A Retrospective Study of Prevalence and Clinical Presentations of Polycystic Ovary Syndrome (PCOS) in Nigerian Women

*Lawrence Chigbata Ikeako[1,2], Cyril Chukwudi Dim[1,3], George Uchenna Eleje[4], Kenechukwu Lawrence Ikeako[5], Tochukwu Christopher Okeke[3], Adaeze Chinenye Ikeako[6], Hyginus Uzochukwu Ezegwui[3], Odidika U.J. Umeorah[7], Ifeanyichukwu Uzoma Ezebialu[8]

Affiliations

1. Institute of Maternal and Child Health, College of Medicine, University of Nigeria Ituku-Ozalla, Enugu, Nigeria
2. Department of Obstetrics and Gynaecology, Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka, Nigeria.
3. Department of Obstetrics and Gynaecology, College of Medicine, University of Nigeria Ituku-Ozalla, Enugu, Nigeria
4. Department of Obstetrics and Gynaecology, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria.
5. Department of Obstetrics and Gynaecology, Life Specialist Hospital, Awka, Nigeria.
6. Department of Obstetrics and Gynaecology, Federal Medical Centre, Asaba, Nigeria.
7. Department of Obstetrics and Gynaecology, Alex Ekwueme Federal University Ndufu-Alike, Ikwo
8. Department of Obstetrics and Gynaecology, Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka, Nigeria.

***Correspondence:**
Prof Lawrence Chigbata Ikeako
Department of Obstetrics and Gynaecology
Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka, Nigeria.

Acknowledgement
This article is a part of the first author's thesis for the PhD in Human Reproduction and Women Health at the Institute of Maternal and Child Health, University of Nigeria.
We sincerely thank all the research assistants for their complimentary roles and also the staff of the Medical Records Department, Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka for pulling out the medical records for analysis. We are grateful for the statistical analysis by Dr Divinefavour Echezona Malachy and the secretarial assistance from Mrs Chimezie Akajiugo

***Abstract**: Polycystic ovary syndrome (PCOS) is the most common endocrinopathy affecting women during the peak of their reproductive career. Common symptoms are irregular menstrual cycles, hirsutism, and acne as well as a plethora of health risks, infertility, diabetes mellitus, endometrial hyperplasia and cardiovascular/ complications.*
Despite the extreme burden and severe impact of PCOS on reproduction and public health, prevalence data remain scarce for specific geographic and racial/ethnic populations. Determining the prevalence of PCOS is also challenging due to the heterogeneity of diagnostic criteria, resulting in inconsistent and varied estimates.

This retrospective analysis was carried out to determine the prevalence and pattern of clinical presentation of PCOS as a guide to early detection and management. Using a pretested data extraction sheet at COOUTH, Awka over a four-years period (2021-2024), 300 women aged 15 years and older with diagnosis of PCOS based on Rotterdam criteria were analyzed for sociodemographic profile and clinical presentations.

Results,

The study found a prevalence of 11.13% (95% Confidence Interval 10-12.27%) with common features including irregular menses 70.3% and hirsutism 12.7%. There was significant association between PCOS and the age bracket 26-35years ($p<0.01$), urban residence, ($p<0.01$) and student population, ($p<0.01$). Analysis of clinical presentation showed increasing yearly prevalence from 8.3% in 2021 to 11.13% in 2024.

Conclusion: the study shows a significant presence of PCOS among patients attending gynaecological clinics in COOUTH, Awka. This highlights the need for targeted screening and management strategies for PCOS in Nigerian women.

Keywords

Polycystic Ovary Syndrome, Prevalence, Clinical Presentation, Menstrual irregularity, Hirsutism, Acne

1.**Introduction**

Polycystic ovarian syndrome (PCOS) is the most common endocrinopathy with manifestations occurring in women during the peak of their reproductive career. Clinically, there is a wide range of symptoms such as acne, hirsutism, alopecia, infertility, menstrual irregularities and ultrasound characteristics typical of polycystic ovarian morphology (PCOM) [1].

Over weight is a known risk factor for developing PCOS, and 5 - 10% loss of weight has been shown to have a salutary effect in the management of PCOS [2].

PCOS has a complex and ill-understood pathophysiology. This involves a complex relationship between genetic, endocrine and environmental factors, embracing insulin resistance, hyperandrogenism and ovarian dysfunction resulting hormonal imbalance (high LH / low FSH) and metabolic issues [3]. This ultimately sets up a vicious cycle where insulin resistance stimulates ovarian androgen production, causing irregular ovulation and symptoms like irregular periods, excess hair (hirsutism), and acne often worsened by obesity and chronic inflammation [3].

The diagnosis of PCOS involves the application of diagnostic criteria that embodies clinical or biochemical hyperandrogenism, evaluation of ovarian morphology and menstrual irregularities [4]. The prevalence of PCOS is a function of the diagnostic criteria used [4]. Applying the Rotterdam criteria, the prevalence is situated between 4% and 21%, whereas the National Institute of Health (NIH) criteria place the prevalence 2 - 3times lower at 4 - 6.6% [5]. In a cross-sectional study, patients were labelled as PCOS based on the fulfilment of the criteria as per Rotterdam, NIH and Androgen Excess -PCOS Society (AE - PCOS Society).[6] Of these participants, 25.7%, 28.5% and 62.8% were diagnosed with PCOS using NIH, AE-PCOS and Rotterdam criteria respectively, showing highest prevalence was recorded using the more liberal Rotterdam criteria compared to the more restrictive NIH criteria [5,6].

PCOS was first described by Stein and Leventhal in 1935 noting its association with anovulatory infertility, amenorrhoea, hirsutism and obesity in addition to enlarged ovaries with the typical multiple subcapsular small cysts (usually 2 - 9cm in diameter) arranged around the periphery of the ovary, resembling a string of pearls [4]. Subsequently, the NIH in 1992 proposed a combination of clinical or biochemical hyperandrogenism and menstrual cycle irregularities as basis for diagnosis of PCOS [7]. All other causes of hyperandrogenism were excluded.

In 2003, Rotterdam consensus group announced a redefinition requiring at least two of the following criteria: oligo-anovulation clinical or biochemical hyperandrogenism and ultrasound features for diagnosis [7]. The androgen excess society in 2006 suggested that clinical or biochemical hyperandrogenism must be associated with ovarian dysfunction or polycystic ovarian morphology to diagnose PCOS [4]. As a result of the varied diagnostic criteria, there is a unique challenge in determining the prevalence of this syndrome. Several patients are often not properly categorized inspite of several visits to the hospital [8].

Despite the heavy burden and severe impact of PCOS on reproduction and public health, prevalence data remain scarce for specific geographic and racial/ethnic populations [8]. Determining the prevalence of PCOS is also challenging due to the heterogeneity of diagnostic criteria, resulting in inconsistent and varied estimates [8].

This retrospective study was necessary to establish the prevalence and pattern of clinical presentation of PCOS in our institution to aid early detection, direct resource allocation as well as help put in place targeted health strategies to avert the increased risks of morbidities associated with the disease.

2. Methodology

Study design

This was a hospital - based retrospective analysis of data extracted from records of women who were diagnosed with PCOS according to Rotterdam criteria, from 1st January 2021 – 31st December 2024.

Study site

The study was carried out at the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Awka, southeast Nigeria. Awka is the capital of Anambra State, located in the southeastern part of Nigeria. With a population of 301,657 as of 2006, Awka is a rapidly developing urban centre [9]. Awka lies below 300 metres above sea level in a valley on the plains of Mamu River and has a tropical climate with two main seasons, the dry and the rainy season. The city is mainly inhabited by Igbos whose main occupations are civil service, trading and subsistence farming, while at the periphery are the Hausa ethnic group engaged in cattle rearing. COOUTH is a tertiary health institution established by Government of Anambra State in 2012. The Hospital receives referrals from neighboring states and several fee-for-profit private medical institutions in and around the town. The Laboratory department has over 30 laboratory scientists and technicians, and has Enzyme Linked Immunosorbent Assay (ELISA) equipment capable of carrying out enzyme linked Immunosorbent procedures, hormonal assays, thyroid function tests, and liver function tests. A study in COOUTH, Awka showed that 21.3% patients in the gynaecology clinic presented with primary infertility while 68.7% had secondary infertility [10]. The average number of first visits per month for gynaecological services is about 240.

Inclusion criteria

Premenopausal women aged 15 years and older diagnosed with PCOS, and whose records of diagnosis and management are available for review at the study centre. Those who needed medications (that is, progesterone) to achieve vaginal bleeding were also included.

Exclusion criteria

Women using hormonal contraception and women with other endocrine abnormalities that may simulate PCOS such as hyperprolactinaemia, hyperthyroidism, late onset congenital adrenal hyperplasia and idiopathic hyperandrogenism.

Sample population

This consists of women diagnosed of PCOS using the Rotterdam criteria and received medical attention in COOUTH between 1st January 2021 and 31st December 2024.

Sample size determination

The sample size was determined using statistical formular for descriptive cross-sectional study [11].

$$N = \frac{Z^2 P(1-P)}{d^2} \quad (1)$$

Where:
N= is the required sample size
Z= the Z- statistic corresponding to the desired confidence level (1.96 for 95% confidence level)
P= is estimated prevalence from a previous study [12].
d= is the desired margin of error (precision)
Using
Z= 1.96 for 95% confidence level
P= Prevalence, 18.1%s
d= desired margin of error of 5% (d=0.05)
N= sample size

$$N = \frac{1.96^2 \times 0.18 \times 0.82}{0.05^2} \quad (2)$$

N= 228
The minimum sample size is 228.
Assuming a missing data rate of 10%, the final sample size shall be approximately 251.

3. Data collection

Data were collected using a pretested data extraction sheet. The data extraction sheet was validated in a pilot study on similar PCOS patients in a nearby health institution and few typographical errors observed were corrected. Socio-demographic data (age, occupation, marital status, occupation, employment status, place of origin (urban or rural), ethnic group, family history of PCOS), laboratory values (hormone profile), anthropometric variables like height in metres, weight in kilograms and body mass index (BMI) calculated as weight in kilograms divided by the square of the height of the height in metres, and clinical features (symptoms on presentation, type of infertility, duration of infertility, hyperandrogenic features such as hirsutism, acne etc.) were extracted from the archives of the medical records department. The recorded ultrasonic parameters (e.g. polycystic ovaries and presence of other pelvic masses) were also extracted. Also obtained from the patient records were the yearly attendance of PCOS patients from 2021 to 2024.

4. Measurements/definitions

Oligomenorrhoea was recorded as menstrual cycles longer than 35 - 40 days with only 4 - 9 periods or when the woman has not had any menstrual flow for three consecutive months in the preceding year [9]. Clinical hyperandrogenaemia was accepted as hirsutism (abnormal or excessive hair growth on the face, abdomen and thighs), acne and alopecia.
The ultrasound diagnosis of PCOS was based on the Rotterdam criteria of 10 or more subcapsular follicles measuring 2-9mm and ovarian volume greater than 10 m^3.

Infertility was accepted as inability to conceive after one year or more of uninhibited sexual intercourse. It is primary infertility when there have not been any pregnancies and secondary when there have been pregnancies irrespective of outcome.
Hyperandrogenaemia was defined as elevated circulatory testosterone > 86.0ng/ml, hypothyroidism as TSH > 6.21mIU/L, elevated LH as LH > 25.5 mIU/mL and elevated LH/FSH as LH/FSH > 2.
Hyperprolactinaemia was accepted as prolactin levels > 25.5ng/ml.
BMI (Body mass index) was classified as underweight < 18.5 kg/m^2, normal 18.5-22.9 kg/m^2, overweight 23-24.9 kg/m^2 and obese > $25kg/m^2$.

5. Data analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, N.Y., USA). The distribution of continuous variables was assessed for normality using the Kolmogorov-Smirnov test, which revealed that age, BMI, and all hormonal parameters (LH, FSH, TSH, Prolactin, Estradiol, Testosterone, and Progesterone) followed a non-normal distribution with $p < 0.01$.
Descriptive statistics were utilized to summarize the clinical and sociodemographic characteristics of the study population. The prevalence of PCOS was calculated as a percentage of the total clinic population with a 95% Confidence Interval. Sociodemographic data, including age groups, BMI categories, place of origin, ethnicity, occupation, marital status, and parity, were presented as frequencies and percentages. Due to the non-Gaussian distribution of continuous data, age and BMI were also expressed as median and interquartile range (IQR).

The clinical symptoms/signs of PCOS, such as oligomenorrhea, hirsutism, and acne, alongside the fertility profile were reported using frequency distributions. Hormonal profiles were categorized into low, normal, and high levels based on laboratory reference ranges and summarized as frequencies and percentages, with central tendencies expressed as median and IQR.

6. Outcome measures

The primary outcome variable shall be prevalence of PCOS. Secondary outcome variables shall include the predictors (demographic, clinical and hormonal characteristics).

7. Ethical clearance

The research was conducted after obtaining ethical clearance from the Ethics Committee of COOUTH, Awka and presented with a certificate dated on 16th February 2025 to conduct the study.
Informed consent was not sought as there was no direct contact with the patients.

8. Results

Of the 2695 patients who presented in the gynaecology clinics, 305 met the Rotterdam diagnostic criteria for PCOS giving a prevalence of 11.13%. However, only 300 folders (98.7%) had complete data for analysis.

Table 1. Prevalence of PCOS in study population

Metric	Value
Number of PCOS Cases (n)	300
Total Clinic Population (N)	2,695
Prevalence (%)	11.13%
95% Confidence Interval	10.00% – 12.27%

The median body mass index (BMI) (IQR) was **25.0 (23.1-27.6)** kg/m^2 . The patients were aged between 15 and 45years and the median (IQR) age was 26.6 (21-32.7) years.

Table 2 shows the demographic profiles of the patients. The age bracket 26-35 years had relatively higher proportion of PCOS patients, 175(58.3%) compared to either the 15-25 years, 84(28.0%) or 36-45 years age group 41(13.7%) $p < 0.01$.

The students showed the highest prevalence rate 88(29.3%) and the least was among the civil servants, 61(20.3%), $p < 0.01$.

BMI was classified as underweight <18.5kg/m^2, normal 18.5-24.9kg/m^2, overweight, 25-29.9kg/m^2 and obese 30kg/m^2. From our study underweight, 44 (14.7), normal weight 106 (35.3), overweight 118 (39.3) and obese 32(10.7) $p< 0.01$.

The Igbo ethnic group had the highest proportion of PCOS patients 148(49.3%), with the Yoruba ethnic group posting the least, 59(19.7%), $p <0.01$.

Two hundred and twenty-one (73.7%) were from the urban area compared to 79(26.3%) from the rural setting and the difference was statistically, $P< 0.01$.

About 92(30.5%) of the patients had first degree relatives with positive history of PCOS. The rest 208(69.5%) did not have first degree relatives with such history. The difference was statistically significant, $p<0.01$

The marital status was classified as single 110(36.7%), married 85(28.3%), separated 50(16.7%), divorced 45(15.0%) and cohabiting 30(10.0%).

Two hundred and one (67.0%) were nulliparous, para 1-2, 80(26.7%%), para 3-4, 59(19.7%) and para ≥5, 40(13.3%). The prevalence was statistically significantly higher in participants of lower parity, $p < 0.01$.

Table 2. Socio demographic characteristics

Variable	N=300	X^2(*p* values)
Age (years)	frequency (%)	
15-25	84 (28.0)	
26 – 35	175 (58.3)	
36-45	41 (13.7)	61.58 (<0.01)
	Median (IQR) 26.6 (21-32.7)	
Occupation		
House wife	65 (21.7%)	
Student	88 (29.3%)	
Farming	76 (25.3%)	
Civil servants	61 (20.3%)	
Others	10 (3.3)	72.28 (<0.01)
Ethnic group		
Hausa	69 (23.0%)	
Ibo	148 (49.3%)	
Yoruba	59 (19.7%)	
Others	24 (8.0%)	1185.12 (<0.01)
Place of origin		
Urban	221 (73.7)	
Rural	79 (26.3)	32.01 (< 0.01)
BMI		
Underweight	44 (14.7)	
Normal weight	106 (35.3)	
Overweight	118(39.3)	
Obese	32(10.7)	158.53 (0.01)
	Median (IQR) 25.0 (23.1-27.6)	
Family history of PCOS		
Positive	92(30.5%)	
Negative	208 (69.5%)	43.61(<0.01)
Marital status	No (%)	
Single	110 (36.7)	
Married	85 (28.3)	
Separated	50 (16.7)	
Divorced	45 (15.0)	
Cohabiting	10(3.3)	547.83(<0.01)
Parity	**No (%)**	
0	151 (67)	
1–2	80 (26.7)	
3–4	59 (19.7)	
≥ 5	40 (13.3%)	226.42 (<0.01)

Table 3 shows the yearly prevalence throughout the period of study, 2021-2024.
The prevalence of PCOS rose from 224 (8.3%) in 2021, through 294 (10.9%) in 2023 to 300 (11.14%) in 2024.

Table 3. yearly prevalence of PCOS patients

Year	No (%	
2021	224(8.3%)	
2022	248 (9.2%)	
2023	294 (10.9%)	
2024	304 (11.14%)	
Total	2695 (100%)	42.61(<0.01)

Table 4 shows the clinical presentation and fertility profile of the PCOS patients.
Sixty-nine (23.0%) had normal pelvis, 182 (60.7%) had ultrasound features of PCOS using the Rotterdam criteria and 49 (16.3%) had other pelvic pathologies. One hundred and ninety-four (64.5%) of the women had infertility of which 131(43.7%) were primary infertility.
Menstrual irregularity, 217(70.3%) was the commonest clinical symptom. Others were oligomenorrhea 158 (52.8%), dysmenorrhea 69 (23.0%), hirsutism and acne that were present in 38 (12.7%) each of our patients.

Table 4. Clinical presentation and fertility profile of the PCOS patients (N=300)

Variable	**YES (no /%)**	**NO (no /%)**	**X^2 (p value)**
Ultrasound features			
Normal pelvis	69(23.0)	231(76.0)	
Polycystic ovaries	182(60.7)	118(39.3)	
Other pelvic pathologies	49(16.3)	251(83.7)	41.27 (<0.01)
Symptoms/signs			
Oligomenorrhea	158(52.8)	109(26.3)	56.3 (<0.01)
Menstrual irregularity	211(70.3)	89(29.7)	49.61 (<0.01)
Acne	38(12.7)	262(89.1)	14.13 (<0.01)
Dysmenorrhea	69(23.0)	231(77)	87.48 (<0.01)
Amenorrhea	53(17.7)	172(57.3)	158.41 (<0.01)
Hirsutism	38 (12.7)	262(87.5)	25.12 (<0.01)
Fertility profile			
Infertility	194(64.7)	106 (35.3)	**49.61 (<0.01)**
Primary	131(43.7)	169 (56.3)	40.33 (<0.01)
Secondary	63(21.0)	237 (79)	15.41 (<0.01)
Desire to conceive	190 (63.3)	110 (21)	35.13 (<0.01)

Table 5 shows the hormonal profile of the patients.
Two hundred and ninety-two (97.3%) of the patients had high testosterone with median (IQR) 20.7 (15.825-24.2) ng/Dl. Additionally, 104(34.7%) had high luteinizing hormone (LH), median (IQR) 12(10.2-15.1) and only 27(9) had elevation of FSH.

Table 5. Hormonal profile of participants

	Low	Normal	High	
	n(%)	n(%)	n(%)	Median (IQR)
LH	3(1)	93(64.3)	104(34.7)	12(10.2-15.1)
FSH	28(9.3)	245(81.7)	27(9)	8(6.1-9.7)
TSH	3(1)	284(94.7)	13(4.3)	2.1(1.7-2.6)
Prolactin	32(10.7)	244(81.3)	24(8)	10.55(7.1-16.9)
Estradiol	90(30)	207(69)	3(1)	35.3(20.125-48)
Testosterone	2(0.7)	46(15.3)	252(84)	20.7(15.825-24.2)
Progesterone	23(7.7)	277(92.3)	0(0)	6.7(3.9-8.99)

9. Discussion

The prevalence of 11.13% established in our study based on Rotterdam criteria agrees with previous reports from Ilorin, Nigeria [13]. The prevalence was however higher than the 2.5% obtained among Omani women [14]. A higher prevalence of 47.5% was reported on the Southern part of US [15]. In western countries, prevalence rates are higher because most studies are community-based which include wider population, capturing more cases, including mild and asymptomatic ones, whereas hospital-based studies focus on more severe cases seeking medical care [15]. The difference in prevalence may also be related to race, region, economic and cultural diversity, as well as differences in study protocols and methodologies [15].

About 50.0%% of our patients had high BMI. This agrees with other reports from Nigeria [16], but differs with the higher values from western countries [15]. This has been attributed to differences in life style and dietary habits which may influence development of PCOS by causing obesity [15]

The median (IQR) age of the patients was 25(21-32.7) years and this agrees with other studies [13,16]. The median age revolves around the peak age of reproduction in our setting.

Analysis of age distribution in our study showed a decline in prevalence from 58.3% in 26 - 35 age bracket to 13.7% beyond 36 years of age. A similar decline in the prevalence of PCOS was observed among Omani women suggesting age may be related to the development of PCOS [14]. It has been suggested that at the peak age of reproduction, the endocrine glands are working optimally and this declines precipitously around the age of 34 years [17]. In addition, marriage in our setting occurs during this period and problems relating to the desire to conceive make these patients seek gynaecological consultations [10,18]. This study showed that 64.7% of the patients had infertility of which 43.7% were primary infertility. Similarly, in a systematic and meta-analysis among infertile women in the Gulf Cooperation Council (GCC) countries, primary infertility was associated with higher PCOS prevalence than secondary infertility [19]. PCOS is one of the leading causes of infertility related to ovulation disruption and accounts for 55% to 70% of cases resulting from chronic anovulation [1].

Our study revealed a rural/urban dichotomy in the prevalence of PCOS with higher values in the urban area. Similarly, a cross-sectional study in India showed that 24% of women with PCOS resided in urban regions, compared to 12% in rural regions amongst the total PCOS cases identified [20]. Though 75% of the population live in rural areas in our setting, health services including the well-equipped specialist centres with efficient diagnostic aids are concentrated in urban area and are poorly utilized by rural dwellers who are not aware of their existence [17]. The different life style and dietary habits in the rural and urban areas may be contributory. Women in rural areas are predominantly subsistence farmers and are more likely to be exposed to pollutants including smoke and pesticides that have detrimental impact on women reproductive health and may initiate or worsen PCOS and the related symptoms [13].

This study revealed a higher prevalence of PCOS among the Igbo ethnic group and this may be due to the predominance of this ethnic group in the area of study. A recent study in India, however showed that

south Indian women have a greater prevalence of PCOS (about 32.11%) than the national average, suggesting likely effect of regional and ethnic differences in the epidemiology of PCOS [21].

The highest prevalence of PCOS in this study was among the students (29.3%). A meta-analysis of studies in China revealed a similar trend with students and medical staff (16.37%) posting higher rates [21]. Students experience enormous changes in life style, stress and physical inactivity, which culminate in weight gain that predispose to PCOS. In addition, owing to transition from adolescence to adulthood, students experience hormonal fluctuations occasioned by this change [22].

Yearly analysis of prevalence showed a gradual increase in number of patients with PCOS from 2022 (9.3%) and 2023, (10.9%) to 2024 (11.14%). The upward trajectory of PCOS is driven by better diagnostics and lifestyle factors like obesity, leading to a greater public health challenge, especially in higher socioeconomic regions, though it affects diverse population [23]. In addition, the adoption of broader diagnostic criteria, such as the Rotterdam criteria (2003) used in this study centre, may have led to more women being diagnosed compared to older, rigid criteria (NIH 1990 criteria) [4].

About 30.5% of the patients had first degree relatives with history of PCOS. In their clinical evaluation of 78 mothers and 50 sisters, Kasher et al [24] established that 19(24%) and 16(32%) were affected with PCOS respectively, although the risk was higher when untreated premenopausal women were considered only. PCOS cases however, have been shown not to follow a clear pattern of Mendelian inheritance [24]

The commonest clinical manifestation of PCOS in our study was menstrual irregularity 70.3% manifested as oligomenorrhoea (52.8%) and amenorrhoea (17.7%), and clinical hyperandrogenic features reflected as hirsutism (12.5%) and acne (10.9%). The high prevalence of oligomenorrhoea and amenorrhoea in our study agrees with the prevalence of the 70% to 80% observed in a review by Letscher and Decherney [8], and the 80 - 90% in studies involving Korean women with PCOS [25]. Menstrual irregularity begins in adolescence but is often controlled by therapeutic measures using oral contraceptives [8]. The high prevalence of menstrual irregularity in our study, 70.3% may be due to the preponderance of students experiencing hormonal fluctuations due to transition from adolescence to adulthood and also young women in their reproductive years seeking evaluation due to infertility on discontinuation of the hormonal treatment [21]. Primary infertility was observed in 43.7% of our patients, and this is in line with several studies which have shown higher prevalence of primary infertility probably due to chronic anovulation from PCOS [24].

Hyperandrogenaemia, observed in 84% of our patients typically manifests clinically as hirsutism, defined as the presence of unwanted terminal hair growth in a male pattern [8]. Hirsutism as assessed by Ferriman Garriway score was seen in 12.7% of patients in this study and this was higher than the 10% reported in a large sample of African American women [8] The manifestation of hirsutism varies depending on the geographical region, ethnicity and genetics [8]. In the current study, acne vulgaris was also seen in 12.7% of the women., In a systematic review of prevalence of acne in mainland China, higher pooled, overall prevalence rates of acne (39.2%) with the rate of 50.2% among primary and secondary students was reported [26].

The higher proportion of patients with elevated levels of LH, 34.7% than those elevated FSH 9% is in sync with the biochemical picture of PCOS [7]. The elevated levels of, LH led to an increased LH/FSH ratio, excess androgen production in the ovaries disrupting follicle development and ovulation [3]. This may have been responsible for the increased levels of oligomenorrheic menstrual cycles in this study, 52.8%.

Our study showed that 60.7% had diagnostic features of PCOS manifested as 10 or more subcapsular follicles, 2 - 9mm in diameter and increased stromal volume. This was higher than the 33.3% reported in black women presenting with infertility in Zimbabwe [27]. There are however wide variations depending on probe frequency, cut-off threshold (≥12, ≥ 20 or ≥ 25 follicles), patient features (obesity or adolescence) and operator proficiency [28].

This study has a few limitations. First, it was a retrospective study of symptomatic patients of PCOS who sought for care in single institution. It may not be possible to extrapolate our findings to mild and moderate cases in the community.

In addition, many folders had incomplete entries, and some of the patients were not properly recorded as having PCOS and were screened out, making it impossible to establish a true prevalence.

Conclusion:

Our retrospective study has helped to determine the prevalence and pattern of clinical presentation of PCOS in our teaching hospital and it is expected to form a foundation for a community-based prospective study to explore its full impact in our area. This study highlights the need for targeted screening and management strategies for PCOS in Nigerian women.

Conflict of interest statement

The authors have reported no conflicts of interests exist.

Acknowledgement

We sincerely thank all the research assistants for their complimentary roles and also the staff of the Medical Records Department, Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka for pulling out the medical records for analysis. We are grateful for the statistical analysis by Dr Divinefavour Echezona Malachy and the secretarial assistance from Mrs Chimezie.

10. References

1. H.S. Omar, N. Batchu, A. M. Ali, F.G..Uisso, E. Maro, and B..Msuya. ‘’Prevalence, clinical patterns and associated risk factors of polycystic ovarian syndrome among women seeking fertility treatment at Kilimanjaro Christian medical centre Hospital, Northern Tanzania’’. Int J Gynecol Obstet., vol 170, no. 3 (2025), pp. 1205 – 1213.

2. A. Dzienny and D. B. Seifer, “Impact of reducing obesity in PCOS methods and treatment outcomes” J Pers Med., vol 15, no.11 (2025), p. 518 doi:10.3390/jpm15110518.

3. M. Harada. ‘’Pathophysiology of polycystic ovary syndrome revisited: Current understanding and perspectives regarding future research’’. Reproductive Medicine and Biology., vol 21, Issue 1, (2022), e12487. https://doi.org/10.1002/rmb2.12487

4. S. Chang and A. Dunaif. ‘’Diagnosis of polycystic ovary syndrome: which criteria to use and when?’’ Endocrinol Metab Clin North Am., vol 50, no.1 (2021), p. 23. doi.10.1016/j.ecl.2020.10.002.

5. G. Bozdag, S. Mumusoglu, D. Zengin, E. Karabulut and B. O. Yildiz. ‘’The prevalence and phenotype features of polycystic ovary syndrome: a systematic review and meta-analysis’’. Hum. Reprod., vol 31, no.12, (2016), pp. 2841-2855.

6. N. Singh, N. Hoga, A. Yadav, P. Bairwa, A. Jaiswal. “Comparison of the various criteria used in polycystic ovary syndrome”. Int J Reprod Contracept Obstet Gynecol., vol 11, no. 8, (2022), pp. 2180-2183.

7. E.S. Dason, O. Koshkina and M. Sobel. “Diagnosis and management of polycystic ovarian syndrome”. CMAJ., vol 196, no. 3, (2024), pp. E85-E94.

8 W.M. Wolf, R.A. Wattick, O.N. Kinkade and M.D. Olfert. “Geographical prevalence of polycystic ovary syndrome as determined by region and race/ethnicity” Int J Environ Res Public Health., November 20, vol 15, no.11 (2018), p. 2589. Doi: 10.3390/ijerph15112589

9 National Population Commission (NPC (Nigeria) and ICF International. 2018. Nigeria Demographic and Health Survey 2018. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF International pp 46-80

10 L. C. Ikeako, O. Iteke, H.U. Ezugwu and T.C. Okeke. "Clinico-Demographic Indicators of Depression among infertile women in a Tertiary Health Institution in Awka, southeast Nigeria" *BJMMR*. vol 7, no.11 (2015), pp. 921-931.

11. J. Charan and T. Biswas. ''How to calculate sample size for different study designs in medical research.'' Indian J Psychol., vol 35, no. 2, (2013), pp. 121-126.

12. G. O. Ugwu, C.A. Iyoke, H.E. Onah and S.G. Mba. "Prevalence, presentation and management of polycystic ovary syndrome in Enugu, Southeast Nigeria". Niger J Med., vol 22, no. 4, (2013), pp. 313-6.

13 L. P. Omokanye, O .A. Ibiwoye-Jaiyeola, A. W. O. Olatinwo, I.F. Abdul, K.A. Durowole and S. A. Bilaminu. ''Polycystic ovarian syndrome: Analysis of management outcomes among infertile women at public health institution in Nigeria'': NJGP (internet)., vol 13, no. 2, (2015), pp.44-8.

14 M. A. Khaduri, Y. A. Farsi, T.S.A. Najjar and V. Gawri. "Hospital-based prevalence of polycystic ovarian syndrome among Omani women''. Middle East Fertil Soc. J., vol 19, no.2, (2014), pp.135-138.

15 M. Rao, K.S. Broughton and M. J. Lemieux. ''Cross-sxzrewdnectional study on the knowledge and prevalence of PCOS at a multiethnic university". Progress in Preventive Medicine 202 vol 5, no. 2, (2020) https://doi.org/10.1097/pp9.0000000000000028.

16 AO Akinpelu, OO Oyewole, BA Adekanle. "Body size perceptions and weight status of adults in a Nigerian Rural Community'. Ann Med Health Sci Res., vol 5, no. 5, (2015), pp. 358 - 364.

17 A. Owen, K. Carlson and P. B. Sparzak . "Age Related fertility decline". 2024: In: Stat Pearl [Internet]. Treasure Island (FL) Stat Pearls Publishing, (2025) Jan-. PMID 35015465

18 Nigeria: Child marriage violates Girl's Right. Available at: https://www.hrw.org/news/2022/01/17/nigeria-child-marriage-violates-girls. Last accessed 22nd December 2025.

19 Z. Alam, S. Alseari, M. Alameemi, M. Alzaabi, R. Akhoori, Ostlundh, and R. Melhem et al. "Prevalence of polycystic ovary syndrome among infertile women in the Gulf Cooperation Council (GCC) countries: A systematic review and meta-analysis". Heliyon volume 10, Issue 24, 30 December 2024, e40603 http://doi.org/10.1016/jheliyon.202 4.e4603

20 S. Balaji, C. Amadi, S. Prasad, J. E. Kasav, V. Upadhyay and A. K. Singh et al. "Urban-Rural comparison of PCOS burden among adolescent girls in hospital setting in India". Biomed Res Int 2015; 2015;158951 doi:10.1155/2015/158951

21 S. Sengupta and V. Khandelwal. "Polycystic ovary syndrome in ethnic populations of India-A comprehensive meta-analysis and review". Universal J Pub Health., vol 12, no. 4, (2024), pp.619-635.

22 W. Gao, J. Gao, D. Bai, Z. Yang and Q Liao. ‘’The prevalence of PCOS in Chinese women: a meta-analysis”. Ann Palliat Med., vol 10, no. 1, (January 31, 2021), pp.74-87.

23 J. Wang, B. Wang, C. Li, T. Meng, C. Liu and J. Chen et al. “Evolving global trends in PCOS burden: a three-decade analysis (1990-2021) with projections to 2036among adolescents and young adults”. Front Endocrinol (Lausanne)., 2025 May 12;16: 1569694. Doi. 10.3389/fendo.2025.1569694

24 M. D, Kasher-Miller, C. Nixon, L. R. Boots, R. C. Go and R. Azziz. “Prevalence of polycystic ovary syndrome (PCOS) in first-degree relatives of patients with PCOS”. Fertil Steril J., vol 75 no. 91, (2001), pp 53-58

25 Y. Kim, J.Y. Chang, S. Kim, M. Yoon, J. Ha and K.H. Um. “Prevalence and risk factors of menstrual disorders in Korean Women”. Healthcare., vol 13, no..6, (2025), p.606; https://doi.org/10.3390/healthcare13060606.

26 D. Li, Q. Chen, Y. Liu, T. Liu, W. Tang and S. Li. “The prevalence of acne in Mainland China: A systematic review and meta-analysis” BMJ Open., vol 7, no.4, (2017), e015354 doi:10.1136/bmjopen.2016.01534

27 J. Mavondo, G. A. Mavondo, F. F. Chikuse, B. N. Mkhwanazi, P. Mdlongwa and B. T. Rakata. “Prevalence and ultrasound presentation of polycystic ovarian syndrome in Black African women presenting with infertility”: A case of women in referral health institutions in Bulawayo, Zimbabwe. Asian j Pregnancy and Childbirth., vol 3, no. 1, (2020), pp. 124-140

28. S. I. Michele, A. M. Fulghesu, E. Pittui, M. Cordella, E. Sicila and G. Mandurino et al. Ultrasound assessment in polycystic ovary syndrome diagnosis: from origins to future perspectives - A comprehensive review”. Biomedicines., vol 13,), no. 2, (2025), p.453: https//doi.org/10.3390/biomedicines13020453