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Prevalence and Ultrasonographic Characteristics of Uterine Fibroids among Women with Polycystic Ovary Syndrome in Two Healthcare Centres in the Niger Delta Region of Nigeria: A Cross-Sectional Study

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ABSTRACT

Background: Polycystic ovary syndrome (PCOS) is a common endocrine disorder characterized by menstrual dysfunction, hyperandrogenism and/or polycystic ovarian morphology. Uterine fibroids are benign gynaecological tumours, yet information on their coexistence with PCOS in Nigerian women is limited. This study assessed the prevalence and ultrasonographic characteristics of uterine fibroids among women with PCOS attending two healthcare centres in the Niger Delta region of Nigeria.

Methods: This cross-sectional study was conducted from 1 December 2024 to 31 November 2025 among women with PCOS who presented for ultrasonography and fertility evaluation at two healthcare centres. Women who provided informed consent were recruited. Data were collected using a questionnaire, while transvaginal ultrasonography was used to assess uterine and ovarian morphology and identify uterine fibroids. Data were analyzed using SPSS version 25 and summarized using descriptive statistics.

Results: The mean age was 32.37 ± 6.78 years, and 56% were aged ≥30 years. Nearly half (47%) had a normal body mass index, while 72% were nulliparous. Menstrual dysfunction was common, with oligomenorrhoea reported in 53% and amenorrhoea in 19%. Uterine fibroids were detected in 16% of participants, while 84% had no fibroids. Among participants with fibroids, intramural fibroids were most common (44.4%), followed by subserosal (27.0%), submucosal (11.0%) and pedunculated (5.6%) fibroids. Some participants had fibroids in multiple locations.

Conclusion: Uterine fibroids were present in 16% of women with PCOS, with intramural fibroids being the predominant ultrasonographic type. Larger studies are needed to clarify coexistence and significance of these conditions.

KEYWORDS: Polycystic ovary syndrome; uterine fibroids; ultrasonography; polycystic ovarian morphology.

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is the leading cause of anovulation in women of reproductive age group and a major contributor to infertility in our environment.(1) PCOS was first diagnosed by Stein and leventhal.(2) It is characterized by constellation of signs and symptoms with include, menstrual irregularity like amenorhoea and oligomenorhoea, secondly, hyperandrogenism which present with hairsuitism and acne, thirdly polycystic ovarian morphology an ultrasound diagnosis characterized by presence of ≥12 follicles measuring 2 – 9 mm in diameter in one or both ovaries and/or ovarian volume > 10mls.(3) There are several criteria for making diagnosis, but the widely known and accepted criteria is the Rotterdam Criteria.(4) This entails the presence of 2 out of 3 parameter listed above aid in diagnosis of the condition.(4) The prevalence of polycystic ovarian syndrome ranges from 4 - 21% depending on the criteria used in making diagnosis.(5) The etiology of PCOS is polygenic or multifactorial. Studies have shown pcom is common in young women of reproductive age group.(6)

Patients with PCOS experience metabolic dysfunction, obesity and long term cardiovascular disease. Other complication they experience include high rate of miscarriages, high incidence of Ovarian hyperstimulation syndrome, decreased apgar score of infant conceived via assisted reproductive technology, oligomenorhoea, subfertility, endometrial cancer.(7)(8)(9) This syndrome also has profound impact on the quality of life of the lady and psychological status.(8) When PCOS is diagnosed incidentally in asymptomatic young women, the clinician is faced with the dilemma of the extent it will affect the individuals fertility potential since they are less fertile than women with normal ovarian appearance.(4) Despite this some subset of woman with PCOS has normal fertility potential, they get pregnant without difficulty.(4)

Uterine fibroid is the most common benign tumour of the uterus and they originate from proliferation of the smooth muscle(myomectrium).(10) They are common in women of reproductive age group whom are also at risk of pcom.(2) Fibroids are heterogeneous in pathophysiology, size, location, and clinical symptomatology.(10) They can be Intramural, submucous and

subserosal fibroids and the may be asymptomatic or symptomatic. The symptoms of uterus fibroid are abdominal pain, heavy menstrual bleeding, and compression effect on the surrounding structures and infertility. There are several postulated theories for the development of uterine fibroid, one of this theories is the hormonal theory. Hormones such as estrogen and progesterone have been implicated. Uterine fibroid are commoner in black population and are said to be common with obese individuals. These risk factors are also seen in patients with polycystic ovarian syndrome.(2)

PCOM which is an endocrine disorder is associated with elevated androgens. Androgen is converted to estrogen by aromatase enzyme which may stimulates the smooth muscles of the uterus causing uterine fibroid. The aromatization process is a 3 step stage involve in removal of methyi group at C19 to yield aromatic phenolic ring of estrogen C18. The organs in the body that are involved in aromatization include adipose tissue, ovaries, testes, brain, liver, skin and adrenal glands. Most patients with PCOM have metabolic disorders insulin resistance. Hyperinsulinemia has been shown to be associated with the development of uterine fibroid. A lot of authorities believe that there is a positive relationship between PCOM and uterine fibroid but other authorities do not believe in this relationship between PCOM uterine fibroid.(10) This study assessed the prevalence and ultrasonographic characteristics of uterine fibroids among women with PCOS attending two healthcare centres in the Niger Delta region of Nigeria.

METHODOLOGY

Study Design and Setting

This was a descriptive cross-sectional study conducted over a 12-month period, from 1 December 2024 to 31 November 2025. The study was carried out in Delta State University Teaching Hospital and Shepherd Hospital and Fertility Centre, Warri, Delta State. Both centres provide gynaecological and reproductive health services, including evaluation and management of women presenting with menstrual disorders, infertility and other reproductive health conditions. Pelvic ultrasonography is routinely performed in the centres as part of the evaluation of women with suspected or established gynaecological and reproductive disorders.

Study Population and Participant Recruitment

The study population comprised women with polycystic ovary syndrome (PCOS) who presented to the two study centres for routine pelvic ultrasonography and/or fertility evaluation during the study period. Women who met the eligibility criteria and consented to participate were recruited consecutively until the study sample of 100 participants was attained.

Eligible participants were women with PCOS who presented during the study period and were willing to participate in the study. Women who declined consent and those whose clinical or ultrasonographic information was inadequate for the study were excluded.

Data Collection

Relevant information was obtained using a structured self-administered questionnaire. The questionnaire captured participants' sociodemographic and reproductive characteristics, including age, educational level, parity, fertility history and menstrual pattern. Information on body mass index (BMI) was also obtained and categorized appropriately.

Following completion of the questionnaire, each participant underwent transvaginal ultrasonography as part of her clinical assessment. The examination was used to assess the uterus and ovaries and to determine the presence or absence of uterine fibroids. Where fibroids were identified, their anatomical location was documented. Fibroids were categorized according to their location as intramural, subserosal, submucosal or pedunculated. Where a participant had fibroids in more than one location, this was also documented. The ovaries were assessed for polycystic ovarian morphology and other relevant sonographic features.

Assessment of PCOS and Uterine Fibroids

The diagnosis of PCOS was based on the clinical and/or ultrasonographic findings documented during the participants' evaluation. Particular attention was paid to menstrual dysfunction, features suggestive of hyperandrogenism and polycystic ovarian morphology on ultrasonography.

Uterine fibroids were identified by transvaginal ultrasonography and defined as well-circumscribed uterine masses with characteristic sonographic features. The presence or absence of fibroids was recorded for each participant, together with their anatomical location.

Data Management and Statistical Analysis

At the end of each day's data collection, the completed questionnaires and ultrasonographic findings were reviewed for completeness and consistency. The data were subsequently coded and entered into the Statistical Package for the Social Sciences (SPSS), version 25, for analysis.

Continuous variables were summarized using means and standard deviations, while categorical variables were presented as frequencies and percentages. The prevalence of uterine fibroids was calculated as the proportion of women with PCOS who had fibroids identified on ultrasonography. The distribution of fibroids according to anatomical location was also described.

Relationships between selected sociodemographic or reproductive characteristics and menstrual pattern were assessed using the chi-square test. Where the assumptions for the chi-square test were not met, Fisher's exact test was used. A p-value of less than 0.05 was considered statistically significant.

Ethical Approval

Permission to access hospital records and data for this study was obtained from the hospital management while ethical approval was obtained from the hospital's Health Research and Ethics Committee. Approval Number: HREC/PAN/2025/029/0574.

RESULTS

A total number of 1,895 patients was seen in gynecology clinic during the study period given a prevalence of 52.8%.

Table1: Table showing socio-demographic and obstetrics characteristics

Characteristics		Frequencies (n)	Percentages(%)
Age (years)	18-24	16	16.0
	25-29	28	28.0
	≥ 30	56	56.0
	Mean ± SD	32.37±6.78	
BMI	<18	5	5.0
	18 – 24	47	47.0
	25 – 29	17	17.0
	≥30	31	31.0
Educational level	No formal education	20	20.0
	Primary	17	17.0
	Secondary	43	43.0
	Tertiary	20	20.0
Parity	P0	72	72.0
	P1	21	21.0
	P>2	7	7.0
Fertility	Primary infertility	18	18.0
	Secondary infertility	51	51.0
	No reproductive attempt	31	31.0

Table 1 showed that most of the patients in this study were aged > 30 year and accounted for 56% with a mean age of 32.37 ± 6.78. Most (47%) of the patient had a normal body mass index and were nulliparous (72%). Majority of the patients had secondary infertility this accounts for 51% of the population under study while 31% had to reproductive attempt.

Table 2 – NATURE OF UTERUS and OVARIES

UTERUS	Frequency (n)	Percentages(%)
Normal	84	84.0
Fibroid	16	16.0
OVARIES		
Normal	0	0.0
PCOM	100	100.0

Table 2 showed that of the 100 patients with pcos that was evaluated 84% had no fibroid in their uterus while 16% had fibroid in various locations in the uterus.

Table 3: Menstrual Pattern

Symptoms	Frequency	Percentages (%)
Normal	13	13.0
Oligomenorrhoea	61	61.0
Amenorrhoea	19	19.0
HMB	7	7.0
Total	100	100

Most of the patients presented with complaints of oligomenorrhoea accounting for 61% of the study population. About 13% of the patients had no symptoms. Table 3.

TABLE 4 –

Table 1: Fibroids location as seen with ultrasound scan in pcom patients.

Fibroid Location	Frequency	Percentages (%)
Subserousal	1	6.25
Submucosal	2	12.5
Pedunculated	1	6.25
Intramural	4	25.0
Multiple Location	8	50.0

Some patents had more than one location

Table 4 - Majority of the patients (50.0%) had fibroid located in multiple sites within the uterus.

Table 5. Relationship between body mass index and menstrual pattern

Menstrual Pattern	BMI				P-Value
	<18	18-24	25-29	≥30	
Normal	1	5	4	3	0.31
Oligomenorrhoea	2	34	8	17	
Amenorrhoea	0	5	4	10	
HMB	2	3	1	1	

Table 5 shows the relationship between body mass index and menstrual pattern. It found that there was no statistical significant relationship with a p value of 0.31.

TABLE 6. Correlation between Patients with Menstrual Pattern and Age of Patients

Menstrual Pattern	Age (years)			P-Value
	18-24	25-29	≥30	
Normal	2	5	6	0.001
Oligomenorrhoea	21	11	29	
Amenorrhoea	5	2	12	
HMB	1	5	1	

The relationship between menstrual pattern and age of patients was statistically significant with a p value < 0.001.

DISCUSSION

This was a prospective cohort study involving 100 women who presented to gynecological clinic. The prevalence in this study was 52.8%. This was higher that similar study done in our environment in 2014 that reported an incidence of 12.2% and this could be due to increase health seeking behavior and availability of diagnostic tools (11). The findings shows that most of the women were aged ≥ 30year, this was similar to study done by Ogueh et al(11) in Delta State, Nigeria who reported an age range of 30 – 39yrs. The mean age in this study was 32.37 ± 6.78, this was in accordance to study done by Irani et al(7). PCOM is a genetically mediated condition that causes a array of symptoms, some of which include menstrual irregularity, acne, hairsuitism and infertility. This makes the patients present early to the hospital for evaluation leading to diagnosis of pcom. Most of the patients had normal BMI this was similar to study done by Fujii et al(9). It was initially thought that women who are obese where the once believed to have pcos, however, recent studies has shown that pcom can be present not only in obese individuals, but also in women who have low and normal body mass index. Majority of these patients where nulliparous this was in accordance to findings done by Ogueh et al(11). Most of these patients are young and usually present to the clinic due to the different symptoms that they experience. More than half of the studied population presented with secondary infertility, this was in contrast to study done by Irani et al(7) that revealed primary infertility to be more common among the patients under review. Secondary infertility occurs when the lady has been pregnant in the past irrespective of the outcome. Some patients with infertility still get pregnant spontaneously with any form of assisted reproduction.

This study revealed that not all women with pcom develop uterine fibroid, this was similar to study done by Ogueh et al, but contrary to other study by Uche-Nwachi et al(12) in west indies. Theories have proposed that due to the hormone interplay patient with pcom are prone to developing uterine fibroid. But our finding had shown that this is not true. The aetiology for this finding is not known but it could be that the hormone from pcom that is elaborated by black individual are protective against uterine fibroid development or that genetics may be involved. This is an area for scientific exploration

The most common symptoms in these women were oligomenorrhoea. This was similar to finding from Rshoud et al(13) in Jordan. Oligomenorrhoea occurs in pcom as a result of disruption of hormonal signaling the HPO axis. The hypothalamus releases GnRh in a pulsatile fashion. This goes to stimulate the pituitary gland resulting in high production of LH and less of FSH. FSH is responsible for stimulation of the ovarian follicles and produce oestrogen. Due to the low levels of production of FSH it retards follicular growth these get stuck and are seen as polycystic ovaries. Also because there is no ovulation, there is lack of progesterone production from the corpus leteum. Progesterone usually cause bleeding if no pregnancy. This conditions results in oligomenorrhoea. Other factors that may contribute to oligomenorrhoea is insulin resistance and hyperandrogenism.

Majority of the fibroid in this study were located at various site in the uterus this was in accordance to study done by Usmani et al(3). Pcom does not influence the location of uterine fibroid. The patients with pcos and fibroid may be the obese individuals that elaborate high levels of estrogen through the process of aromatization which in turn stimulates myomectrial fibres that later result in the development of uterine fibroid. Another contributory factor is hyperinsulinemia which causes elevation of testosterone leading to high levels of ostrogen from aromatization, also insulin downregulates the level of SHBG, leading to high levels of androgen in the circulation. For this reason combine oral contraceptive pill is important for this patients as it helps to increase the serum levels of SHBG thereby reducing the effect of hyperandrogenism seen in this patients.(14)

There was no statistical significant relationship between menstrual pattern and body mass index with a $p = 0.31$. This was in contrast to study done by Rshoud et al(13) who revealed that there was a significant positive correlation between the menstrual pattern of patients and their BMI. He further postulated that the higher the BMI, the more the pattern shifted towards abnormal (oligomenorrhoea or amenorrhoea). These abnormalities occurs because there is no ovulation leading to lack of progesterone production from the corpus leteum. Progesterone usually cause bleeding if no pregnancy.

The relationship between menstrual pattern and age of patients was statistically significant with a p value < 0.001. This implies that menstrual irregularity is common with advance age in women with pcos.

CONCLUSION

Uterine fibroids were present in 16% of women with PCOS, with intramural fibroids being the predominant ultrasonographic type. Larger studies are needed to clarify coexistence and significance of these conditions.

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AUTHORS CONTRIBUTION

Criteria for inclusion in the author/contributions list: AAE,OO were involved in study conception and revising the manuscript for intellectual content. AAE and OI was involved in study design and data collection/acquisition while AAE/OO and OI was responsible for statistical analysis. All authors gave final approval for publication.

CONFLICT OF INTEREST

There was no conflict of interest to declare

AVAILABILITY OF RESEARCH DATA

Authors are available and ready to supply the data upon any requests through the corresponding author.

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ETHICAL APPROVAL

Ethical approvals was obtained from the Hospital Research Ethics Committee of Delta State University Teaching Hospital Oghara.

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