

Implementation of international guidelines for polycystic ovary syndrome: barriers and facilitators among gynecologists and primary care providers

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Objective: To identify barriers and facilitators to the implementation of evidence-based guidelines among gynecologists and primary care physicians (PCPs) caring for women with polycystic ovary syndrome (PCOS).

Design: Qualitative semi-structured interview study.

Setting: Academic medical center.

Patients: None.

Interventions: None.

Main Outcome Measures: Barriers and facilitators in the diagnosis and management of PCOS.

Results: We interviewed 10 gynecologists and 8 PCPs to reach thematic saturation using a thematic analysis approach. Four themes were identified: diagnostic considerations, treatment of symptoms of PCOS, screening for long-term complications of PCOS, and counseling on long-term complications. Many gynecologists did not perform the recommended metabolic screening and were uncomfortable managing metabolic complications of PCOS. They uniformly counseled patients on the risk of endometrial hyperplasia and infertility. PCPs expressed the lack of familiarity with diagnostic criteria and often did not complete a comprehensive workup before making a diagnosis of PCOS. However, they routinely counseled patients on cardiometabolic risk and were familiar with managing the related long-term complications. Common barriers to comprehensive care delivery included the lack of knowledge and inadequate time and resources. Important facilitators included the overlap between the management of PCOS and other conditions such as obesity and abnormal uterine bleeding.

Conclusions: Our study highlights the need for interventions that target the barriers identified among gynecologists and PCPs in implementing guidelines for diagnosing and managing PCOS. In conjunction with prior studies, our findings support a multidisciplinary care model for women with PCOS. Future studies should focus on implementation strategies to facilitate evidence-based care. (*Fertil Steril Rep*® 2022;3:94–101. ©2022 by American Society for Reproductive Medicine.)

Key Words: Implementation science, long-term counseling, polycystic ovary syndrome, primary care provider

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Polycystic ovary syndrome (PCOS) is a common endocrine disorder that affects 8%–15% of women of the reproductive age (1). It affects long-term gynecologic health and fertility and increases the risk of obesity, diabetes, and dyslipidemia (2).

Although PCOS is a prevalent disorder, its treatment is fraught with debate and practice variation. Even the diagnosis of PCOS presents a challenge, sometimes requiring 6–24 months and consultation with 1–3 physicians before establishing a diagnosis, leading to significant patient dissatisfaction (3). Previously, three different diagnostic criteria—National Institutes of Health, Rotterdam, and Androgen-Excess and PCOS Society—have been used (4–6). This has led to widespread confusion, as demonstrated by surveys reporting that most practicing and in-training physicians do not know the criteria that they use to diagnose PCOS (7, 8). The finding that even many senior trainees lack a firm understanding of how to diagnose and manage PCOS further suggests that there also exists a deficiency in training as opposed to just confusion surrounding a complicated subject (8). After a diagnosis has been established, patients report limited counseling on long-term comorbidities and significant variation in the management of symptoms (7). To complicate the landscape additionally, many disciplines within medicine treat women with PCOS, and surveys highlight that reproductive endocrinologists, general gynecologists, and medical endocrinologists may have very different approaches to managing this syndrome (9–11).

Recognizing the inconsistencies in practice, international evidence-based guidelines were published in 2018 (2). The guidelines clearly state that diagnosis should be made using the Rotterdam criteria; considerations in less clear-cut cases are presented for clarification. They also provide updated recommendations for screening for long-term comorbidities and management of symptoms. Despite the publication of these clinical guidelines, studies surveying reproductive endocrinologists, general gynecologists, and medical endocrinologists have identified poor uptake of the previously published screening recommendations, the lack of recognition of salient clinical features and complications associated with PCOS, and frequent use of non-evidence-based treatments (7, 9, 10). In the general population, primary care physicians (PCPs) provide first-line preventive care and may act as gatekeepers for the access to specialists. There is a paucity of information on the management of PCOS by this important group of physicians. A 2014 Australian survey of 105 PCPs identified significant gaps in knowledge related to both diagnosis and treatment of PCOS (12). Given that women with PCOS commonly receive care from both general gynecologists and PCPs, a deeper understanding of their respective experiences with the diagnosis and management of PCOS will be essential to identify facilitators and barriers to improving the uptake of evidence-based guidelines.

In this study, we used a qualitative approach to gain insight into the knowledge and practice patterns in general gynecologists and PCPs. The overall goal was to ascertain

facilitators and barriers to care provided by general gynecologists and PCPs to inform the implementation of best practices for comprehensive PCOS care.

MATERIALS AND METHODS

Participants and Setting

This qualitative study used semi-structured interviews of general gynecologists and PCPs (internists/family medicine physicians) practicing in a single urban academic medical center to understand the barriers and facilitators to evidence-based practices for PCOS. Participants were identified using heterogeneous purposive sampling with the goal of including providers with a wide range of experiences with PCOS, varying durations of clinical practice, and both general gynecologists and PCPs. The gynecologists were approached via e-mail and asked whether they would be willing to participate in an interview. For PCPs, we had previously conducted an electronic survey on provider knowledge about diagnostic criteria and management of PCOS. The survey participants were subsequently asked whether they would be willing to participate in a follow-up interview.

Interview Procedure

Two researchers (I.T.-L.L. and S.S.) approached these participants and conducted the interviews between June 2018 and October 2019. The interviewer introduced the study's aim to understand physician perspectives on PCOS-related care and asked questions focused on provider experience with the diagnosis and management of PCOS, common clinical practices and approaches to care in the context of the international guidelines, and barriers encountered in care delivery. We used an interview guide from a prior Australian qualitative study of physicians managing women with PCOS. This guide was developed by a research team composed of clinicians from varying specialties and patients with PCOS (13) (Supplemental Data 1, available online). Audio of the telephonic interviews were recorded; these telephonic interviews lasted for an average of 20 minutes and were transcribed fully for analysis (by I.T.-L.L. and S.S.). Enrollment for interviews was closed when thematic saturation was reached, as reflected by the lack of new themes emerging with additional interviews (14). The study was considered exempt from review by the University of Pennsylvania institutional review board.

Data Analysis

Investigator R.B. (implementation scientist with expertise in qualitative interviewing and analysis) trained two other team members (I.T.-L.L. and S.S.) in qualitative data analysis. After interviewing 10 gynecologists and 8 PCPs, the researchers (I.T.-L.L. and S.S.) independently reviewed 4 transcripts (2 gynecologists and 2 PCPs) to identify major topics and emerging themes. The transcripts were reviewed fully to assess for thematic saturation, at which point data collection was discontinued. The impressions from this review process were used to shape a coding framework, which

was then used to develop a codebook using thematic analysis. The codebook was revised with assistance from R.B. and applied subsequently to two random transcripts. Both I.T.-L.L. and S.S. separately coded these two transcripts, and coding was compared to ensure rigor and interobserver reliability (Cohen's kappa = 0.92) (15). Additionally, R.B. facilitated discussion of discrepancies in coding to refine the codebook. The remainder of the transcripts was then coded using the codebook. The consolidated criteria for reporting qualitative research checklist was applied.

RESULTS

Participant Characteristics

Ten general gynecologists, with no specific area of specialization, and eight PCPs were interviewed (Table 1). For most gynecologists, the common complaints on presentation among women with PCOS were irregular bleeding or infertility; for most PCPs, the complaints on presentation were irregular bleeding and weight gain.

Thematic Analysis

Using inductive reasoning, the codebook was created including the following codes: diagnosis, self-efficacy, barriers and controversy, communication, beliefs about long-term sequelae, patient perception, care coordination, and treatment. These codes were then redistributed to identify broad themes that synthesized different aspects of each code such that facilitators and barriers were able to be contrasted. Four themes were identified: diagnostic considerations, treatment of symptoms of PCOS, screening for long-term complications of PCOS, and counseling on long-term complications. These are described further in the context of barriers and facilitators to the implementation of guidelines, with additional representative quotes included in Table 2.

Diagnostic Considerations

This theme focused on how providers establish the diagnosis of PCOS and their experiences with diagnosis. The 2018 international guidelines endorse the use of the Rotterdam criteria for diagnosis, requiring two of the following three features: oligo-ovulation, hyperandrogenism, and polycystic ovarian morphology on ultrasound (2). It also specifies that other disorders (e.g., thyroid dysfunction) should be excluded before making the diagnosis of PCOS and discusses the nuances that ethnic variation and age can introduce into diagnostic considerations.

Barriers. Many PCPs were not familiar with the Rotterdam criteria. They cited low patient volume and identified confusion over the multiple possible diagnostic criteria that have been used in the past as barriers to their ability to make the diagnosis. On the other hand, one PCP reported not being aware of any of the diagnostic criteria for PCOS.

“I go to Uptodate to refresh myself and make sure I’m doing the right labwork—like the role of (luteinizing hormone) and (follicle-stimulating hormone) I always have to look up because it’s not at the top of my head

TABLE 1

| Interview participant characteristics. | | |
|---|-------------------------|---------------|
| Characteristic | Gynecologists n = 10 | PCPs n = 8 |
| Specialty | | |
| Internal medicine | — | 4 |
| Family medicine | — | 3 |
| Adolescent medicine | — | 1 |
| Sex | | |
| Male | 1 | 3 |
| Female | 9 | 5 |
| Years of experience after training | | |
| <5 | 4 | 4 |
| 5–10 | 2 | 1 |
| 11–20 | 2 | 2 |
| >20 | 2 | 1 |
| Average number of patients provider diagnosed with PCOS in one month ^a | | |
| <1 | 3 | 2 |
| 1–2 | 4 | 2 |
| 3–9 | 2 | 3 |
| >10 | 1 | 0 |

Note: PCOS = polycystic ovary syndrome; PCP = primary care physician.

^a One PCP did not specify the number of patients.

Lee. Implementation of PCOS guidelines. *Fertil Steril Rep* 2022.

... I didn’t want to skew myself so I purposely didn’t look (the criteria) up. It starts with an R. Rotterdam? That’s the one that comes to mind. I just run to Uptodate because I’m not doing this consistently. Can I look at them? I didn’t want to study for this (interview).” (PCP, practicing seven years)

Additionally, the evolution of the diagnostic criteria over time was identified as a barrier.

“Rotterdam—it’s an adjustment. It’s not what I learned in med school, and that’s always a transition.” (PCP, practicing four years)

Both gynecologists and PCPs expressed the belief that particular patient features make it more difficult to diagnose PCOS, for example, young age due to alterations in the appearance of ovaries on ultrasound and frequent oligo-ovulation at baseline or certain ethnicities due to variation in body hair.

“I feel like there’s always controversy about how we diagnose PCOS, especially because right now, the diagnosis is clinical—you know, the hirsutism depends on ethnic group. Or oligo-ovulation can be from just obesity and not PCOS. Or people can have cysts on their ovaries just because. These are sort of soft criteria.” (PCP, practicing four years)

Facilitators. Multiple gynecologists cited the Rotterdam criteria as their method for diagnosing PCOS, specifically commenting on the existence of other criteria and recalling

TABLE 2

Interview themes and quotes.

Gynecologists

Diagnostic considerations

Q1: "There are the Androgen Society guidelines, NIH, Rotterdam. I use the Rotterdam criteria. I do not find all the different criteria bothersome. I understand why different perspectives have different takes." (GYN3, practicing 3 years)

Screening for sequelae of PCOS

Q3: "I don't do any preventative screening but I recommend their PCP do." (GYN7, practicing 3 years)

Treatment

Q5: "I am not very good with discussing diabetes and metabolic implications. Partly because I do not have an interest in those aspects. I also do not do the screening—I may order and then send them to PCP to discuss... I rarely use metformin, because I don't feel comfortable. I believe PCPs do a better job." (GYN8, practicing 12 years)

Q7: "If they're not trying for pregnancy, I recommend contraception to protect the endometrium with LARC (long-acting reversible contraception) as the first option—IUD, Nexplanon. If not interested in LARC, then pill, patch, ring, or depo." (GYN5, practicing <1 year)

Q9: "I wish I had better access to a nutritionist for PCOS." (GYN1, practicing 4 years)

Long-term counseling

Q10: "I have told women that in the future they may have trouble getting pregnant because they have this but I am usually very successful in helping them, so that takes a lot of the burden off of it." (GYN4, practicing 37 years)

Q12: "My general opinion in medicine is that the more information to give to patients, the better. The way you deliver is very important—give patient appropriate time to ask questions, even if that means bringing them back." (GYN10, practicing 8 years)

Q14: "We're so used to seeing patients for annual visits. That might actually be too long of an interval for someone with this disease." (GYN9, practicing 17 years)

Q16: "For those women with good insurance, I feel more comfortable telling them about fertility options because IVF is covered. For those without insurance, it can be more of a difficult conversation to have." (GYN5, practicing <1 year)

Note: FM = family medicine; GYN = gynecologist; IM = internal medicine; IUD = intrauterine device; IVF = in vitro fertilization; LARC = long-acting reversible contraception; NIH = National Institutes of Health; PCOS = polycystic ovary syndrome; PCP = primary care physician; Q = question.

Lee. Implementation of PCOS guidelines. Fertil Steril Rep 2022.

Primary care physicians

Q2: "It's usually a clinical diagnosis and I don't need to order any tests... If there's no hyperandrogenism but some irregular periods, I may get an ultrasound. I typically don't get one—about 10% of the time." (IM4, practicing 11 years)

Q4: "(My screening is) not much different than normal patients at their age. Blood pressure, weight, lipids—I might check those earlier in someone with PCOS." (FM1, practicing 4 years)

Q6: "For insulin resistance, I do metformin like I would for anyone else with insulin resistance. I go over the routine counseling for anyone struggling with weight management or those kinds of things." (FM2, practicing 4 years)

Q8: "I guess my biggest challenge is around infertility. A lot of my patients are Medicaid and don't have access to fertility resources, so that's hard to navigate when they are having trouble getting pregnant." (FM2, practicing 1 year)

Q11: "I'm sure there's an increased risk of some type of cancer that I can't recall off the top of my head." (IM2, practicing 3 years)

Q13: "Women who are more well educated and anxious at baseline—it's very concerning about fertility. They'll immediately want a referral to a gynecologist." (IM5, practicing 4 years)

Q15: "The best thing for them is decreasing risk of metabolic syndrome more than anything else. I tell them they'll get diabetes and obesity and high blood pressure; they could have a heart attack at a younger age." (FM1, practicing 4 years)

that they had been taught to use the Rotterdam criteria as trainees (question 1). Both gynecologists and some PCPs commented that ultrasound is not always necessary if the patient already fulfills the other two criteria for PCOS, making it more streamlined and straightforward to make the diagnosis (question 2).

"I follow the Rotterdam criteria, which are oligomenorrhea, hyperandrogenism, and signs of (polycystic ovaries) on ultrasound. I document hirsutism and acne, but I nearly always send labs—TSH, prolactin, testosterone, ancillary labs would be A1c, HCG if no office urine. I do not always order an ultrasound if they fulfill those two." (Gynecologist, practicing five years)

"I think it's actually more helpful to use Rotterdam because you capture more women that this is affecting, especially if you don't have an ultrasound to support it or you can't get an ultrasound. I was taught that you needed all three in medical school." (PCP, practicing four years)

For the initial workup, both gynecologists and PCPs reported routinely measuring the levels of thyroid and prolactin hormones to rule out mimicking conditions, although most PCPs did not describe checking for other causes of hyperandrogenism, such as dehydroepiandrosterone sulfate and 17-hydroxyprogesterone levels. However, one PCP did specify

that an order panel in the electronic medical record is the reason that she remembers to obtain these laboratory workups when attempting to make a diagnosis.

Treatment of Symptoms of PCOS

This theme encompassed the various presenting symptoms of PCOS and how providers approach the management of those symptoms. The international guidelines discuss treatment for the individual features of PCOS, with specific recommendations on the use of lifestyle modification (LSM) and metformin as an off-label treatment for PCOS, methods for regulating irregular menstrual cycles and hyperandrogenism such as combined oral contraceptives, and letrozole as the first-line agent for ovulation induction in PCOS-related infertility (2).

Barriers. There was consensus on the importance of LSM and management of metabolic risk in this population; however, both gynecologists and PCPs cited barriers to doing so. However, the barriers cited by the two groups were distinct. Gynecologists tended to comment on the lack of training/experience with management of the metabolic complications of PCOS and the lack of an established multidisciplinary care model including support from other health professionals (questions 5, 8, and 9).

“Metabolic issues are difficult—I am not sure how much I should take on. I do not think I have the time/resources/knowledge to manage. I believe PCPs do a better job.” (Gynecologist, practicing 12 years)

“I am not clear on the benefit of metformin. I have consulted family medicine about metformin, and they also do not think it should be started. I wish I had better access to a nutritionist for PCOS.” (Gynecologist, practicing four years)

On the other hand, PCPs were very comfortable addressing metabolic risk but found patient factors to be the primary barrier to implementing recommendations.

“(It’s) just the challenges I face with taking care of obese American patients. Diet, exercise, and the lack of good food resources. Not having somewhere to exercise or walk—all of the problems that plague the population I take care of.” (PCP, practicing four years)

Although both gynecologists and PCPs overall reported being comfortable regulating menses, some PCPs noted a limitation in their ability to offer all possible options, and others commented that they did not believe that they needed to address this aspect because they presumed that gynecologists were already doing so.

“I think I would (refer to gynecology) ... if they wanted an IUD (intrauterine device) or Nexplanon—something outside of practice.” (PCP, practicing three years)

“I do ask about menses in the annual, but many just come for sick visits and so we may not talk about their periods for a few years.” (PCP, practicing seven years)

For patients trying to conceive, PCPs generally were not comfortable initiating preliminary treatment before referring to reproductive endocrinology (question 8). One PCP mentioned that they might prescribe clomiphene for ovulation induction if their patient was unable to consult a reproductive endocrinologist due to the lack of insurance coverage, whereas another specifically reported being uncomfortable prescribing clomiphene and was unsure of prescribing metformin for ovulation. They also did not recognize that the guidelines specify letrozole rather than clomiphene as the first-line agent for ovulation induction in women with PCOS.

“(Women with PCOS) need medications that I don’t really know how to navigate. Like sometimes metformin is used (for infertility), but I don’t have enough sophistication to know if they need certain doses or timing or when to pull it off. And I’ve never prescribed clomiphene.” (PCP, practicing 1.5 years)

Both groups of physicians also identified limitations when managing more refractory symptoms, such as dermatologic manifestations that did not respond to the first-line therapies, although most did report the ability to refer to a dermatologist for further management.

Facilitators. The overarching facilitator to implement the clinical guidelines for the treatment of PCOS-related conditions was familiarity with the topic and alignment of the issues with routine practice. For example, PCPs more frequently prescribed metformin for their patients with PCOS and insulin resistance because this was seen as part of their routine practice for patients without PCOS (question 6). Gynecologists considered the management of irregular bleeding to be one of their most common and familiar aspects of care, and thus they expressed confidence in various treatment approaches and workup for related complications such as endometrial hyperplasia and malignancy. For PCOS-related infertility, many gynecologists initiated ovulation induction medications before referring to reproductive endocrinologists, and several of them specifically identified letrozole as the medication of choice (question 10).

“If they’re trying to get pregnant, then I take a careful menstrual history, tell them to track periods and send infertility labs. I might do a trial of letrozole up to three months depending on the situation.” (Gynecologist, practicing <1 year)

Screening for Long-Term Complications of PCOS

This theme included provider perspectives on how to monitor patients with PCOS for long-term complications that are well established in this patient population. The international guidelines provide recommendations for screening for comorbidities and sequelae of PCOS (2). The major domains include cardiovascular disease/metabolic syndrome (e.g., monitoring weight at least every 6–12 months, blood pressure monitoring at least yearly); obstructive sleep apnea; and mental illness, including depression, anxiety, and eating disorders.

Barriers. Some gynecologists described not performing metabolic screening, with one commenting that she was

not comfortable performing it because she was not trained in this area. Some deferred to their PCP colleagues to order these tests, although none specifically mentioned a collaborative effort but rather assumed that PCPs were performing this screening (question 3). Neither gynecologists nor PCPs reported routine screening for obstructive sleep apnea or mental illness in women with PCOS, with some noting that the other seemingly more pressing concerns are already time-consuming and labor-intensive. Along the same lines, others noted that there is a tendency to narrow in on one particular aspect of the disorder, with subsequent neglect of other aspects.

“For women who have BMIs between 35 and 50—there’s other things we’re thinking about, maybe we’re not screening as much for their menses, and so we miss it in the context of the diabetes. I could imagine that I don’t do the best job to screen for that.” (PCP, practicing seven years)

None of the providers acknowledged that there are published screening recommendations for women with PCOS.

Facilitators. Most gynecologists and all PCPs checked the levels of lipid and hemoglobin A1c, although the screening frequency varied between three months and two years, with most screening yearly. Primary care physicians evaluated for metabolic complications at closer time intervals than gynecologists and expressed a much higher comfort level in initiating these screenings, stating that this was similar to their practice in patients without PCOS (question 4). Performing these screenings in women with PCOS was seen as a natural extension of their general practice.

“I do routine women’s health screening for their age. I’d pay attention to their diabetes screen and lipids—probably the same frequency as everyone else. But if the tests are abnormal, I’d check every year or so, maybe every 6 months if they’re getting close to a diagnosis.” (PCP, practicing three years)

Counseling on Long-Term Complications of PCOS

This theme focused on the communication between providers and patients surrounding the long-term complications of PCOS. The international guidelines detail many sequelae of PCOS and specify that providers should discuss these with their patients (2). This includes a discussion of increased risks of cardiovascular disease, endometrial cancer, and potential infertility (question 13).

Barriers. Common between gynecologists and PCPs was the barrier of time. Providers commented that PCOS is such a complex disorder with so many potential consequences that it is difficult to touch on all of them, especially given the short duration of the visits and the need to address other issues as well. As a result, gynecologists and PCPs tended to focus on the few issues that were the most pertinent to their field.

“I find it difficult to find time to discuss lifestyle changes that are beneficial to their overall health.” (Gynecologist, practicing three years)

Providers also cited the limited availability of the follow-up visits as a reason that they are unable to counsel patients in person after making a diagnosis.

“Sometimes (my counseling) is over e-mail or through the patient portal ... I do not bring people back for a discussion ... I am completely booked in my patient schedule.”

An additional barrier was a misalignment of provider and patient priorities, with some providers noting that even when they try to comprehensively counsel their patients on long-term complications, it is difficult to communicate their importance fully.

“The biggest challenge is getting women to understand the longer-term risks when they don’t see themselves as having a problem. Like diabetes, cardiovascular disease, and fertility—trying to communicate that to younger women in their 20s is hard.” (PCP, practicing 11 years)

“The biggest challenge is when a patient isn’t trying to get pregnant. It is difficult to convince them to do something about it. Some women think ‘I only have six periods a year and I think that is fine’ but it is difficult to convince them they still need routine contraception and to potentially do more screening.” (Gynecologist, practicing <1 year)

Furthermore, they identified an unmet need for a longitudinal provider-patient relationship, as not all providers are as well-versed in PCOS.

“Definitely the longer-term risks (are challenging) because they require long follow-up. The other stuff is more immediate and pressing for the patient. They’re always bringing up these issues and so they get resolved. But the longer-term risks you have to continue to remember. When they have gaps in care or transition to a new provider, that diagnosis might be dropped because it falls to the wayside.” (PCP, practicing 11 years)

Additionally, one long-term complication that was not uniformly acknowledged was the risk of endometrial hyperplasia and malignancy—although all gynecologists and most PCPs did comment specifically on this risk, some PCPs were unaware (question 11).

Facilitators. Both gynecologists and PCPs placed significant value on counseling their patients on the complications of PCOS (questions 12 and 14). All physicians reported that they discuss long-term risks such as metabolic implications, endometrial hyperplasia, and infertility with their patients. However, gynecologists more frequently reviewed the importance of endometrial protection and the possibility of infertility, whereas PCPs typically emphasized metabolic implications (question 15). Overall, providers tended to emphasize aspects of care that they believed they would be able to successfully address. For example, one gynecologist reported being very comfortable counseling about the impact on fertility because she knows of effective methods for

treating PCOS-related infertility (question 16). Providers also noted that they often use existing resources such as patient support groups and websites to provide additional counseling.

“I explain what it is and print something out for them to go home and read. Then if they have questions, we can follow-up.” (PCP, practicing 13 years)

DISCUSSION

Throughout our interviews of general gynecologists and PCPs, we identified four thematic areas—diagnostic considerations, treatment of symptoms of PCOS, screening for long-term complications of PCOS, and counseling on long-term complications—that offer insight into the barriers and facilitators to implementation of evidence-based guidelines for the diagnosis and management of PCOS.

Among all four thematic areas, one common barrier was the lack of knowledge or training. These results are similar to those of PCP interviews analyzing challenges in the diagnosis of PCOS in a study conducted in Australia (13). The most direct approach in addressing this would focus on educating trainees on the evidence-based guidelines. However, education and evidence dissemination alone may not be sufficient to effect behavioral change on a large scale. Furthermore, as some providers noted, guidelines can change over time and no longer reflect what was taught during training. Some providers also cited lower patient volume as a reason why they did not know the diagnostic criteria or first steps in management. The electronic medical record is a potential tool to overcome these challenges. As one provider mentioned, the existence of order panels to order the appropriate tests. Other studies have shown that clinical decision support systems, technology-based software that supplies patient-specific recommendations for evidence-based care, may help minimize the effect of provider deficiencies in knowledge and experience on practice variation (16). Further studies should explore whether a clinical decision support system standardizing the ordering of diagnostic testing and screening tests in indicated patients or management algorithms for abnormal results can be harnessed to improve the implementation of evidence-based guidelines in the care of women with PCOS.

Additionally, a common barrier among all themes was the role of time constraints and limited in-person appointments. This was prominent particularly in the interview responses on long-term counseling, in which many providers noted that they are unable to perform in-depth face-to-face counseling on the long-term complications of PCOS once they make a diagnosis. For example, both gynecologists and PCPs were aware of the benefits of LSM; however, they identified inadequate time to provide in-depth recommendations and longitudinal follow-up for weight management as a significant barrier to optimal care delivery. There is evidence to suggest that allied healthcare providers such as nutritionists are underused in the care of women with PCOS. For example, one study found that only 15% of women with PCOS consulted a dietician, and only 3% of them had more than two visits (17). Improving access to allied health professionals can enhance the long-term management that patients with PCOS may need without requiring major overhauls of

physician scheduling. Additionally, many providers have mentioned the informal use of new communication methods to perform some of the counseling that could not be delivered in person. New platforms have been developed to provide a more structured counseling and support for patients with PCOS, such as the AskPCOS mobile app, and additional efforts to establish other similarly accessible platforms may enable physicians to provide more comprehensive counseling when in-person visits are limited (18). These strategies may help address the significant dissatisfaction identified in surveys of PCOS related to the lack of long-term counseling.

The last major barrier that was consistently discussed in the interviews was the scope of practice. Prior surveys have indicated differences in practice patterns depending on the physician's specialty (9, 13, 19). Although one provider cannot be reasonably expected to be an expert in all components of PCOS, our semi-structured interviews identified distinct silos in both counseling and treatment offered by gynecologists and PCPs. The interviews further revealed that providers very rarely communicated with providers in other specialties. For example, many gynecologists stated that they were not well versed in recommended metabolic screening tests and perceived this to be outside their practice domain, deferring to PCPs. However, it was unclear whether gynecologists routinely referred patients to see PCP to address this aspect of the disorder that they were not comfortable managing. These responses corroborate findings from a 2016 US survey in which only 20% of general gynecologists reported screening women with PCOS for cardiometabolic complications (20). Similarly, PCPs reported being less comfortable counseling about gynecologic risks such as endometrial hyperplasia and uterine malignancy. Some presumed that the patient's gynecologist would address them; however, there was no coordination of care underlying this assumption. A potential avenue to explore is whether a structured and formalized multidisciplinary care model among different specialties would provide more coordinated and streamlined care.

In conjunction with prior studies, our interviews support the implementation of a multidisciplinary model of care, as recommended in the international guidelines (2). A 2018 systematic review found that multidisciplinary PCOS clinics demonstrate increased weight loss, high patient satisfaction, and high retention compared with single-care providers (21). The multidisciplinary teams typically included endocrinologists, psychologists, dietitians, gynecologists, and specialized nurses. Our finding that gynecologists and PCPs have different and complementary skills supports this proposed model, particularly considering the time and resource limitations that we have identified.

Our study had several strengths. We used semi-structured interviews to build on information obtained from prior survey studies of physicians and trainees practicing both in the United States and worldwide (7, 8, 10, 19, 22). We applied a rigorous approach for qualitative analysis of the interviews and recruited participants until no new themes were identified during the interview process. It is evident that in-depth interviews allow for the identification of several themes, including barriers and controversies, that are not apparent with written surveys (23). To our knowledge, this is also the first study to

directly compare the experiences of gynecologists and PCPs. Most of the survey data on this subject are obtained from general gynecologists and reproductive and medical endocrinologists, with limited information on practice patterns of PCPs. A limitation of our study was the possibility of participation bias, as providers who are interested in or knowledgeable about PCOS may be more willing to participate. However, even in this potentially more informed or experienced group, we identified significant gaps in knowledge and unmet needs. Additionally, although we reached thematic saturation with a small sample size, it is similar to sample sizes in other qualitative studies (13, 24). However, the small sample size did limit our ability to draw comparisons between gynecologists and PCPs. Our findings also reflect the practice patterns of physicians practicing in diagnosis and counseling align with prior survey results from larger cohorts (7, 20).

CONCLUSION

By endorsing the Rotterdam criteria and providing evidence-based recommendations for screening and management of PCOS, the international guidelines have the potential to negate several barriers to standardization of care. On the basis of our findings, it is time for the next stage of research to draw upon principles of implementation science, including comparative effectiveness and hybrid effectiveness-implementation trials, to identify the best way to disseminate guidelines (25). These studies must also assess improvements in patient satisfaction and quality of life. To date, an implementation science lens to the deployment of best practices for PCOS has been understudied, and we anticipate that our study provides a tentative agenda for targeting that lens.

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