge of diagnostic criteria and in starting treatment for PCOS, increases can be seen along with likelihood of screening, illustrating that with education there is potential to increase perceived behavioral control and affect attitudes toward behavior; ultimately increasing likelihood of PCOS screening.

Student Preparedness

Student preparedness in this project was assessed with Likert style questions assessing participant’s confidence. These participants represent a case study of one group of students prior to practice. Participants primarily disagreed with the statement ‘I feel confident in starting treatment’ and ‘I feel confident in my understating of the diagnostic criteria for PCOS’ in the pre-survey. In the post-survey, this shifted to primarily agreeing with those statements. According to the TPB their knowledge and power may ultimately affect the likelihood of screening for PCOS (Figure 1).

Impact on Practice

This project does show there is lack of knowledge in various aspects of PCOS and that there may be need for additional education for those who are entering into practice. It can be seen, by participant selection, that these particular participants are likely to screen for PCOS. At this time, there is no assessment of the impact on practice as this project focused on nurse

practitioner students who have not yet started practice. However, similar education efforts that focus on the disease process, diagnostic criteria, long-term implications, and treatment could have impact on knowledge for both current and future providers. From this, the hope is that the increase in knowledge will translate to practice and provide the opportunity for improvement in diagnosis and potentially earlier treatment for those with PCOS.

Strengths and Limitations

Strengths of this project included clear inclusion and exclusion criteria, that each aspect of the project question was assessed, it was not a capital-intensive project and with limited resources the education impacted knowledge regarding this condition. Another strength of this project is that it can be used to strengthen future studies for this topic by identifying areas of improvement, limitations, and potential variables that need to be controlled for (Burns, 2009). Lastly, this project was given in an online format and this can be further expanded on in future studies as more providers may be reached in an online capacity versus in person.

Due to the confidentiality of Qualtrics, participants who completed the pre-survey but not the post-survey are included in the pre-survey results as there is no way to differentiate which participants completed both parts of the project. The surveys were kept confidential using Qualtrics; this prevented any potential matching identifiers in the pre- and post-survey and thus prevented the removal of the participants who did not complete both parts from the pre-survey results. The one way to avoid this would have been to provide participants with a number to use on both the pre- and post-surveys. This would have allowed for removal of pre-surveys for participants who did not complete the entire project. Including participants' pre-survey without having their data completed post-survey likely impacted the validity and accuracy of comparison

of the pre- and post-survey data. Some aspects of the results were seen to have a decline or no significant positive change such as participant knowledge of signs and symptoms of PCOS. In this regard, this project serves more as case study of one cohort of students prior to entering into practice. This study had a small sample of participants at one university. In the event that removal of incomplete responses would be possible, it would have resulted in an even smaller sample size possibly affecting the results in unforeseen ways but perhaps a more accurate comparison of the pre- and post-results.

Another limitation was the timing of the distribution of the project. It was distributed on the last day of the semester due to a delay in IRB submission and approval process. At that time participants may have had low motivation to participate as they had already completed the program. Two reminders were sent to encourage participation over the course of the project, four weeks. In addition to this, there was no way to appreciate the time period after the education that the post-test was taken which could affect the post-survey results. Lastly, there was no way to tell if participants viewed the entire education, which may also affect results. Due to these factors the results of this project may have been affected.

Dissemination

It is the author's goal that the results obtained from this study will be disseminated in a presentation to the University of Arizona faculty who are involved in the teaching of the women's health course. This may affect future cohorts and the education they receive on this topic and affect their confidence level as they approach this topic post-graduation. Future projects may look at the best way to educate NP students on PCOS diagnosis and treatment, thus providing treatment that is more efficient and improved outcomes for this population.

Additionally, assessment of current NP knowledge and the impact a similar education could have on their knowledge of PCOS is recommended.

Conclusion

This study was meaningful because it shows potential knowledge gaps of the upcoming providers regarding this topic and their confidence in approaching this topic. Although the sample size of this study was small, the results do lead to further questions that may be addressed in subsequent studies and quality improvement efforts. Questions that may revolve around selecting the optimum medium utilized for education, length of time of the education/depth of the education, and method of assessment used. Despite these participants' knowledge or acquisition of this syndrome, it was not sufficient to provide confidence in the diagnosis or treatment of PCOS. This project's results coincide with the study done by Carron, Simon, Gilman-Kehrer, and Boyle (2018) showing that additional education can provide for better understanding of PCOS diagnostic criteria and management. However, the biggest impact was on participant's confidence in knowledge of criteria and starting treatment. Education does appear to have an effect on the importance a participant may place on screening for PCOS and their likelihood to do so. In future projects, additional education on PCOS for nurse practitioner students may be better served in an in-person setting to help to control for other variables such as time lapse between the education completion and post-education assessment, attention/attendance of the education, and loss of participants.

Due to its prevalence, complications, health care costs and consequences associated with PCOS, it is imperative that providers be well versed in the screening, diagnosis, and management of the disease. Without the increase in knowledge among current and future providers, diagnoses

will continue to be missed and women plagued with this condition will continue to be at a disadvantage. While improving knowledge of providers through additional education efforts, more headway can be gained towards timely diagnosis, earlier treatments, and better health outcomes.

APPENDIX A:
LITERATURE REVIEW

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
Carron, R., Simon, N., Gilman-Kehrer, E., & Boyle, D. K. (2018). Improving rural nurse practitioner knowledge about polycystic ovary syndrome through continuing education. <i>The Journal of Continuing Education in Nursing</i> , 49(4), 164-170.	Objective was to determine whether a continuing education program about PCOS would improve NPs' knowledge about PCOS.	None listed	Pretest–posttest design	48	Pretest–posttest surrounding an education intervention	There was low recognition of symptoms to diagnose and manage PCOS among NP. Only 40% (pretest) recognized T2DM as a long-term complication.
Crete, J. & Adamshick, P. (2011). Managing polycystic ovary syndrome: What our patients are telling us. <i>Journal of Holistic Nursing</i> , 29(4), 256-266. https://doi.org/10.1177/0898010111398660	The aim of this study was to describe the lived experience of women with PCOS in the management of their disorder and the meaning of that experience.	Sandelowski's and Orem's nursing theory of self-care		10	Participant interviews	Three common themes among PCOS patients found: frustration, confusion, and searching.
Dokras, A., Saini, S., Gibson-Helm, M., Schulkin, J., Cooney, L., Teede, H. (2017) Gaps in knowledge among physicians regarding diagnostic criteria and	To identify gaps in polycystic ovary syndrome (PCOS) knowledge and practice patterns among physicians in North America	None listed		630	Online survey	27.7% did not know which PCOS criteria they used or listed criteria outside. More than 80% recognized association of

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
management of polycystic ovary syndrome. <i>Fertility and Sterility</i> , 107(6), 1380-1386						PCOS to insulin resistance, cardiovascular disease as long-term complications.
Gibson-Helm, M., Lucas, I., Boyle, J., & Teede, H. (2014). Women's experiences of polycystic ovary syndrome diagnosis. <i>Family Practice</i> , 31(5), 545-549.	The aim of this study was to explore the experience of PCOS diagnosis in a community-based sample to frame the need for evidence-based guidelines for PCOS and to inform dissemination and education resource needs.	None listed	Cross-sectional study	210	Online and paper questionnaire	24% of women, diagnosis took more than 2 years, 39% saw more than three health professionals before diagnosis, 62% of those who received any information at diagnosis felt dissatisfied. 79% were provided information on long term implications.
Gibson-Helm, M., Teede, H., Dunaif, A., & Dokras, A. (2016). Delayed diagnosis and a lack of information associated with dissatisfaction in women with polycystic ovary	To investigate PCOS diagnosis experiences, information provided, and concerns about PCOS	None listed	Cross-sectional study with online questionnaire	1385 women with diagnosis of PCOS	Online questionnaire	One-third reported diagnosis time of greater than 2 years, 47% saw greater than 3 providers before diagnosis. Only

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
syndrome. <i>Journal of Clinical Endocrinology & Metabolism</i> , 102(2), 604-612. doi:10.1210/jc_2016-2963						35.2% were satisfied with diagnosis experience.
Gilbert, E. W., Tay, C. T., Hiam, D. S., Teede, H. J., & Moran, L. J. (2018). Comorbidities and complications of polycystic ovary syndrome: An overview of systematic reviews. <i>Clinical Endocrinology</i> , 89(6), 683-699. doi:10.1111/cen.13828	To summarize and appraise methodological quality of systematic reviews and meta-analyses evaluating complications and comorbidities associated with PCOS.	None listed			Systematic review	Patients with PCOS have worse cardiac risk profiles and prevalence of metabolic syndrome, worse insulin sensitivity, and reproductive complications
Hakim, E. E. & Wardle, P. (2010). Polycystic ovary syndrome: Polycystic ovary syndrome is increasingly being diagnosed in primary care, so an in-depth knowledge of the condition is important to manage patients and to counsel them on the possible short-	Provide overview of PCOS for primary care	None listed	Disease overview	N/A		

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
and long-term implications. (Disease/Disorder overview). <i>Practice Nurse</i> , 40(1), 21.						
Hart, R. & Doherty, D. (2015). The potential implications of a PCOS diagnosis on a woman's long-term health using data linkage.	To determine the rate of hospital admissions for women with PCOS in comparison to those without (Hart & Doherty, 2015)	None listed	A population-based retrospective cohort study	2566	Hospital database	PCOS has major health implications. PCOS was associated with hospitalizations related to diabetes, hypertension, ischemic heart disease, self-harm, illicit drug use and many others and were all statistically significant (p<.001)
Huffman, C. S., Brackney, D. E., Martin, S. R. (2017). Provider experiences with lifestyle management in women with PCOS. <i>Fertility and Sterility</i> 108(3, Supplement): e247.	To assess provider comfort in providing lifestyle management (LM) counseling in patients with polycystic ovary syndrome (PCOS) and provider perceptions of	None listed	Cross-sectional survey design using descriptive statistics.	56 providers	Online PCOS provider survey	NPs and PAs were more comfortable in giving specific diet and exercise advise. Family practice more comfortable giving advise than OB/GYN providers.

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
	patient willingness to engage in LM.					OB/GYN providers more likely to see patients as unwilling to engage in LM
Lin, A., Bergomi, E., Dollahite, J., Sobal, J., Hoeger, K., & Lujan, M. (2018). Trust in physicians and medical experience beliefs differ between women with and without polycystic ovary syndrome. <i>Journal of the Endocrine Society</i> , 2(9), 1001-1009.	To compare trust in physicians and beliefs about social support from health care providers between women with and without PCOS.	None listed	Cross-sectional study with online questionnaire	332 women (with and without PCOS)	Online questionnaire	PCOS was associated with greater distrust in Primary Care Providers opinion ($p < 0.01$). PCOS patients felt PCP spent less effort and were less qualified to manage PCOS symptoms than general health concerns ($p < 0.001$).
Lua, A., How, C. H., & King, T. (2018). Managing polycystic ovary syndrome in primary care. <i>Singapore Medical Journal</i> , 59(11), 567-571. https://doi.org/10.11622/sm-edj.2018135	Provide overview of PCOS and treatment	None listed				

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
Moran, L., Hutchison, S., Norman, R., & Teede, H. (2011). Lifestyle changes in women with polycystic ovary syndrome. <i>Cochrane Database System Review</i> , 7. doi:10.1002/14651858.CD007506.pub3	To assess lifestyle management of PCOS in improving metabolic and quality of life factors.	None listed		498	Systematic review	Lifestyle interventions may improve free androgen, weight and BMI in women with PCOS.
Nieuwenhuis-Ruifrok, A. E., Kuchenbecker, W., Hoek, A., Middleton, P., & Norman, R. (2009). Insulin sensitizing drugs for weight loss in women of reproductive age who are overweight or obese: systematic review and meta-analysis. <i>Human Reproduction Update</i> , 15(1), 57-68. doi:10.1093/humupd/dmn043	To assess the treatment with insulin sensitizing drugs and lifestyle modification contributes to weight loss.	None listed			Systemic review and meta-analysis	Structured lifestyle modification should be firstline treatment in obese women regardless of PCOS diagnosis. Treatment with metformin provided statically significant decrease in weight.
Tomlinson, J., Pinkney, J., Adams, L., Stenhouse, E., Bendall, A., Corrigan, O., & Letherby, G. (2017). The	To explore the impact of diagnosis of PCOS on health and health identity.	None listed	Qualitative Study	32	Thematic analysis from 11 focus groups	Diagnosis and support of women with PCOS could be enhanced by

Author / Article	Qual: Concepts or phenomena Quan: Key Variables Hypothesis Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
diagnosis and lived experience of polycystic ovary syndrome: A qualitative study. <i>Journal of Advanced Nursing</i> , 73(10), 2318-2326.						increase in provider knowledge and communication concerning PCOS.
Williams, T., Mortada, R., & Porter, S. (2016). Diagnosis and treatment of polycystic ovary syndrome. <i>American Family Physician</i> , 94(2), 106-113.	Provide overview of PCOS and treatment	None listed			Practice guideline	Treatment of PCOS should be individualized based on patient's presentation and desire for pregnancy.

APPENDIX B:
PRE-EDUCATION SURVEY AND DEMOGRAPHIC QUESTIONNAIRE

Pre-Education and Demographic Survey

Please answer the questions below. In this survey Polycystic Ovarian Syndrome will be referred to as PCOS.

1. What is your gender?
 1. male
 2. female
 3. self-identify
2. What is your age? Please indicate one.
 - 20-30
 - 31-40
 - 41-50
 - 51-60
 - 61+
3. What is your previous level of education? Please circle one.
 - Bachelor's degree
 - Master's degree
 - Doctorate degree
4. I have PCOS or personally know someone with PCOS?
 - a. Yes
 - b. No
5. I have already practiced as a Nurse Practitioner:
 - a. Yes
 - b. No
6. Where do you intend to practice?
 - a) Northeast
 - b) Northwest
 - c) Midwest
 - d) Southwest

- e) Southeast
- f) South
- g) Outside of the United States

Please indicate one of the options below for each statement:

	Strongly Agree 5	Agree 4	Neither Agree or Disagree 3	Disagree 2	Strongly Disagree 1
It is important to screen for PCOS in primary care.					
I am likely to screen for PCOS in my future practice					
I believe my peers and superiors would screen for PCOS					
I feel confident in my understanding of the diagnostic criteria for PCOS.					
I feel confident starting treatment for PCOS					

7. The most widely accepted diagnosis criteria for PCOS consists of these clinical features (select all that apply):
- a. Polycystic ovaries
 - b. Hypoandrogenism
 - c. Menstrual irregularities
8. Please indicate signs and/or symptoms of PCOS below (select all that apply):
- a. Irregular menstruation
 - b. Infertility
 - c. Facial swelling/edema
 - d. Obesity and trouble losing weight
 - e. Cystic ovaries
 - f. Hirsutism (Excessive hair growth), male pattern baldness
 - g. Weight loss

- h. Increased urination
9. Please indicate long-term complications of PCOS, select all that apply
- a. Cardiovascular disease
 - b. Infertility
 - c. Weight loss
 - d. Type 2 diabetes
 - e. Increased risk for Endometrial Cancer
 - f. Increased risk for Ovarian Cancer
9. Please indicate treatment options for PCOS, select all that apply:
- a. Metformin
 - b. Spironolactone
 - c. Oral Contraception
 - d. Dapaglifozin and other SGLT2 inhibitors
 - e. Lifestyle modifications
 - f. No treatment available
10. What is considered firstline treatment for PCOS, select one:
- a. Metformin
 - b. Spironolactone
 - c. Oral Contraception
 - d. Weight loss
 - e. No treatment available

APPENDIX C:
EDUCATION OUTLINE



Polycystic Ovarian Syndrome

Kimberly Evuleocha



Background

What is PCOS?

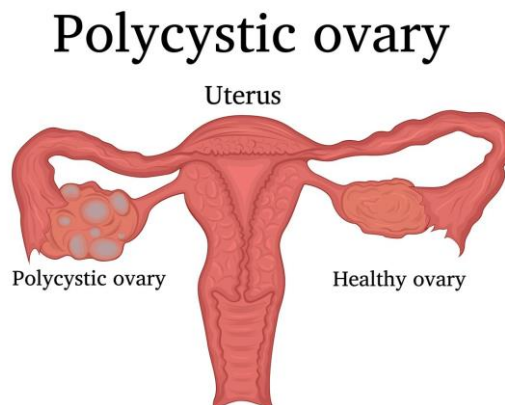
The exact mechanism of PCOS is not known, but produces a wide variety of symptoms and consequences for women who have it.

Prevalence and Primary Care

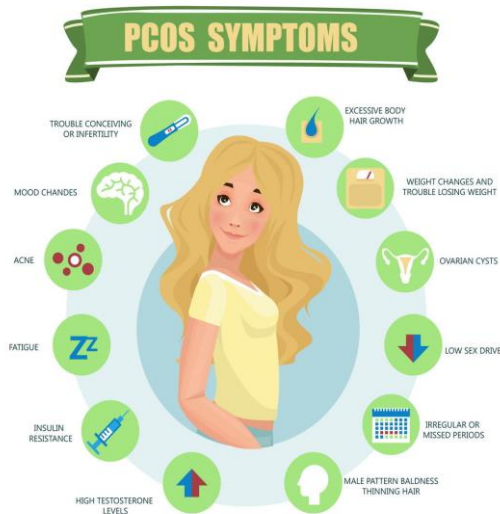
The estimates of PCOS vary due to varying diagnosis criteria. It's important for primary care to understand more about PCOS as it is where most of the diagnosis occurs (AHRQ, 2012; Pfeiffer, 2019).

Why is it important to my future practice?

With estimates of up to 20%, you will need to be knowledgeable about this condition as an FNP.



Clinical Manifestations



- Varying symptoms of PCOS
 - Physical manifestations of PCOS
 - Some psychological manifestations

3

Barriers & Room for Improvement

- Delay in Diagnosis
 - Due to varying presentations of symptoms
- Patients seek multiple providers for diagnosis.
 - Multiple providers sought over periods of years and greater than 5 providers for some (Gibson-Helm, 2014).
- Patients express frustration in diagnosis process and lack of empathy from providers due to
 - Lack of knowledge
 - Due to lack of explanation of the condition when diagnosed
 - Treatment options not being presented when diagnosed

4

H.O.P. 2 It

- Rotterdam's criteria consists of three characteristics.
 - **H**yperandrogenism
 - **O**ligomenorrhea
 - **P**olycystic Ovaries
- For diagnosis, patients must meet **2** of these criteria.

5

Long-term Complications

- Impaired glucose tolerance
 - 25-30% by the age of 30
- Type 2 Diabetes
 - 8% of affected women will develop annually
- The risk for development of cancer: ovarian and breast cancer
- Cardiovascular Disease and Hypertension
 - Impaired glucose and diabetes- well known risk factors for cardiovascular disease
- Infertility

6

Treatment

While there is no cure for PCOS at this time, it can be managed.

- Lifestyle modifications as first line treatment as it improves the manifestations of PCOS
 - Weight loss with those who are obese
 - Diet modifications (Farhat, Mansour, & Attieh, 2011).
 - Several approaches: Ketogenic, Mediterranean, low carbohydrate (Boyd & Ziegler, J. (2019).
 - Increased exercise
- Metformin
 - To assist with ovulation- individualized for patients (Konecki et al, 2017)
 - Insulin resistance

(Daniilidis & Dinas, 2009).

7

Treatment

- Spironolactone
 - Primarily for use in decreasing hirsutism symptoms.
 - Low dose, in addition to Metformin aids in further reduction of clinical and biochemical hyperandrogenism (Mazza et al, 2014).
- Oral Contraceptives
- Combination of Therapies



8

Summary

Presentation symptoms

- Irregular periods or absence of periods
- Trouble losing weight
- Hirsutism and thinning scalp hair
- Infertility
- Acne
- Sleep disturbances

Diagnosis

Meet 2 of 3 criteria:

- Hyperandrogenism
- Polycystic Ovaries
- Oligomenorrhea

HOP 2 It

Treatment options

Lifestyle changes are first line treatment, primarily weight loss. Possible addition of medications if further therapy is needed. Treatment is individualized.



Thank you!

Please complete the post-education survey.



APPENDIX D:
POST-EDUCATION SURVEY

Post-Education Survey

Please indicate one of the options below for each statement:

	Strongly Agree 5	Agree 4	Neither Agree or Disagree 3	Disagree 2	Strongly Disagree 1
It is important to screen for PCOS in primary care.					
I am likely to screen for PCOS in my future practice					
I believe my peers and superiors would screen for PCOS					
I feel confident in my understanding of the diagnostic criteria for PCOS.					
I feel confident starting treatment for PCOS					

1. The most widely accepted diagnosis criteria for PCOS consists of these clinical features (select all that apply):
 - a. Polycystic ovaries
 - b. Hypoandrogenism
 - c. Menstrual irregularities
2. Please indicate signs and/or symptoms of PCOS below, select all that apply:
 - a. Irregular menstruation
 - b. Infertility
 - c. Facial swelling/edema
 - d. Obesity and trouble losing weight
 - e. Cystic ovaries
 - f. Hirsutism (Excessive hair growth), male pattern baldness
 - g. Weight loss
 - h. Increased urination
3. Please indicate long-term complications of PCOS, select all that apply
 - a. Cardiovascular disease

- b. Infertility
 - c. Weight loss
 - d. Type 2 diabetes
 - e. Increased risk for Endometrial Cancer
 - f. Increased risk for Ovarian Cancer
4. Please indicate treatment options for PCOS, select all that apply:
- a. Metformin
 - b. Spironolactone
 - c. Oral Contraception
 - d. Dapaglifozin and other SGLT2 inhibitors
 - e. Lifestyle modifications
 - f. No treatment available
5. What is considered firstline treatment for PCOS, select one:
- a. Metformin
 - b. Spironolactone
 - c. Oral Contraception
 - d. Weight loss
 - e. No treatment available

APPENDIX E:
THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD APPROVAL
LETTER



Human Subjects
Protection Program

1618 E. Helen St.
P.O. Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
<http://hgw.arizona.edu/compliance/home>

Date: December 11, 2019
Principal Investigator: Kimberly Kelechukwu Evuleocha
Protocol Number: 1912210954
Protocol Title: Nurse Practitioner Student Perceptions And Knowledge On Polycystic Ovarian Syndrome: A Quality Improvement Project
Determination: Human Subjects Review not Required

Documents Reviewed Concurrently:

HSPF Forms/Correspondence: *Evuleocha Determination of Human Subjects determination 12-9.pdf*

Regulatory Determinations/Comments:

- ♦ Not Human Subjects Research as defined by 45 CFR 46.102(e): as presented, the activities described above do not meet the definition of research involving human subjects as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "Human subject means a living individual about whom an investigator (whether professional or student) conducting research: (i) Obtains information or biospecimens through intervention or interaction with the individual, and uses, studies, or analyzes the information or biospecimens; or (ii) Obtains, uses, studies, analyzes, or generates identifiable private information or identifiable biospecimens. "
- ♦ Data can only be used for QI purposes of students at the U of A CON

The project listed above does not require oversight by the University of Arizona.

If the nature of the project changes, submit a new determination form to the Human Subjects Protection Program (HSPF) for reassessment. Changes include addition of research with children, specimen collection, participant observation, prospective collection of data when the study was previously retrospective in nature, and broadening the scope or nature of the study activity. Please contact the HSPF to consult on whether the proposed changes need further review.

The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).

APPENDIX F:
PERMISSION TO OBTAIN FNP STUDENT EMAILS



1305 N. Martin Avenue
P.O. Box 210203
Tucson, AZ 85721-0203
Tel: (520) 626-6152
Fax: (520) 626-2669
www.nursing.arizona.edu

July 26, 2019

University of Arizona Institutional Review Board
c/o Office of Human Subjects
1618 E Helen St
Tucson, AZ 85721

Please note that Ms. Kimberly Evuleocha, UA Doctor of Nursing Practice student, has permission from the College of Nursing to conduct a quality improvement project through access of student emails for her project, "Nurse Practitioner Student Perceptions and Knowledge On Polycystic Ovarian Syndrome: A Quality Improvement Project."

Ms. Evuleocha will conduct a survey of family nurse practitioner Students through Qualtrics before and after a recorded education. She will recruit these students through email. The email will provide a description of the project, what they will be asked to do, the time involved, and a link to the online surveys and education.

Ms. Evuleocha has agreed to provide to my office a copy of the University of Arizona Determination before she recruits participants.

If there are any questions, please contact my office.

Signed,

A handwritten signature in blue ink, appearing to read 'Allen Prettyman'.

Dr. Allen Prettyman, PhD, FNP-BC, FAANP
Director of Family Nurse Practitioner Program

APPENDIX G:
ASSESSING FNP STUDENT KNOWLEDGE OF PCOS AND ITS LONG-TERM
CONSEQUENCES – DISCLOSURE

Subject: Nurse Practitioner Student Perceptions and Knowledge On Polycystic Ovarian Syndrome: A Quality Improvement Project

Kimberly Evuleocha

Dear Fellow FNP student,

You have the opportunity to participate in an education about Polycystic Ovarian Syndrome (PCOS) and potentially increase your knowledge on the topic, as a future family nurse practitioner. The purpose of this project is to assess and improve current University of Arizona Family Nurse Practitioner students' perception and knowledge regarding PCOS, its long-term implications, treatment options, and confidence in starting treatment. Information gathered from this project may be used to better prepare current students on this syndrome and improve patient-provider relationships with those who may have this condition.

If you choose to take part in this project, you will be asked to complete a pre-survey (including demographic information), watch a pre-recorded education about PCOS via Zoom, and complete a post-survey. It will take approximately 5 minutes to complete the pre and post survey. The recorded education presentation will take approximately 10 minutes to attend. There are no foreseeable risks associated with participating in this project and you will receive no immediate benefit from your participation.

Participation in this project is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may withdraw at any time from the project. In addition, you may skip any survey questions that you choose not to answer. No identifying information will be collected in this project. By participating, you do not give up any personal legal rights you may have as a participant in this project.

If you choose to participate in this project:

1. Please follow this link to the pre- education survey:

Take the Survey

Or copy and paste the URL below into your internet browser:

https://uarizona.co1.qualtrics.com/jfe/form/SV_0pr4W3GdOMeyiQB?Q_DL=5608GKweheXkgbP_0pr4W3GdOMeyiQB_MLRP_e8TNORKFVevBCyV&Q_CHL=email

2. Then watch the pre-recorded education on PCOS which can be found here:

<https://uahs.zoom.us/recording/share/ZShb0ZYe9t-a3PdrxBFPTDbnnTnDP4Taw0nZJUT9hKwIumekTziMw?startTime=1575933581000>

3. Lastly, please complete the post-education survey, found here:

https://uarizona.co1.qualtrics.com/jfe/form/SV_38Hy5Ev3oZuOOfX

Thank you for considering participation in this project. For questions, concerns, or follow-up about the project, you may contact Kimberly Evuleocha, BSN, RN at 763-843-9080 or email at kevuleocha@email.arizona.edu.

APPENDIX H:
ASSESSING FNP STUDENT KNOWLEDE OF PCOS AND ITS LONG-TERM
CONSEQUENCES – DISCLOSURE REMINDER EMAIL

Subject: REMINDER Nurse Practitioner Student Perceptions and Knowledge on Polycystic Ovarian Syndrome: A Quality Improvement Project

Kimberly Evuleocha

Dear Fellow FNP student,

This is a reminder email regarding your potential participation in my DNP project regarding Polycystic Ovarian Syndrome. Please find the disclaimer, instructions, and links below:

You have the opportunity to participate in an education about Polycystic Ovarian Syndrome (PCOS) and potentially increase your knowledge on the topic, as a future family nurse practitioner. The purpose of this project is to assess and improve current University of Arizona Family Nurse Practitioner students' perception and knowledge regarding PCOS, its long-term implications, treatment options, and confidence in starting treatment. Information gathered from this project may be used to better prepare current students on this syndrome and improve patient-provider relationships with those who may have this condition.

If you choose to take part in this project, you will be asked to complete a pre-survey (including demographic information), watch a pre-recorded education about PCOS via Zoom, and complete a post-survey. It will take approximately 5 minutes to complete the pre and post survey. The recorded education presentation will take approximately 15 minutes to attend. There are no foreseeable risks associated with participating in this project and you will receive no immediate benefit from your participation.

Participation in this project is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may withdraw at any time from the project. In addition, you may skip any survey questions that you choose not to answer. No identifying information will be collected in this project. By participating, you do not give up any personal legal rights you may have as a participant in this project.

1. Please follow this link to the pre- education survey:

Take the Survey

Or copy and paste the URL below into your internet browser:

https://uarizona.co1.qualtrics.com/jfe/form/SV_0pr4W3GdOMeyiQB?Q_DL=5608GKweheXkbP_0pr4W3GdOMeyiQB_MLRP_e8TNORKFVevBCyV&Q_CHL=email

2. Then watch the pre-recorded education on PCOS which can be found here:

<https://uahs.zoom.us/recording/share/ZShb0ZYe9t-a3PdrtxBFPTDbnnTnDP4Taw0nZJUT9hKwIumekTziMw?startTime=1575933581000>

3. Lastly, please complete the post-education survey, found here:

https://uarizona.co1.qualtrics.com/jfe/form/SV_38Hy5Ev3oZuOOfX

Thank you for considering participation in this project. For questions, concerns, or follow-up about the project, you may contact Kimberly Evuleocha, BSN, RN at 763-843-9080 or email at kevuleocha@email.arizona.edu.

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