ASSESSMENT OF THE KNOWLEDGE, AWARENESS AND DETERMINANTS OF POLYCYSTIC OVARY SYNDROME (PCOS) AMONG FEMALE UNDERGRADUATE STUDENTS AT THE UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

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DECLARATION

I hereby declare that this project work titled '**ASSESSMENT OF THE KNOWLEDGE, AWARENESS AND DETERMINANTS OF POLYCYSTIC OVARY SYNDROME AMONG FEMALE UNDERGRADUATE STUDENTS'** at the University of Benin Edo State was conducted under the supervision of Dr. O. E. OBARISIAGBON and has not been submitted anywhere else for the award of a degree or certificate.

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CERTIFICATION

This is to certify that this research study titled '**ASSESSMENT OF THE KNOWLEDGE, AWARENESS AND DETERMINANTS OF POLYCYSTIC OVARY SYNDROME AMONG FEMALE UNDERGRADUATE STUDENTS AT THE UNIVERSITY OF BENIN**' was carried out by **OGBONNA CHIOMA PRECIOUS** with matriculation number **MED1706245** under supervision of Dr. Mrs. O.E. Obarisiagbon, in the Department of Public Health and Community Medicine, School of Medicine, College of Medical Sciences, University of Benin, Benin City, Edo State, Nigeria as part of the requirements for the award of Bachelor of Medicine, Bachelor of Surgery (MBBS) degree.

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TABLE OF CONTENTS

DEDICATION

This study is dedicated to God for His grace, which was more than sufficient to achieve all the goals that were set on this journey and for always showing me that He is with me. To my supervisors and teachers, whose wisdom and insight were invaluable throughout this study process. And to my family for their overwhelming love and support. This work is also dedicated to every woman silently battling PCOS—I hope that this study, even in a small way, helps to raise awareness and bring hope.

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LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

PCOS	Polycystic Ovarian Syndrome
CDC	Centre for Disease Control
SPSS	Statistical Package for Scientific Solutions
WHO	World Health Organization
UAE	United Arab Emirates
UBTH	University of Benin Teaching Hospital

DEFINITION OF TERMS

I. Anovulation - Failure of the ovaries to release an egg during a menstrual cycle

II. Hirsutism - Unwanted male pattern hair growth in women.

III. Reproductive age - All women between the ages of 15-49years

IV. Hyper-androgenism - High levels of androgen the male hormone

V. Metabolic syndrome - A group of conditions that elevate the risk to cardiovascular diseases and diabetes. It includes high blood pressure and sugar, excessive visceral fat and high cholesterol.

ABSTRACT

Background:

Polycystic Ovarian Syndrome (PCOS) is a prevalent hormonal disorder affecting women of reproductive age globally, yet a significant proportion remains undiagnosed due to insufficient baseline knowledge regarding its causes and symptoms. This lack of awareness contributes to delayed medical attention and progression of the disease, leading to serious long-term complications such as type 2 diabetes mellitus, hypertension, cardiovascular diseases, hypercholesterolemia, and endometrial cancer. Studies in Nigeria indicate particularly low awareness levels, underscoring a critical public health challenge.

Objective:

This study aimed to comprehensively assess the knowledge and awareness of the causes, symptoms, and long-term complications and determinants of Polycystic Ovarian Syndrome among female undergraduate students at the University of Benin, Edo State, Nigeria with a view to generate evidence that will guide the design of tailored strategies aimed at increasing awareness and strengthen healthcare delivery.

Methods:

A descriptive cross-sectional study design was employed, targeting female undergraduate students at the University of Benin. Data collection occurred between April 2024 and June 2025. A sample size of 415 respondents was determined using Cochran's formula and a 10% non-response adjustment. A multi-stage sampling technique involved the simple random selection of the Ugbowo campus, followed by the random selection of eight faculties. Information was collected using a 29-item structured questionnaire, and data analysis was performed using SPSS V 25.0 to generate percentages and frequencies.

Results:

Over half of the respondents (54%) reported having heard of PCOS, with approximately two-thirds (60.7%) demonstrating good baseline knowledge of its causes and symptoms, while one-third (39.3%) exhibited poor knowledge. Abnormal menstruation (40.7%) was identified as the most common symptom, overproduction of hormones (36.9%) and genetics (35.4%) were frequently cited causes. Drugs (46.7%) was perceived as the most effective treatments. Regarding awareness of complications, 46.4% showed good awareness, while 53.6% lacked sufficient awareness particularly concerning infertility. Social media (especially TikTok and WhatsApp at 42.9% and 21.0% respectively) was the primary source of PCOS, followed by medical professionals. The key predictors of good knowledge included being in a medical related field like Medicine (OR = 0.033, p = 0.001) and a higher monthly allowance above N20,000. N20,000 – N50,000 (OR = 0.379, p = 0.002) and N51,000 – N100,000 (OR = 0.059, p <0.001).

Conclusion:

The study revealed moderate knowledge but a significant gap in awareness regarding PCOS complications among female university students, compounded by reliance on non-medical information sources and prevalent misconceptions. Academic background and socioeconomic status were influential factors in knowledge levels. These findings necessitate targeted public health interventions, including integrating comprehensive PCOS education into university curricula, launching official social media campaigns led by healthcare professionals, organizing workshops, encouraging routine health screenings, and promoting mental health support services for affected individuals.

Keywords: Polycystic Ovarian Syndrome (PCOS), Awareness, Knowledge, Perception, Public Health Female Undergraduates, University of Benin, Nigeria.

Word Count: 444

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Polycystic Ovarian Syndrome (PCOS) is a common hormonal condition that affects women of reproductive age. It usually starts during adolescence but symptoms may persist over time.[1] The National Institute of Health (NIH)/Rotterdam/Androgen Excess (AE) Society Diagnostic criteria describes PCOS as a combination of oligo-ovulation, hyper-androgenism and the presence of polycystic ovaries.[2]

Globally PCOS affects a significant percentage of women in their reproductive age yet a lot of women worldwide has remained undiagnosed and this owes to the lack of baseline knowledge of the syndrome, its causes and symptoms which isn't sufficient to prompt potential patients to seek medical attention when needed, neither is it enough to stop disease progression.[1,3] The more common symptoms of PCOS includes heavy, long, intermittent, unpredictable or absent periods, oily skin, acne, excessive hair on the body and face weight gain, male pattern baldness, mood swings, fatigue.[4] In Nigeria, studies have revealed that the prevalence of PCOS is high in infertile women with a huge economic burden. This assessment will help bridge the knowledge gap, allowing for targeted educational intervention, early presentation to health care providers, diagnosis, prevent future health comorbidities and also reduce financial burden.[5]

Patients diagnosed with PCOS can prevent the complications associated with this syndrome if appropriate and proper awareness is done to educate people of these long term implications. Some of these complications according to WHO includes the following health conditions: type 2 diabetes mellitus, hypertension, cardiovascular diseases, hypercholesterolemia, endometrial cancer.[1] Research has shown that early diagnosis, treatment and lifestyle modification could improve cardiovascular diseases, infertility, diabetes mellitus associated

with PCOS.[6] A study in UAE revealed that a large majority were not aware that PCOS could cause heart diseases, while one third falsely believed that back pain was a complication of PCOS.[3]

The sources through which people have gotten information regarding PCOS includes friends and family, media, health care professionals, campaigns. Information gotten from health care professionals reflects poor counselling and knowledge about PCOS among health care professionals[3]. Patients who have had a rough journey of PCOS diagnosis and have been dissatisfied with information and treatment from health care professionals resorted to finding information themselves and in turn advocating to increase awareness among their family and friends.[7] This reflects the importance of assessing the already existing knowledge and using the data obtained to increase accurate and relatable information made available on all these sources. Studies have shown that although social media has become a powerful disseminating tool, it was one of the least used in obtaining accurate information about PCOS. This goes to show that there isn't so much online presence of accurate PCOS information therefore using these media tools successfully could help with increasing the awareness of PCOS.[8]

There is a significant relationship between PCOS awareness and each of the following: being diagnosed of PCOS, knowing someone that has been diagnosed of PCOS, studying or working in a medical field and having a health care provider as source of information.[3] Research has shown that age of students, level of study or years spent in the university did not have any correlation with their knowledge levels of PCOS, most of the them were between their late teens to early twenties which serves as a reminder to the fact that important basic information should be taught early in life and reiterates that awareness programs should be implemented for early detection, treatment and even prevention.[9] Most metabolic diseases including PCOS are worsened by unhealthy lifestyle choices which includes lack of physical activity, consumption of high fatty diet, smoking. With easy access to fast food through

delivery apps and social media, these unhealthy lifestyle practices that contribute to PCOS are promoted. There is therefore need to create awareness regarding these unsafe practices that predispose and worsen PCOS symptoms.[9] A study in Nigeria showed that there was no significant difference in in age and educational status of women with PCOS but there was a significant difference in the Body Mass Index (BMI).[10]

Increasing PCOS awareness in Nigeria is a multi-faceted approach and will involve health care improvements, educational initiatives, cultural sensitization and community engagement.

1.2 STATEMENT OF PROBLEM

Polycystic Ovarian Syndrome (PCOS) poses a significant public health problem and is one of the commonest hormonal disturbances affecting women of reproductive age. The condition affects an estimated 6–13% of women of reproductive age, and up to 70% of cases are undiagnosed.[1] Studies have revealed that PCOS awareness was at 21.74% which is very low despite the fact that many of the participants had higher level of education.[3] In a study done on female Emirati students, 13% self-reported 1801 Main St., Kansas City, MO 64108being diagnosed with PCOS, 3.5% were taking medications for PCOS. The students displayed low reproductive health knowledge and poor awareness of PCOS and they also indulged in poor quality lifestyle choices such as fast food and low physical activity.[9]

Women with PCOS in Ontario Canada were suspended in un-certainty of their diagnosis for a significant portion of their lives due to un-acknowledgement of their symptoms by health care professionals pushing these women to resort to use of social media and away from medical institutions to navigate their PCOS journey and the information and support groups online were not entirely accurate and didn't have positive outcomes for everyone. Healthcare professionals, including primary care physicians, gynaecologists, and endocrinologists, often lack the necessary knowledge and expertise to effectively diagnose and manage PCOS possibly due to heterogeneous nature and diverse clinical manifestations.[7]

A Texas USA study conducted where 42.6% of men and 21.7% of women indicated that they knew nothing regarding PCOS with only 4% stating that they knew everything about PCOS showed a gross lack of awareness regarding PCOS and could lead to delayed diagnosis and inadequate management.[8]

In research conducted in a Pakistan University among female students, the frequency of PCOS symptoms were very significant among the students such that a good number of the students suffered from oily skin and acne, hirsutism, menorrhagia or amenorrhea, weight gain

and alopecia. Although a good number of these students have not been diagnosed of PCOS which goes to show how common PCOS was in the University, highlighting possible under diagnosis of affected individuals.[4]

In Kano northern Nigeria, a study conducted there revealed that the prevalence of polycystic ovary syndrome was 6.2%. Classical type was present in 67.6%, while the normo-ovulatory type was present in 2.7% which is a significant finding. According to another study done in Enugu Nigeria, the prevalence was set at 18.1% and the commonest presentation was inability to conceive showing that PCOS often resulted in complications most commonly infertility concerns before presentation in most patients.[11]

In a study done in Ogun State, Nigeria in women of reproductive age 15-50, 56.8% of respondents have not heard of PCOS, 52.5% indicated that hormonal imbalance is not a key feature of polycystic ovarian syndrome and 76.0% were not aware polycystic ovarian syndrome is treatable while 46.0% disagreed certain environmental factors increased their risk of having PCOS. This indicates that many women of reproductive age are unaware of the signs, symptoms and risk factors associated with PCOS.[12]

More than half (51.40%) of enrolled participants in a survey in the UAE considered themselves aware. 88.60% of participants were not aware of the fact that PCOS can lead to heart disease and back pain was the third most selected complication which isn't a complication of PCOS. This goes to show that information and knowledge of people about PCOS had lots of flaws and that there is a need for accurate information to be made available to individuals to promote early presentation to the hospital in the face of existing signs and symptoms.[13]

The same study in UAE showed that friends and family were the most frequently chosen source of information regarding PCOS before media, health professionals and campaigns.

Another study in Jordan reflected that information was obtained from doctor and from family members equally followed by websites.[13]

In a study conducted in medical and dental students in Pakistan, 42.2% of the participants gained the knowledge of the disease from social media and internet, as observed that huge population hear or read about the disease from internet and then they discuss with each other and spread the knowledge, whereas 27.3% of the participants came to know about the disease from each other and only 2.8% from television. There was only 4% of the population who gained knowledge from reading books and class lectures and universities. The reduced or relatively low presence of health care providers among information sources serves as an opportunity for misconceptions and false information to thrive among individuals who seek for information and knowledge amongst these unverified sources[4].

PCOS is a leading cause of infertility, it is a chronic condition and cannot be cured. However, some symptoms can be improved through lifestyle changes, medications and fertility treatments. The cause of PCOS is unknown but women with a family history or type 2 diabetes are at higher risk.[1]

The failure to seek timely medical attention and get information from health care providers can also be attributed to societal stigma and misconceptions surrounding women's health, menstruation and fertility.[5]

1.3 JUSTIFICATION

Polycystic Ovary Syndrome is a common endocrine disorder that affects women of reproductive age with serious public health implications with significant implications for their health and well-being. Despite its prevalence, a lack of awareness still persists as an issue among the general population especially among young women who are the at-risk population. Assessment of the knowledge and perceptions of female university students regarding PCOS is therefore important for the following reasons:

Gap in the literature: Majority of the awareness studies done on PCOS has been centred around the Western world while Africa and Nigeria particularly hasn't received much attention in regards to research in this aspect. The few studies in Nigeria has focused on the prevalence of the disease and various treatment options majorly for fertility concerns. Only one study has studied awareness of the disease among university students[12] who make up the bulk of females in their reproductive age group. This research gap calls for an in-depth assessment of the awareness levels in Nigeria and especially among university students.

Reproductive Health: PCOS is a leading cause of female infertility supported by various studies conducted in Nigeria[6,10] making early detection and management crucial in women looking to have children. By assessing awareness levels, the study can identify barriers to women's fertility and informed strategies put in place.

Public Health Policy: Awareness of PCOS among policymakers and healthcare providers is essential for developing effective public health policies and guidelines. A study on awareness can provide evidence-based data to advocate for increased funding, research and resources for PCOS education, prevention and treatment initiatives.

By conducting this study, early detection, access to care and overall health outcomes for individuals affected by this common yet often misunderstood condition can be effectively improved.

1.4 RESEARCH QUESTIONS

1. What is the baseline knowledge of the causes and symptoms of PCOS among female undergraduate students?
2. What is the awareness level among female undergraduate students regarding the implications of PCOS on the reproductive and general health of PCOS patients?
3. What are the sources from which female undergraduate students gather information and the potential misconceptions and gaps in knowledge regarding PCOS?
4. What are the factors that influence knowledge levels of PCOS among female undergraduate students?

1.5 GENERAL OBJECTIVE

To assess the knowledge, awareness of the causes, symptoms and long term complications and determinants of Polycystic Ovarian Syndrome among female undergraduate students at the University of Benin with a view to generate evidence that will guide the design of tailored strategies aimed at increasing awareness and strengthen healthcare delivery.

1.6 SPECIFIC OBJECTIVES

1. To assess the baseline knowledge of the causes and symptoms of PCOS among female undergraduate students of University of Benin.
2. To investigate the awareness level among female undergraduate students of the University of Benin students regarding the implications of PCOS on the reproductive and general health of PCOS patients.
3. To identify the sources from which female undergraduate students of University of Benin students gather information and the potential misconceptions and gaps in knowledge regarding PCOS.
4. To determine the factors that influence the knowledge levels of PCOS among female undergraduate students at the University of Benin.

CHAPTER TWO

LITERATURE REVIEW

INTRODUCTION

Polycystic Ovarian Syndrome is among the prevalent endocrine disorders affecting women of reproductive age globally with diverse clinical and metabolic symptoms like irregular menstruation, hyperandrogenism.[1] Despite it's high occurrence, PCOS remains largely undiagnosed and poorly understood majorly due to inadequate awareness and knowledge among women especially in the younger population which includes female undergraduate students. This study reviews various research conducted across different groups and institutions which have evaluated the knowledge, awareness, sources of information as well as the factors influencing knowledge levels of PCOS.

2.1 KNOWLEDGE OF FEMALE UNDERGRADUATE STUDENTS REGARDING THE CAUSES AND SYMPTOMS OF PCOS

In the Texas Women's University campuses in Denton, Dallas and Houston in the United States, a cross sectional study was conducted in 2020 where 722 females and 47 males completed the survey to identify PCOS prevalence, knowledge, and information sources in a young multiethnic cohort. Participation was voluntary and anonymous and completion of the survey was interpreted as consent to participate in the study. This online survey polled students from Texas Woman's University campuses in Denton, Dallas and the data obtained were analyzed using IBM SPSS v. 25.0.

The results showed that 66.3% of women said they were somewhat knowledgeable about the condition, 21.7% indicated that they knew nothing while 4% of the women said that they

knew everything about PCOS. Overall, women with a diagnosis of PCOS reported that they had better knowledge than those who did not have PCOS.[8]

The limitation of this study was that the scope of this survey was exploratory and did not include questions related to health literacy.[8]

A cross sectional type of quantitative study was conducted on a sample of Medical and Dental students in Pakistan 2020, with a calculated sample size of 278 individuals aimed to evaluate the knowledge and level of awareness of female students about polycystic ovary syndrome and determine the prevalence of the symptoms of polycystic ovary syndrome using a questionnaire-based survey. Inclusion criteria were female medical students and willingness to participate and one of the most imperative and significant question was regarding the awareness of polycystic ovary syndrome. It is interesting to note that 74.5% of the participants were aware of the disease, while 25.5% were unacquainted with it. The frequency of different polycystic ovary syndrome symptoms in all the 278 students that we surveyed regardless of them being diagnosed or not with polycystic ovary syndrome were as follows: 37.1% students suffered from menorrhagia or amenorrhea, 55.4% had oily skin and acne, 50.7% had hirsutism, 36.3% encountered weight gain and 42.8% subjects had alopecia.[4]

A cross-sectional study was conducted in 2020 on 430 females living in the UAE (nationals and non-nationals) aged 18 years and above conveniently selected and interviewed using a 21-item self-structured questionnaire that assessed participant's awareness of PCOS as a term, it's causes, symptoms, complications, treatment and prevention. Data was analyzed using SPSS Version 25.0. The results showed that 84.3% of respondents were familiar with the term PCOS, 59.9% stated knowing someone with PCOS diagnosis while 18.6% were PCOS patients themselves. Overproduction of hormones was believed to be a cause by most, followed by genetics and then diet. A minority of participants falsely believed that infections, aging, and lack of sleep can cause PCOS. The most frequently chosen PCOS symptom was

menstrual irregularities followed by weight gain and signs of hyperandrogenism (facial hair and acne). The three most commonly chosen choices regarding knowledge on preventive methods were ones that have been proven helpful in reducing the likelihood of getting PCOS which were healthy exercise (59.4%), good diet (60.1%) and weight control (55.1%). On the other hand, one-third and one-quarter of participants incorrectly believed that good hygiene and quitting smoking prevent PCOS respectively.[13]

A descriptive cross sectional study carried out in females of reproductive age 18 - 45 in Jordan in December 2019 to March 2020 on a sample size of 130 to assess female awareness, knowledge and perceptions about PCOS in Jordan. The study was carried out through a follow up validated questionnaire and analyzed using SPSS version 22 and the descriptive analysis was done using mean and standard deviation for continuous variable and percentage for qualitative variables. Most of the participants were aware and answered positively that irregular or absence of menstrual cycle is a symptom of PCOS 90.3%. 89.5% believed that symptomatic treatment may be given to relieve the symptoms of PCOS, unusual amount of hair growth on different body parts is a symptom of PCOS (83.7%) and PCOS may lead to infertility (79.3%). Around half of the participants (55.9%) believed that PCOS patients have low body image and 49.3% of them believed that hirsutism in PCOS can lead to decrease social performance. Of the participants 11.9% (n = 27) strongly agreed that PCOS is a permanent condition and cannot be cured and 17.6% (n = 40) believed that PCOS patients have no control over the disease.[14]

In 2020, a cross sectional descriptive study was carried out among female students in a tertiary institution within the age ranges of 15 – 50 in Ogun State, Nigeria on a sample size of 387. This study sought to assess the current knowledge and perceptions of women in the Nigerian setting regarding PCOS. A multi stage sampling technique was used and a 25-item

structured questionnaire was administered. The data collected was analyzed using SPSS V 22.0 to derive percentages and frequencies used to describe the data. [12]

The results showed that 56.8% of respondents have not heard of PCOS and regarding what they knew in detail, 67.2% indicated that polycystic ovarian syndrome is not a curable disease, 52.5% indicated that hormonal imbalance is not a key feature of polycystic ovarian syndrome and 76.0% were not aware polycystic ovarian syndrome is treatable. To describe perceptions towards PCOS, agree responses was aggregated from strongly agree and agree while disagree responses were an aggregate of strongly disagree and disagree and undecided. Most respondents (54.5%) perceived that their genetic makeup increased their risk of having PCOS. Other respondents (54.0%) agreed that certain environmental factors increased their risk of having PCOS while 46.0% disagreed. [12]

In a descriptive cross-sectional survey where interviewer-administered questionnaires were used to obtain information from one hundred and twenty (120) respondents in some health facilities in Port Harcourt, Rivers State in 2021 to evaluate their perceptions and attitudes towards polycystic ovarian syndrome (PCOS). The study sample included 120 women suffering from polycystic ovarian syndrome (PCOS) of age 15-50years. Few of the respondents (28.3%) perceived that their genetic makeup increased their risk of having PCOS, other respondents (83.3%) disagreed that certain environmental factors increased their risk of having PCOS. 58.3% of the respondents agreed that if they lose/reduced weight it would help in restoring ovulation and 66.7% affirmed that miscarriage can be as a result of PCOS, while 65.0% were of the opinion that PCOS can lead to menstrual irregularities. About one-third of the respondents (33.3%) agreed that Polycystic Ovarian Syndrome and its feature can be controlled by making healthy lifestyle choices alone. Only 25.0% of the respondents agreed that Polycystic Ovarian Syndrome is a health problem which majorly affects elderly women who have passed the period of monthly menstrual cycle. Two-third of the respondents felt

that Polycystic Ovarian Syndrome is a health problem which majorly affects females of reproductive age while 75.0% of them agreed that having PCOS can lead to excess/abnormal hair growth of a masculine pattern.[15]

A research that explored the awareness of Polycystic Ovary Syndrome (PCOS) among adolescent girls in secondary schools in Anambra State, Nigeria, conducted in 2023 was administered to 384 girls aged 10-20 years attending secondary schools in Anambra State. The study employed across-sectional descriptive design to assess PCOS awareness. Anambra State was selected purposively due to its high concentration of secondary schools, facilitating access to the target population. The research employed a multi-stage probability sampling method and chose 6 state schools from 3 education zones. Only 25% of the participants had prior knowledge of PCOS while 75% of them had never heard of it.[16]

2.2 THE AWARENESS LEVEL REGARDING THE COMPLICATIONS OF PCOS ON THE REPRODUCTIVE AND GENERAL HEALTH AMONG FEMALE UNDERGRADUATE STUDENTS

Genetic and environmental factors are associated with the negative sequelae of PCOS, including obesity and infertility. PCOS is usually only diagnosed when complications develop that significantly reduce the patient's quality of life (e.g., hair loss, acne, alopecia and infertility-related problems)[5]. Early term complications of polycystic ovary syndrome include infertility and obstetric complications. Long term complications include cardiovascular risks, among these the most common being hypertension, diabetes, dyslipidemia and obesity[4]. PCOS is a major public health concern with a huge impact on reproductive, metabolic, and psychological health of women worldwide[9]. The most adverse aspect of the disease is its manifestation across the lifespan, predisposing its victims to

increased risk of cardiovascular disease (CVD), type 2 diabetes, infertility, and poor quality-of-life due to depression and anxiety. CVD is already the leading cause of death among women in UAE; conditions such as PCOS will only aggravate this situation[9].

In a cross-sectional study conducted in 2020 on 430 females living in the UAE (nationals and non-nationals) aged 18 years and above conveniently selected and interviewed using a 21-item self-structured questionnaire that assessed participant's awareness of PCOS as a term, it's causes, symptoms, complications, treatment and prevention. Data was analyzed using SPSS version 25.0. For PCOS complications, around half (51.40%) of enrolled participants considered themselves aware. Of those, around one-third (37.10%) demonstrated sufficient knowledge about the complications. Infertility and uterine cancer were the most frequently chosen complications, followed by back pain, which is not a complication of PCOS. Interestingly, 88.60% of participants were not aware of the fact that PCOS can lead to heart disease. Most participants agreed that a healthy diet and physical exercise can help manage PCOS, while traditional herbs and chemotherapy were the least frequently chosen options. Furthermore, post-assessment analysis revealed that signs and symptoms was the aspect that people were most aware of, followed by treatment modalities, prevention, causes, and lastly, complications. All in all, 78.26% of participants fell under the non-aware group, compared to only 21.74% (95%) who demonstrated sufficient awareness. Among PCOS complications, infertility is usually the one of most concern, as it can cause stress and psychological issues, further exacerbating patients' quality of life. Nevertheless, more than half were unaware of it as a complication of PCOS. Since a majority only seek medical attention when complications arise, this signified that being aware of the syndrome's signs and symptoms is not alarming enough for potential patients to seek the care they need, and fear of complications is probably the driving force. Such misconceptions can further extend the time to diagnosis, which has been linked to a higher rate of patient dissatisfaction and a longer period of untreated disease

course. This further increases the risk of complications, including infertility, psychological distress, and cardiovascular events.[13]

A descriptive cross sectional study carried out in females of reproductive age 18 - 45 in Jordan in December 2019 to March 2020 on a sample size of 130 to assess female awareness, knowledge and perceptions about PCOS in Jordan. The study was carried out through a follow up validated questionnaire and analyzed using SPSS version 22 and the descriptive analysis was done using mean and standard deviation for continuous variable and percentage for qualitative variables. Participants did not know that PCOS may leads to heart disease (n = 28, 12.3%), and diabetes (n = 71, 31.3%). Furthermore, 10 (4.4%) and 41 (18.1%).[14]

A cross sectional descriptive study was carried out among female students in a tertiary institution in Ogun State, Nigeria in 2020 within the age ranges of 15-45 on a sample size of 387. This study sought to assess the current knowledge and perceptions of women in the Nigerian setting. A multi stage sampling technique was used and a 25-item structured questionnaire was administered. The data collected was analyzed using SPSS V 22.0. 51.7% indicated that polycystic ovarian syndrome is not a major cause of infertility and majority of the respondents (50.7%) agreed that miscarriage can be as a result of PCOS. Most of the respondents (48.5%) disagreed that PCOS can increase their risk of womb cancer and 57.8% perceived PCOS makes them more prone to depression and psychological disorders than other women.[12]

A descriptive cross-sectional study was conducted among nurses working at the La General Hospital Accra, Ghana. A self-administered questionnaire consisting of close-ended questions were adopted in this survey. The aim of this study was to determine the factors associated with the level of knowledge and perceptions on Polycystic Ovary Syndrome among nurses at the La General Hospital, Ghana. Results was analyzed using Stata version 15 and presented as mean, standard deviations, percentages, chi-square and ordinal logistic

regression. All statistical tests performed were at a significance level of 5%. 44% of respondents disagreed that PCOS patients were suicidal, 43% agreed that that they were depressed, 48% agreed that the patients required support, 37% said the condition cannot be managed and 17% agreed that it was a permanent condition.[17]

In a descriptive cross-sectional survey where interviewer-administered questionnaires were used to obtain information from one hundred and twenty (120) respondents in some health facilities in Port Harcourt, Rivers State in 2021 to evaluate their perceptions and attitudes towards polycystic ovarian syndrome PCOS between the ages of 15-50 years. Most of the respondents (73.3%) were concerned about being overweight; 86% of them felt frustrated trying to lose weight while 82% of them confessed having difficulties staying at an ideal weight. Regarding their states of infertility as a result of the PCOS condition, 90% of them felt bad about their condition and 80% of them were afraid of not being able to have children of their own. Their sense of self-worth was similarly impacted negatively as 78% of them confessed to have a low self-esteem, 90% said they were depressed, 87% said they were both depressed and anxious while 74% confessed their moody states as a result of their PCOS condition. Majority of the respondents therefore demonstrated a negative attitude and outlook to life. The PCOS condition has significantly reduced the self-esteem and confidence of the some of the women and has also negatively affected their behaviors. Some of the women now restrict their eating, start obsessing over food or stop spending time with friends.[15]

2.3 THE SOURCES FROM WHICH FEMALE UNDERGRADUATE STUDENTS GATHER INFORMATION AND THE POTENTIAL MISCONCEPTIONS AND GAPS IN KNOWLEDGE REGARDING PCOS

A cross-sectional study conducted in 2020 on 430 females living in the UAE (nationals and non-nationals) aged 18 years and above conveniently selected and interviewed using a 21-item self-structured questionnaire that assessed participant's awareness of PCOS as a term, it's causes, symptoms, complications, treatment and prevention. Data was analyzed using SPSS version 25.0. The results showed that friends and family 51.20% were the most frequently chosen source of information regarding PCOS, second to the media 29.70% and then health care professionals 24.40% with the least source of information being campaigns 5.10%.[13]

In a survey of 200 girls done to assess the knowledge on the polycystic ovarian syndrome among the medical students of different colleges studying in 1st, 2nd, and 3rd year in India in 2017. The data was collected from the students using structured questionnaires. It was observed that 33% adolescent and young girls got information about PCOS from their teachers, 19% got information from friends, 11.5% got information from a doctor, 3.5% got information from newspaper while 5% got information from the internet.[8]

A cross sectional type of quantitative study was conducted on a sample of Medical and Dental students in Pakistan 2020, with a calculated sample size of 278 individuals: To evaluate the knowledge and level of awareness of female students about polycystic ovary syndrome. To determine the prevalence of the symptoms of polycystic ovary syndrome: a questionnaire-based survey was implemented. Inclusion criteria were (1) female medical students; (2) willingness to participate, while the exclusion criteria were (1) male students; (2) unwilling to participate. It was noteworthy to find out that 42.2% of the participants gained

the knowledge of the disease from social media and internet. As we have observed that huge population hear or read about the disease from internet and then they discuss with each other and spread the knowledge, whereas 27.3% of the participants came to know about the disease from each other and only 2.8% from television. There was only 4% of the population who gained knowledge from reading books and class lectures.[4]

A descriptive cross sectional study carried out in females of reproductive age 18 - 45 in Jordan in December 2019 to March 2020 on a sample size of 130 to assess female awareness, knowledge and perceptions about PCOS in Jordan. The study was carried out through a follow up validated questionnaire and analyzed using SPSS version 22 and the descriptive analysis was done using mean and standard deviation for continuous variable and percentage for qualitative variables[3]. It was worthy to note that information gotten from the doctor and that from family members was equal (n = 77, 34%). This was followed by websites which accounted for (n = 57, 25%). The fourth source was the pharmacist at (n = 14, 6%). The lowest rated source of information was from the faculty at (n = 2, 1%).

In a cross sectional study conducted at the Texas Women's University, USA in 2020, where 722 females and 47 males completed the survey to identify PCOS prevalence, knowledge, and information sources in an online survey which polled students and staff at Texas Woman's University campuses in Denton, Dallas and the data obtained were analyzed using IBM SPSS v. 25 Houston. Students who have been formally diagnosed of PCOS were more likely to have healthcare professionals as their source of information (83.7%) as compared to their undiagnosed counterparts (31.1%) or their unsure counterparts (52.3%). Diagnosed individuals were more likely to utilize PCOS support groups (32.3%), whereas undiagnosed or unsure individuals were more reliant on family and friends (29.4% and 25%, respectively) for information. Additionally, diagnosed and unsure individuals were equally likely to use government websites/ journal articles (25.7% and 20.5% respectively) for information, at a

level about twice that for undiagnosed (14.4%, Fig. 5). Although the most common sources of information about PCOS for males were healthcare professionals (29.8%), their reliance on this source was about half that for undiagnosed and unsure and about one-third that of diagnosed polycystic women. Male use of family and friends (23.4%) and government websites/journal articles (19.1%) closely emulated those seen for women unsure of their PCOS status. Individuals that have been formally diagnosed were more likely to utilize PCOS support groups (32.3%), undiagnosed or unsure individuals relied on friends and family (25% and 29.4% respectively) for information.[8]

In a study conducted in India over a two-year period in a tertiary care teaching hospital from Eastern India in 2020 using a pre formed questionnaire to record details and descriptive statistics to report findings. The results showed that the major source of information was from doctors (40.7%) and internet (25.9%); the rest being from books, newspapers and teachers.[18]

A research that explored the awareness of Polycystic Ovary Syndrome (PCOS) among adolescent girls in secondary schools in Anambra State, Nigeria, conducted in 2023 was administered to 384 girls aged 10-20 years attending secondary schools in Anambra State. The study employed across-sectional descriptive design to assess PCOS awareness. Anambra State was selected purposively due to its high concentration of secondary schools, facilitating access to the target population. The research employed a multi-stage probability sampling method and chose 6 state schools from 3 education zones.

Notably 20.8% of the respondents learned about PCOS from family members, 41.7% from teachers and 25% from social media with the primary social media preferences among the students being Facebook at 51%, WhatsApp following closely at 35.4% while Instagram holds a share of 13.5% with a comparatively lower usage by the respondents.[16]

A descriptive cross-sectional study was conducted among nurses working at the La General Hospital Accra, Ghana. A self-administered questionnaire consisting of close-ended

questions were adopted in this survey. The aim of this study was to determine the factors associated with the level of knowledge and perceptions on Polycystic Ovary Syndrome among nurses at the La General Hospital, Ghana. Results was analyzed using Stata version 15 and presented as mean, standard deviations, percentages, chi-square and ordinal logistic regression. All statistical tests performed were at a significance level of 5%.

Results showed that the internet and school were the most used sources of information at 30.4% each, followed by a health professional at 21.7%, training program at 11.6% and media at 5.8%.[17]

2.4 FACTORS THAT INFLUENCE THE KNOWLEDGE LEVELS OF PCOS AMONG FEMALE UNDERGRADUATE STUDENTS

In a cross-sectional study conducted in 2020 on 430 females living in the UAE (nationals and non-nationals) aged 18 years and above, conveniently selected and interviewed using a 21-item self-structured questionnaire that assessed participant's awareness of PCOS as a term, it's causes, symptoms, complications, treatment and prevention. Data was analyzed using SPSS version 25.0. A significant correlation was found between being aware of PCOS and the following variables: working/studying in a medical field, knowing someone with a PCOS diagnosis, having a previous diagnosis of PCOS, and reporting the source of information to be from a medical professional. About 33.5% of participants who knew someone diagnosed of PCOS were aware of the syndrome in comparison to 6.5% of those who didn't. Students in the medical field were twice more likely to be well-aware compared to those in a non-medical field. Additionally, a higher percentage of previously diagnosed participants (39%) demonstrated sufficient awareness compared to only 21.6% among those without a previous PCOS diagnosis.[13]

A descriptive cross sectional study carried out in females of reproductive age 18 - 45 in Jordan in December 2019 to March 2020 on a sample size of 130 to assess female awareness, knowledge and perceptions about PCOS in Jordan. The study was carried out through a follow up validated questionnaire and analyzed using SPSS version 22. This study revealed that educational level significantly affects participants' knowledge about PCOS. On the contrary, married females showed better knowledge about PCOS compared with those who are non-married. This can be explained by the fact that married females usually visit their gynecologists, which could be a possible cause for their higher level of awareness and knowledge about PCOS.[14]

A total of 493 Emirati students were recruited based on convenience sampling and completed a survey containing questions related to demography, lifestyle preferences, knowledge and PCOS awareness among the age group 18 to 25 years. Convenience sampling was used and questionnaires were administered after obtaining consent. Data was entered into an Excel spreadsheet by research assistant and cross-checked by another student assistant. It was coded and entered into SPSS by an investigator. Data obtained were statistically analyzed using Statistical Package for the Social Science. Age did not appear to influence knowledge of reproductive health or PCOS awareness. It was observed that 35% of participating students weighed between 50–60 kg, 19% weighed between 60–70 kg, 18.5% of students weighed above 70 kg, and 27.5% weighed less than 50 kg. Students who reported being diagnosed with PCOS were distributed through all the weight ranges and weight did not seem to correlate with the condition[9].

A questionnaire-based cross sectional study was conducted in 2018 in women aged 18-75 years old at the outpatient department of Jordan University Hospital aimed to assess the knowledge and attitude of women towards PCOS. Bachelor's degree holders were found to be significantly more likely to agree that PCOS is characterized by multiple cysts, increased

hair growth, and acne, women who worked fulltime jobs were more likely to know that PCOS is characterized by increased hair growth and acne and married women were more likely to know that PCOS is characterized by abnormal menstruation and an increased risk of infertility. Moreover, married women were more likely to know that PCOS is treated with drugs and weight reduction. Women who worked full-time jobs were significantly more likely to agree that PCOS will increase the risk of depression and anxiety. With regard to age, women aged 18-30 years were significantly more likely to agree that PCOS is related to increased acne and abnormal menstruation and that it can be diagnosed by laboratory test. [19]

A descriptive cross-sectional study was conducted among nurses working at the La General Hospital Accra, Ghana. A self-administered questionnaire consisting of close-ended questions were adopted in this survey. The aim of this study was to determine the factors associated with the level of knowledge and perceptions on Polycystic Ovary Syndrome among nurses at the La General Hospital, Ghana. Results was analyzed using Stata version 15 and presented as mean, standard deviations, percentages, chi-square and ordinal logistic regression. All statistical tests performed were at a significance level of 5%.

Factors that were associated with knowledge included department and sources of information. Pediatric department was significantly associated with lower knowledge. If a nurse worked in the pediatric department, she was 92% less likely to possess higher knowledge of PCOS compared to if she worked in OPD. (OR= 0.08.CI= 0.008-0.911, P<0.05). Media as a source of information was associated with lower knowledge. If a nurse had media as a source of information, she was 94% less likely to have higher knowledge about PCOS compared to if she heard her information from a training program (OR=0.06, CI= 0.005-0.909, P<0.05).[17]

A descriptive cross-sectional survey was conducted among female nurses in Lebanon from June 2023 to September 2023 and the sample size consisted of 106 female nurses. Inclusion criteria required respondents to be female nurses aged 17 to 45 who had not received a

clinical diagnosis of polycystic ovary syndrome (PCOS). Exclusion criteria included individuals who refused to participate, did not fully complete the questionnaire, self-reported having PCOS, or were not part of the nursing field. A self-administered questionnaire in Arabic and English languages and SPSS version 26 and Microsoft Office Excel 2016 was used, respectively, for data collection and analysis.

Evidence from this study revealed that knowledge of PCOS was strongly influenced by age, education level, mother's education, and history of PCOS diagnosis. Age and knowledge score had a significant correlation in our study.[21]

A survey conducted among final-year undergraduate pharmacy students in University of Nigeria, Nsukka Enugu State Nigeria on a total of 239 students aimed to investigate the impact of video-based educational intervention on knowledge and perception of PCOS. The limitations of the study were that: the study was conducted in a single school of pharmacy in Nigeria, even though the university is among the premier public institutions in the country with a mixed student population from across different ethnic, cultural and geopolitical zones. Second, the present study was unable to determine whether the observed improvement in knowledge of PCOS remains stable over time due to the pre-test and post-test design. Lastly, it would be practically difficult to isolate the effect of the video intervention from other factors that could possibly influence students' knowledge of PCOS since the study had no control group.

Results showed that being a female and having heard of PCOS in the past were associated with higher levels of knowledge of PCOS while age, residence and number of female siblings were not significantly associated with increased knowledge levels of PCOS.[20]

CHAPTER THREE

METHODOLOGY

3.1 STUDY AREA

This study was conducted in the University of Benin (UNIBEN), located in Benin City Edo State, Nigeria. Edo State is one of the 6 Southern States in the 36 states of Nigeria with its capital in Benin City. Edo State is bounded by Kogi State to the Northeast and East, Anambra to the East, Delta to the Southeast and South and Ondo to the West and Northwest; the Niger River flows along the state's eastern boundary. Edo State lies at elevations between 500 feet (150 metres) in the South and more than 1800 feet (550 metres) in the North and tropical rain forest covers most of the area. Agriculture is the mainstay of the economy with produce such as yams, cassava, oil palm, corn (maize) with an excellent road network and an airport at Benin City facilitating transportation. The State is largely inhabited by the Bini people and other ethnic groups including Esan, Owan, Estako and other tribes that reside in there. There are seven (7) universities in the state comprising one federal university, two state universities and four private universities.[22]

The University of Benin is located in Ovia North East Local Government Area which is one of the eighteen (18) local government areas in Edo State in a Southern a government owned tertiary institution, established on the 23rd of November, 1970, by the then Colonel Samuel Osaigbovo Ogbemudia-led military administration of Midwest State. It was first established as Midwest Institute of Technology, before attaining the status of a full-fledged university in line with requirements of the National Universities Commission on the 1st of July, 1971 and the name was changed to the University of Benin. The Institution became a federal government owned University on the 1st of April, 1975.[22]

UNIBEN is located in present day Benin City, Edo State a south-south geopolitical State of Nigeria. It is a government owned tertiary institution, established on the 23rd of November,

1970, by the then Colonel Samuel Osaigbovo-led military administration of Midwest State. The University was established first as Midwest State of Technology and later became a full-fledged university on the 1st of July, 1971 in line with requirements of the National Universities Commission (NUC). The name was changed to the University of Benin and the Institution became a federal government owned University on the 1st of April, 1975.[23]

The University which currently has two campuses: Ugbowo and Ekenwan campuses initially commenced academic activities at the site of the Old Teachers' Training College on Ekehuan Road (which is now one of the campuses of the University) with 109 students, now has an estimated 60,000 student's population who are spread across the two campuses of the University. The University has a student enrolment of 38,309 full-time students and 4,000 – 4,499 academic staff with 15 Faculties, 1 College and 3 Institutes. The faculties in UNIBEN include Agriculture, Arts, Education, Engineering, Engineering Sciences, Environmental Sciences, Humanities, Life Sciences, Management Sciences, Pharmacy, Physical Sciences, Social Sciences, Veterinary Medicine and a College of Medical Sciences composed of the Schools of Medicine, Dentistry, Basic Medical Sciences and Institute of Child Health.

Since the establishment of the University, it has continued to break new grounds in the realization of its goals of teaching, learning, research and community service. It undertakes programmes at various levels of graduate and postgraduate, for which students are admitted annually. It is important to note that nearly all courses offered at the University of Benin are, by 2021, fully accredited. For over five decades of its existence, the University of Benin has grown to mentor other institutions that operate as affiliate institutions to the University. They include: Lagos State University, Akoka, Lagos; College of Education, Warri; College of Education, Asaba; College of Education, Mosogar, and the National Institute for Legislative and Democratic Studies, Abuja.

The University has a website where a portal exists and students can log into their personal portal and the students can also monitor their academic progress and make payments to the institution via the portal after logging in with their student identity number and password.[23]

STUDY DESIGN

A descriptive cross-sectional study design was used for this study.

3.2 STUDY POPULATION

This study was carried out among female undergraduate students at the Ugbowo campus of the University of Benin, Benin City Edo State.

3.4 STUDY DURATION

This study was carried out between April 2024 and September 2025.

3.3 SELECTION CRITERIA

Inclusion Criteria

I. Female undergraduate students of University of Benin who were present at the time of data collection and provided consent for the study.

Exclusion Criteria

I. Female undergraduate students who were sick or unable to fill out the questionnaire adequately.

3.5 SAMPLE SIZE DETERMINATION

The minimum sample size (n) was calculated using the Cochran's formula for descriptive studies.[24]

$$n = \frac{z^2 pq}{d^2}$$

Where:

n = minimum sample size.

z = normal standard deviation (1.96 at 95% confidence interval)

p = proportion of students who had heard about PCOS in a tertiary institution in Ogun State, Nigeria University was 43.2% = 0.432.[12]

p = 0.432

q = p – 1

q = 0.432 – 1 = 0.568

d = degree of precision set at 0.05

n = 377

To account for non-response, 10% non-response rate will be added to the minimum sample size, utilizing the formula for non-response rate.[26]

ns = adjusted sample size

ns = calculated sample size + non-response rate

nr = non-response rate = 10% = 0.1

nr = 0.1x 377 = 37.7

n = calculated sample size = 377

ns = final sample size

377 + 37.7 = 414.7

A sample size of 415 was then selected.

3.6 SAMPLING TECHNIQUE

A multi-stage sampling technique was used in selecting respondents and a total of 415 respondents was selected with the questionnaires being administered to students from selected departments. Respondents who met the inclusion criteria was selected while those who fit into the exclusion criteria were excluded until the sample size was reached.

Stage 1: Selection of Campus

The University of Benin has two campuses: Ugbowo and Ekehuan campuses. The Ugbowo campus of the University of Benin was selected using simple random sampling by balloting.

Stage 2: Selection of Faculties

A list of all the faculties were obtained from the University Department of Records and Statistics. Out of fifteen (15) faculties, eight (8) were included in the study, and these were selected by simple random sampling using balloting (See Appendix for Undergraduate Student Count List at the University of Benin). The faculties selected were:

i. Faculty of Law
ii. Faculty of Basic Medical Sciences
iii. Faculty of Management Science
iv. Faculty of Art
v. Faculty of Social Science
vi. Faculty of Medicine
vii. Faculty of Agriculture
viii. Faculty of Education

Stage 3: Selection of Departments

A simple random sampling using the table of random numbers was used to select one department each from the eight (8) faculties. The departments selected are as follows;

i. Department of Law
ii. Department of Nursing
iii. Department of Banking and Finance
iv. Department of Linguistics
v. Department of Public Administration
vi. Department of Medicine
vii. Department of Crop Science
viii. Department of Human Kinetics

Stage 4: Selection of Levels

One level from each chosen department was selected using simple random sampling technique (balloting method). The levels selected were arranged in respect to how the faculties were chosen;

i. 300 level
ii. 100 level
iii. 300 level
iv. 200 level
v. 400 level
vi. 600 level
vii. 500 level
viii. 200level

Stage 5: Selection of Respondents

A random sampling approach was implemented to select undergraduate students using balloting. The number of respondents per department was first calculated by proportional allocation:

Proportionate allocation= $\frac{\text{Minimum sample size}}{\text{population size}}$ x Number of students in that department

Where;

Population size = Total number of students across the selected faculties= 866.

Minimum sample size = 415

(See Appendix for proportionate allocation)

The class list for each level was utilized as a sampling frame from which students were selected using a systematic sampling technique.

3.7 DATA MANAGEMENT

3.7.1 METHOD OF DATA COLLECTION

The pre-tested structured questionnaires were self-administered at the University of Benin. The respondents were allowed to answer the questionnaires in or around the lecture theatres where they felt safe and their privacy was ensured. Informed consent was obtained from the respondents and they were assured of confidentiality.

3.7.2 TOOLS FOR DATA COLLECTION

Data was obtained with the aid of a structured, self-administered questionnaire. The questionnaire was standardized and developed in line with the research objectives, consisting

of both close ended and open-ended questions adapted from a previous study that assessed the knowledge of PCOS among students in Nigeria.[19]

The questions were divided into 5 sections as follows:

Section A: Sociodemographic data which obtained information on the respondents such as age, sex, faculty, department, level and socioeconomic status

Section B: Baseline knowledge of the causes and symptoms of PCOS

Section C: Awareness of the long term complications of PCOS

Section D: Sources of information regarding PCOS

Section E: Factors that influence knowledge levels of PCOS

3.7.3 PRETESTING

To ensure standardization of the questionnaire, it was pretested using 10% of the initial sample size among female undergraduate students at Benson Idahosa University, Benin City, Edo State.

3.7.4 RESEARCH ASSISTANTS

Research assistants were recruited for the purpose of this study with proper standardization of the questionnaire.

3.7.5 DATA ANALYSIS

Data gathered was collated and screened for completeness after which they were cleaned, coded and serially entered into Statistical Package for Social Sciences (SPSS) 25.0 software for analysis before scoring.

Frequencies and proportions were used to preset categorical data. Continuous data was presented as means and standard data. Bivariate analysis including Chi-square tests and Fishers exact tests were carried out to test for associations of categorical variables. Multivariate analysis was also conducted to identify the relationship between dependent and independent variables. A p value of less than 0.05 was considered statistically significant for this study.

3.7.6 DATA PRESENTATION

The results of the analysis were presented using frequency distribution tables, contingency tables, pie charts and prose.

3.7.7 SCORING SYSTEM

1. **Section B: Knowledge of the causes and symptoms of PCOS**

Definition of Good Knowledge

A respondent was considered to have **good knowledge** of PCOS if they scored **at least 50%** of the possible correct answers across the questions that test understanding of the causes and symptoms of PCOS. (Questions 2-7).

A total of 7 (4 multiple response question) questions was used to assess the knowledge of PCOS. Each question in this section was scored based on correctness with a score of 1 given for every correct answer and a score of 0 for every wrong answer. A maximum score of 17 was derived and subsequently converted to percentages.

Scoring for Good Knowledge

Question Number	Topic Tested	Correct Answer(s)
2	Nature	Multiple Cysts in the Ovaries that can be diagnosed by ultrasound **(Agree)**
3	Symptoms (multiple)	Acne **(yes),** increased hair growth **(yes),** abnormal menstruation **(yes)**
4	Symptoms (multiple)	Fever **(no),** change in voice (yes), diarrhea (no), weight gain (**yes**), loss of scalp hair (**yes**)
5	Treatment	Drugs (**yes**), surgery (**no**), losing weight (**yes**), healthy diet (**yes**)
6	Causes (multiple)	Genetics (**yes**), over production of hormones (**yes**), diet (**yes**), aging (**no**)
7	Causes (multiple)	Infections (**no**), lack of sleep (**no**), exposure to chemicals (**yes**)
TOTAL	17	

Good Knowledge Threshold

The total possible score was **17 points**.

50% of the total score is 0.5×17 = 8.5 points.

Respondents were then categorized into two groups based on their scores.

A respondent demonstrates good knowledge of PCOS if they obtain a maximum score of 8.5 out of 17 points on the knowledge questions.

2. **Section C: Awareness on complication, a total of 6 questions.**

   A score of 1 was given for every correct answer and a score of 0 was given for every wrong answer. A maximum score of 6 was derived and subsequently

converted to percentages. Individuals with scores <50% had poor awareness while those with scores ≥50% had good awareness.

3.7.8 ETHICAL CONSIDERATIONS

Ethical approval and permission to carry out the study was obtained from the Health Research Ethics Committee of the University of Benin Teaching Hospital (UBTH) with protocol number (ADM/E 22/A/VOL. VII/148654830).

Informed consent was obtained from the respondents before administering the questionnaires. The respondents were informed that they have the right to withdraw from the study at any time and that withdrawal poses no loss or harm.

CHAPTER FOUR

RESULTS

A total of 415 participants were recruited in this study, giving a response rate of 100%. The results are presented in the following section in line with the specific objectives:

SECTION A: Socio-demographic Characteristics.

SECTION B: Baseline Knowledge of the Causes and Symptoms of PCOS.

SECTION C: Awareness Level Regarding the Complications of PCOS.

SECTION D: Sources from which Students gather Information and Gaps in Knowledge Regarding PCOS.

SECTION E: Factors that influence the knowledge levels of PCOS.

SECTION A:
SOCIODEMOGRAPHIC CHARACTERISTICS

TABLE 1: SOCIODEMOGRAPHIC CHARACTERISTICS.

Variables	Frequency(n=415)	Percent
Age (in years)		
15-19	148	35.7
20-24	227	54.7
25-29	39	9.4
30-34	1	0.2
Mean age (SD) = 20.6 (2.7)		
Marital Status		
Single	404	97.3
Married	11	2.7
Tribe		
Benin	133	32.0
Igbo	72	17.3
Yoruba	65	15.7
Etsako	42	10.1
Esan	30	7.2
Urhobo	19	4.6
Hausa	17	4.1
Isoko	10	2.4
Ora	9	2.2
Ibibio	8	1.9
Igbanke	5	1.2
Idoma	5	1.2
Religion		
Christianity	382	92.0
Islam	33	8.0
Faculty		
Law	94	22.7
Basic Medical Science	72	17.3
Medicine	58	14.0
Management Science	58	14.0
Arts	49	11.8
Social Science	47	11.3
Agriculture	20	4.8
Education	17	4.1
Level		
100	72	17.3
200	66	15.9
300	152	36.6
400	47	11.3
500	20	4.8
600	58	14.0
Monthly Allowance (=N=)		
<20000	167	40.2
20000-50000	176	42.4
51000-100000	57	13.7
>100000	15	3.6
Mean income (SD) = N33,213.3		
Median income = N26,903		
Income range = N20,000 - N100,000		

Two hundred and twenty-seven (54.7%) of the respondents were within the age range of 20 - 24 years and accounted for the largest age group followed closely by those between 15 – 19 years. The mean age of the participants was 20.6 years, with a standard deviation of 2.7 years. Four hundred and four respondents were single (97.3%) and two hundred and eighty-two predominantly practicing Christianity (92%) while eleven (2.7%) were married and thirty-three (8%). The Benin ethnic group had the highest representation at (32%) followed by Igbo (17.3%) and Yoruba (15.7%). The highest number of respondents were from the Faculty of Law (22.7%), Basic Medical Science (17.3%), Medicine and Management Science having (14.0%) each.

300 level, 100 and 200 levels were the most numerous, making up 36.6%, 17.3% and 15.9% of the respondents respectively, while those at the 400 level were the least represented at 9.6%. The students' monthly allowance varied, with 42.4% receiving between ₦20,000 and ₦50,000 with a significant number (40.2%) having a monthly allowance of less than ₦20,000. The mean monthly income was ₦33,213.3.

SECTION B:
BASELINE KNOWLEDGE OF THE CAUSES AND SYMPTOMS OF PCOS.

TABLE 2: BASELINE KNOWLEDGE OF THE CAUSES AND SYMPTOMS OF PCOS.

Variable	Frequency(n=415)	Percent
Respondent has heard of PCOS (n=415)		
No	191	46
Yes	224	54
PCOS is characterized by multiple cysts in the ovaries that can be diagnosed by ultrasound (n=224)		
Disagree	216	96.4
Agree	8	3.6
PCOS is characterized by(n=224)*		
An increase in acne in a clear and a higher than expected manner	143	34.5
An increase in hair growth in places like on the upper lip, around nipples and belly	83	20.0
Abnormal menstruation	169	40.7
PCOS is characterized(224)		
Fever	67	16.1
Change in voice to a more masculine voice	61	14.7
Diarrhoea	23	5.5
Weight gain	136	32.8
Loss of scalp hair	44	10.6
PCOS can be treated by(224)		
Drugs	194	46.7
Surgery	90	21.7
Loosing weight	52	12.5
Healthy diet	114	27.5
PCOS can be caused by(224)		
Genetics	147	35.4
Over production of hormones	153	36.9
Diet	76	18.3
Aging	50	12

*Multiple response question

A total number of two hundred and twenty-one (54%) had heard of PCOS. Among those who had heard of PCOS, there was a significant misconception. Two hundred and sixteen (96.4%) incorrectly disagreed that PCOS was characterized by multiple cysts in the ovaries that can be diagnosed by ultrasound. Abnormal menstruation was the most commonly recognized symptom by one hundred and forty-three (40.7%) of respondents followed by an increase in acne (34.5%) and hair growth at eighty-three (20%). Other recognized symptoms included an increase in acne (34.5%) and weight gain (32.8%). Notably, respondents incorrectly associated symptoms like fever (16.1%) and diarrhea (5.5%) with PCOS. One hundred and

fifty-three (36.9%) and one hundred and forty-seven (35.4%) of the respondents selected overproduction of hormones and genetics as the common causes of PCOS respectively. One hundred and ninety-four (46.7%) correctly agreed that drugs were a form of treatment and only fifty-two (12.5%) correctly agreed that losing weight could also be a treatment modality for PCOS.

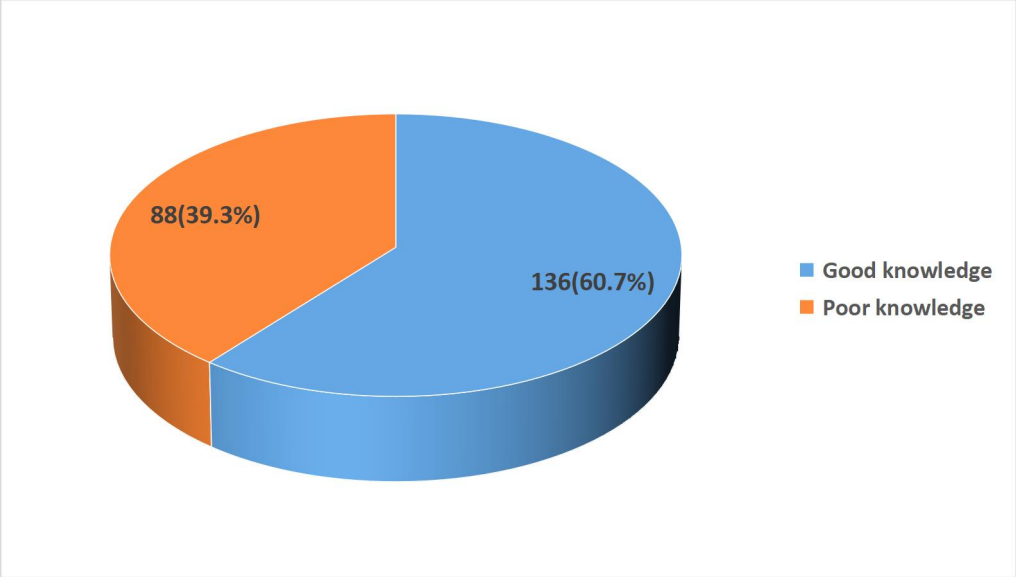

FIGURE 1: PIE CHART SHOWING BASELINE KNOWLEDGE OF PCOS.

One hundred and thirty-six respondents (60.7%) had good knowledge of PCOS while eighty-eight (39.3%) of respondents had poor knowledge of PCOS.

TABLE 3: RELATIONSHIP BETWEEN BASELINE KNOWLEDGE OF PCOS AND SELECTED SOCIODEMOGRAPHIC FACTORS

Variable	Baseline Knowledge Of PCOS		Test statistic	p-value
	Good Knowledge (n=136) Frequency(%)	Poor Knowledge (n=88) Frequency(%)		
Age				
15-19	40(54.1)	34(45.9)	2.065†	0.356
20-24	83(63.8)	47(36.2)		
25-29	13(65.0)	7(35.0)		
Marital Status				
Single	134(60.4)	88(39.6)	1.306*	0.521
Married	2(100.0)	0(0.0)		
Faculty				
Medicine	32(97.0)	1(3.0)	32.66†	**<0.001**
Arts	17(60.7)	11(39.3)		
Agriculture	19(59.4)	13(40.6)		
Management Science	6(31.6)	13(68.4)		
Social Science	9(40.9)	13(59.1)		
Basic Medical Science	19(63.3)	11(36.7)		
Education	9(81.8)	2(18.2)		
Law	25(51.0)	24(49.0)		
Level				
100	19(63.3)	11(36.7)	29.016†	**<0.001**
200	26(66.7)	13(33.3)		
300	31(45.6)	37(54.4)		
400	9(40.9)	13(59.1)		
500	19(59.4)	13(40.6)		
600	32(97.0)	1(3.0)		
Monthly Allowance				
<20000	34(39.5)	52(60.5)	38.657†	**<0.001**
20000-50000	57(63.3)	33(36.7)		
51000-100000	33(91.7)	3(8.3)		
>100000	12(100.0)	0(0.0)		

† = chi-square, * = Fisher's exact

Respondents within the age group of 25 – 29 had the highest proportion (65%) of those with good knowledge of PCOS as compared to those within the age group of 15 – 19 (54.1%). Respondents who were married (100%) and from the faculty of Medicine (97%) had good knowledge compared to single (60.4%) and from other faculties.

Respondents in 600 level (97%) and those whose monthly allowance was above N100,000 (100%) were associated with higher knowledge levels of PCOS in comparison to those in 400 level (40.9%) and with a monthly allowance of < N20,000 (39.5%). The relationship between faculty ($p = < 0.001$), respondent's level ($p < 0.001$) and monthly allowance ($p < 0.001$) were all found to be statistically significant with having knowledge of PCOS.

TABLE 4: PREDICTORS OF GOOD KNOWLEDGE OF PCOS AMONG RESPONDENTS

Factors	B (regression coefficient)	Odds Ratio	95 CI for OR		p-value
			Lower	Upper	
Age	0.015	1.015	0.893	1.153	0.823
Faculty					
Medicine	-3.425	0.033	0.004	0.257	**0.001**
Arts	-0.394	0.674	0.263	1.73	0.412
Agriculture	-0.339	0.713	0.29	1.754	0.461
Management Science	0.814	2.257	0.738	6.902	0.153
Social Science	0.409	1.505	0.544	4.164	0.431
Basic Medical Science	-0.506	0.603	0.238	1.529	0.287
Education	-1.463	0.231	0.045	1.183	0.079
Law		1*			
Level					
100	2.919	18.526	2.214	155.02	**0.007**
200	2.773	16	1.962	130.495	**0.010**
300	3.643	38.194	4.933	295.725	**<0.001**
400	3.833	46.222	5.308	402.493	**0.001**
500	3.086	21.895	2.65	180.896	**0.004**
600		1*			
Monthly Allowance					
<20000		1*			
20000-50000	-0.971	0.379	0.206	0.696	**0.002**
51000-100000	-2.823	0.059	0.017	0.209	**<0.001**
>100000	-21.628	0	0	.	0.999

R^2: 23.0-31.2%; * = Reference category

From the results, it was found that respondents' Knowledge of PCOS increased with age but was not statistically significant (OR = 1.015, p = 0.823). Respondents who were in medicine (OR = 0.033, p < 0.001) was statistically found to have good knowledge of PCOS.

All the academic levels were found to be statistically significant with good knowledge with 100 level (OR = 18.526, p = 0.007), 200 level (OR = 16, p = 0.010), 300 level (OR = 38.194, p <0.001), 400 level (OR = 46.222, p = 0.001) and 500 level (OR = 21.895, p = 0.004).

Respondents who received a monthly allowance of N20,000 – N50,000 (OR = 0.379, p = 0.002) and >N100,000 (OR = 0.059, p <0.001).

SECTION C:
AWARENESS LEVEL REGARDING THE COMPLICATIONS OF PCOS

TABLE 5: AWARENESS LEVEL REGARDING THE COMPLICATIONS OF PCOS

Variables	Frequency(n=224)	Percent
The disease is not serious and not related to being able to have children		
Disagree	148	66.1
Neutral	50	22.3
Agree	26	11.6
PCOS is a chronic disease and requires life-long treatment		
Disagree	53	23.7
Neutral	63	28.1
Agree	108	48.2
The major organ affected by PCOS		
Uterus	22	9.8
Ovaries	174	77.7
Lungs	10	4.5
Kidney	18	8
Untreated PCOS can lead to cardiovascular diseases		
Disagree	36	16.1
Neutral	110	49.1
Agree	78	34.8
PCOS patients have an increased risk of depression and] anxiety		
Disagree	25	11.2
Neutral	52	23.2
Agree	147	65.6
PCOS patients have increased blood sugar levels		
Disagree	27	12.1
Neutral	92	41.1
Agree	105	46.9

Twenty-six respondents (11.6%) erroneously concurred that PCOS was not serious and related to being able to have children while one hundred and forty-eight respondents (66.1%) disagreed that PCOS was not a serious disease and unrelated to fertility which indicates good awareness in regards to fertility. while one hundred and eight (48.2%) correctly agreed that

PCOS was a chronic disease requiring lifelong treatment with fifty-three respondents (23.7%) disagreeing. The most recognized organ that was affected were the ovaries identified by one hundred and seventy-four respondents (77.7%) second to uterus at twenty-two respondents (9.8%). Seventy-eight (34.8%) agreed that PCOS patients were at an increased risk of cardiovascular diseases, one hundred and forty-seven (65.6%) selected depression and anxiety, while one hundred and five (46.9%) choose increased blood sugar levels to be associated with PCOS.

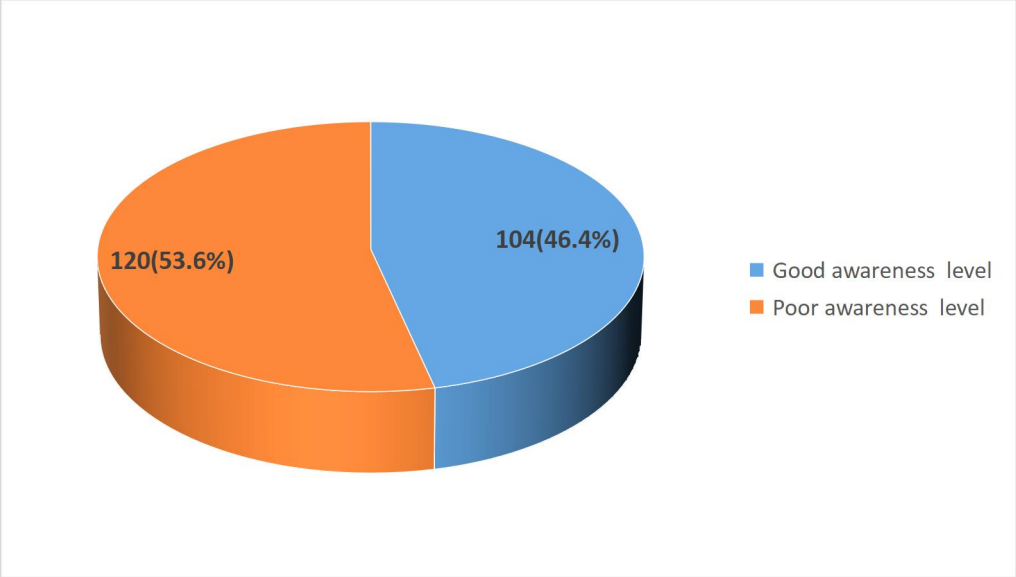

FIGURE 2: PIE CHART OF OVERALL AWARENESS LEVEL REGARDING THE COMPLICATIONS OF PCOS

One hundred and four respondents (46.4%) had good awareness level on the complications of PCOS while one hundred and twenty respondents (53.6%) had poor awareness on the complications of PCOS.

TABLE 6: RELATIONSHIP BETWEEN OVERALL AWARENESS LEVEL REGARDING THE COMPLICATIONS OF PCOS AND SELECTED FACTORS

Variable	Overall awareness level regarding the complications of PCOS.		Test statistic	p-value
	Good awareness level (n=104) Frequency(%)	Poor awareness level (n=120) Frequency(%)		
Age				
15-19	31(41.9)	43(58.1)	0.931†	0.628
20-24	63(48.5)	67(51.5)		
25-29	10(50.0)	10(50.0)		
Marital Status				
Single	103(46.4)	119(53.6)	0.001†	>0.999
Married	1(50.0)	1(50.0)		
Faculty				
Medicine	27(81.8)	6(18.2)	34.004†	**<0.001**
Arts	12(42.9)	16(57.1)		
Agriculture	18(56.3)	14(43.8)		
Management Science	4(21.1)	15(78.9)		
Social Science	10(45.5)	12(54.5)		
Basic Medical Science	17(56.7)	13(43.3)		
Education	2(18.2)	9(81.8)		
Law	14(28.6)	35(71.4)		
Level				
100	17(56.7)	13(43.3)	31.759†	**<0.001**
200	14(35.9)	25(64.1)		
300	18(26.5)	50(73.5)		
400	10(45.5)	12(54.5)		
500	18(56.3)	14(43.8)		
600	27(81.8)	6(18.2)		
Monthly Allowance				
<20000	18(20.9)	68(79.1)	47.659†	**<0.001**
20000-50000	59(65.6)	31(34.4)		
51000-100000	25(69.4)	11(30.6)		
>100000	2(16.7)	10(83.3)		

† = chi-square, * = Fisher's exact

The age group of 25 – 29 had the highest proportion (50.0%) of those with good awareness of PCOS as compared to those within the age group of 15 – 19 (41.9%). Marriage was not

contributory in good awareness levels of PCOS while those that were single had a poor awareness level among one hundred and nineteen respondents (53.6%).

Twenty-seven (97%) respondents in Medicine and those in 600 level who were also twenty-seven (81.8%) had a good awareness of PCOS compared to those in Management Science four (21.1%) and 300 level fifteen (26.5%). Respondents with a monthly allowance between N51,000 - N100,000 twenty-five (69.4%) were associated with better awareness levels of PCOS. The relationship between faculty ($p = < 0.001$), respondent's level ($p < 0.001$) and monthly allowance ($p < 0.001$) were all found to be statistically significant with having good awareness levels of PCOS.

TABLE 7: PREDICTORS OF GOOD AWARENESS LEVEL OF THE COMPLICATIONS OF PCOS

Factors	B (regression coefficient)	Odds Ratio	95 CI for OR		p-value
			Lower	Upper	
Age	0.005	1.005	0.887	1.139	0.935
Marital Status					
Single	-0.358	0.699	0.029	16.598	0.825
Married		1*			
Faculty					
Medicine	-2.42	0.089	0.03	0.262	**<0.001**
Arts	-0.629	0.533	0.202	1.409	0.205
Agriculture	-1.168	0.311	0.122	0.792	**0.014**
Management Science	0.405	1.5	0.423	5.315	0.530
Social Science	-0.734	0.48	0.169	1.362	0.168
Basic Medical Science	-1.185	0.306	0.118	0.792	**0.015**
Education	0.588	1.8	0.345	9.399	0.486
Law		1*			
Level					
100	1.236	3.441	1.098	10.78	**0.034**
200	2.084	8.036	2.674	24.147	**<0.001**
300	2.526	12.5	4.437	35.215	**<0.001**
400	1.686	5.4	1.595	18.279	**0.007**
500	1.253	3.5	1.134	10.803	**0.029**
600		1*			
Monthly allowance					
<20000	-0.88	0.415	0.08	2.15	0.294
20000-50000	-2.647	0.071	0.014	0.357	**0.001**
51000-100000	-2.771	0.063	0.011	0.352	**0.002**
>100000		1*			

R^2: 25.5-34.0%; * = Reference category

It was discovered from the results that respondents' Awareness of PCOS increased with age but was not statistically significant (OR = 1.005, p = 0.935). Those in medicine (OR = 0.089, p < 0.001), Agriculture (OR = 0.311, p = 0.014) and Basic Medical Science (OR = 0.306, p = 0.015) were found to have good knowledge of PCOS which was statistically significant. Respondents in all levels 100 level (OR = 3.441, p = 0.034), 200 level (OR = 8.036, p <0.001) and 300 level (OR = 12.5, p <0.001), 400 level (OR = 5.4%, p = 0.007) and 500 level (OR = 3.5, p= 0.029) were found to be statistically significant with good awareness levels of PCOS. Respondents who received a monthly allowance of N20,000 – N50,000 (OR = 0.071,

p = 0.001) and N51,000-N100,000 (OR = 0.063, p = 0.002) had statistically significant good awareness of PCOS.

SECTION D:
SOURCES FROM WHICH STUDENTS GATHER INFORMATION AND GAPS IN KNOWLEDGE REGARDING PCOS.

TABLE 8: SOURCES FROM WHICH STUDENTS GATHER INFORMATION AND GAPS IN KNOWLEDGE REGARDING PCOS.

Variables	Frequency (n=224)	Percent
Respondent heard of PCOS from*		
Friends and family	47	21.0
Medical professionals	86	38.4
Campaigns	20	8.9
PCOS support groups	12	5.4
Social media	103	46.0
Newspapers and magazines	20	8.9
TV and radio	13	5.8
Respondent heard of the causes of PCOS from*		
Friends and family	22	9.8
Medical professionals	100	44.6
PCOS support groups	20	8.9
Social media	113	50.4
Newspapers and magazines	16	7.1
TV and radio	6	2.7
Respondent heard of symptoms of PCOS from*		
Friends and family	35	15.6
Medical professionals	81	36.2
Campaigns	25	11.2
PCOS support groups	17	7.6
Social media	112	50.0
Newspapers and magazines	1	0.4
TV and radio	4	1.8
Respondent came across information concerning PCOS*		
WhatsApp	47	21.0
Twitter	41	18.3
Instagram	29	12.9
Facebook	30	13.4
Tiktok	96	42.9
Linkedin	12	5.4
Reddit	9	4.0
The last time respondent came across information concerning PCOS from these sources		
This week	40	17.9
Last week	70	31.3
A month ago	101	45.1
Not at all	13	5.8
Frequency by which respondent receive messages from information sources on PCOS		
Very often	25	11.2
Often	43	19.2
Not often	156	69.6
There is a need for information sources to improve messages on PCOS		
Yes	196	87.5
No	28	12.5
This questionnaire has improved your awareness about PCOS		
Yes	194	86.6
No	30	13.4
Respondent believe the following can be done to prevent PCOS		
Health exercise	43	19.2
Good diet	31	13.8
Vaccines	62	27.7
Weight control	43	19.2
Good hygiene	27	12.1
Quitting smoking	18	8

*** Multiple response question**

One hundred and three (46%) of respondents heard of PCOS from social media while only twelve (5.4%) heard of it from PCOS support groups. One hundred and thirteen (50.4%) got to know about the causes and one hundred and twelve (50%) of the symptoms of PCOS from social media with ninety-six (42.9%) citing Tiktok as the most common social media platform where they came across such information followed by WhatsApp (21.0%) and Twitter (18.3%). One hundred and ninety-six respondents (87.5%) felt there was a need for information sources to improve messages on PCOS, and one hundred and ninety-four (86.6%) agreed that the questionnaire itself had improved their awareness. This is a powerful indicator that educational interventions are both needed and effective.

Some misconceptions about prevention like vaccines were chosen by sixty-two (27%), while healthy exercise and weight control were accurately selected by forty-three respondents each (19.2%).

SECTION E:
FACTORS THAT INFLUENCE THE KNOWLEDGE LEVELS OF PCOS

TABLE 9: FACTORS THAT INFLUENCE THE KNOWLEDGE LEVELS OF PCOS

Variable	Frequency (n=415)	Percent
Being a PCOS patient		
Agree	105	25.3
Neutral	226	54.5
Disagree	84	20.2
Knowing someone diagnosed with PCOS		
Agree	116	28.0
Neutral	220	53.0
Disagree	79	19.0
Academic Major		
Agree	50	12.0
Neutral	198	47.7
Disagree	167	40.3
Marital status		
Agree	128	30.8
Neutral	95	22.9
Disagree	192	46.3
Age		
Agree	115	27.7
Neutral	99	23.9
Disagree	201	48.4

Two hundred and twenty-six respondents (54.5%) were neutral as regards being a PCOS patients and knowledge levels with only one hundred and five (25.3%) agreeing to this. Likewise, two hundred and twenty (53%) were neutral on whether knowing someone with PCOS was important, with one hundred and sixteen (28%) concurring.

Academic major, marital status, and age seem to have a more varied relationship with PCOS knowledge. For example, one hundred and sixty-seven (40.2%) disagreed that their academic major contributed to their knowledge of PCOS, while one hundred and ninety-two (46.3%) and two hundred and one (48.4%) disagreed that their marital status and age respectively did not contribute to their knowledge.

CHAPTER FIVE

5.1 DISCUSSION

The majority of the respondents were aged 20 to 24 years with a mean age of 20.7 years. This age distribution shows the typical demographic components of most universities where majority of their undergraduate students are in their early adulthood. The predominant single status of majority of the respondents goes to show that this population are in the age where educational pursuit is paramount and not particularly marriage. The ethnic distribution reflected the diversity of Edo State, Nigeria, with the Benin ethnic group being the most represented, followed by Igbo and Yoruba and the popular Christianity practiced can be attributed to the region where the study was carried out - South-South Nigeria and urban environment which is made up of majorly Christians. Respondents were drawn from different faculties, with Law and Basic Medical Sciences contributing the largest proportions. The academic level with the highest number was 300 level followed by 100 level. Most participants received monthly allowances between ₦20,000–₦50,000. This is similar to a study carried out at the Nnamdi Azikiwe University Anambra where the mean age was 21 and majority were Christians.[28] A proper understanding of the demographic profile of this study will be very instrumental in the implementation of health intervention programs among young adults.

The findings from this study indicated that over half of the respondents had heard of PCOS. However, only about 2/3rd demonstrated good baseline knowledge and perception regarding its causes and symptoms, while about 1/3rd had poor knowledge. More than two-third of the respondents chose abnormal menstruation as the commonest symptom of PCOS while two-third selected overproduction of hormones and about one-third chose genetics as a common cause of PCOS. Healthy diet and losing weight was the most effective treatment for PCOS

selected by almost half and about one-fifth of the respondents respectively. This may be attributed to the limited exposure to comprehensive reproductive health education and reliance on informal information sources. The absence of structured health education programs focusing on PCOS in university curricula could contribute to these knowledge gaps. This is similar to the findings in a study carried out among female undergraduate students in Ogun state, Nigeria where few of the respondents correctly identified irregular menstruation, infertility, obesity, or hirsutism as associated with PCOS many women linked PCOS to wrong causes such as poor hygiene, spiritual factors, or excessive sexual activity.[12] Our findings were in contrast to findings in a study carried out in Ghana where most of the respondents recognized infertility and irregular menstruation to be associated with PCOS, fewer identified obesity, hirsutism, or acne. Misconceptions existed, with some attributing PCOS to poor diet, stress, or contraceptive use.[17] This is also in contrast to a study conducted in the UAE which reported that majority of participants were familiar with the term PCOS while only about one-fifth had sufficient awareness of the syndrome. Menstrual irregularities and weight gain were the most chosen symptoms of PCOS and overproduction of hormones and genetics were the most chosen cause while healthy exercise and weight control were the most selected treatment modalities of PCOS all of which were similar to our findings.[9] Limited knowledge of PCOS can lead to delayed diagnosis and management, increasing the risk of complications such as infertility, type 2 diabetes, and cardiovascular diseases. Early recognition and understanding are crucial for timely intervention and improved health outcomes. Universities should incorporate reproductive health modules into general education courses, and healthcare professionals should engage students through health seminars, infographics, and peer-education models targeting non-medical faculties to correct misconceptions.

The findings from the evaluation of the long-term complications of PCOS showed that almost half of the participants demonstrated good awareness of PCOS complications while more than half had a poor awareness. Only about one-tenth of the respondents agreed that infertility was a common complication of PCOS, two-third agreed that depression and anxiety were seen in PCOS patients in the long run while about one-third concurred that cardiovascular diseases were complications and increased blood sugar levels was selected by almost half of the respondents which was quite a significant number. The focus of available information on immediate symptoms rather than long-term consequences may contribute to this gap. Additionally, cultural stigmas surrounding reproductive health issues might hinder open discussions and education on the subject.

In Rivers State and Ogun State Nigeria, studies showed that participants believed that PCOS could increase the risk of womb cancer and that women with the syndrome were predisposed to depression and psychological issues in comparison to other women which was similar to the findings in this study.[15,12]

Our findings were also similar to a study done in Jordan revealed that the participants believed that infertility and low body image were associated with the condition.[14]

In another survey carried out in the UAE, around half of the participants considered themselves aware of PCOS complications and one-third demonstrated sufficient knowledge about the complications of which infertility and uterine cancer were the most selected complications and a majority were unaware of its link to heart disease which was similar to our finding.[9] Unawareness of the chronic nature and complications of PCOS can result in neglecting necessary lifestyle changes and medical interventions, exacerbating health risks and burdening healthcare systems. Implementation of comprehensive health education that includes information on the long-term complications of PCOS and encourage routine health screenings for early detection and management of PCOS-related complication.

Public health messaging should emphasize that PCOS is a chronic, multisystem disorder. University health centers should organize regular seminars on lifestyle modification, highlighting risks of cardiovascular disease, diabetes, and mental health disorders.

As regards sources of information from which respondents heard about PCOS, about half of them selected social media with Tiktok and WhatsApp being the most used social media App. Medical professionals were chosen by close to half of respondents with a majority expressing the need for improved messages on PCOS. This finding is in contrast to a study conducted in Anambra State Nigeria where Teachers where the most selected source of information, next to social media which was majorly Facebook being the most popular source followed by family members.[16] The findings in this study was also in contrast to another study done in Jordan where a Physician and family members were the major sources of information followed by websites and Pharmacists.

The finding in this current study is in tandem with a study conducted in Pakistan where social media and internet were selected as the major information source of PCOS.[27] The possible reason for this was the accessibility and popularity of social media among university students making it a common source of health information.

However, the lack of regulation and potential for misinformation on these platforms can lead to misconceptions.

Dependence on unverified sources can perpetuate myths and hinder effective disease management. Accurate information dissemination is essential for informed health decisions and behaviors. Official social media campaigns led by healthcare professionals to provide accurate PCOS information could be a very effective strategy.

Public health agencies and university medical centers should collaborate with influencers and student associations to deliver accurate, youth-friendly PCOS messages on social media platforms.

Academic major, level and higher monthly allowances were significantly associated with better knowledge and awareness of PCOS. Students from Medicine and Basic Medical Sciences exhibited better understanding, while those from arts and management sciences had lower awareness levels. Other factors such as age, marital status, and academic level showed no significant associations. This relationship may reflect the influence of socioeconomic status on access to healthcare, educational resources, and private consultations. Students with greater financial resources may also have better internet access, allowing them to explore health topics more extensively. Students with higher financial resources may have better access to healthcare services and educational materials.

A study carried out in Nsukka Enugu Nigeria showed that having heard of PCOS in the past were associated with higher levels of knowledge of PCOS while age, residence and number of female siblings were not significantly associated with increased knowledge levels of PCOS which were in contrast to our findings.[20]

In Jordan, studies revealed that married women and women working full time jobs had better knowledge of PCOS than their counterparts.[14] Studies in Pakistan found that medical students had higher PCOS knowledge scores compared to non-medical students which was in tandem with our findings.[27] Similarly, UAE studies reported that being in the medical field was associated with greater awareness which was also similar to our findings.[9] Socioeconomic and educational disparities can lead to unequal health knowledge, affecting disease prevention and management across different population segments.

Awareness programs should prioritize low-cost and accessible platforms such as peer education, radio programs, and university health bulletins to bridge socioeconomic disparities in PCOS knowledge.

5.2 CONCLUSION

Based on the findings, it can be concluded that awareness and knowledge of PCOS among female undergraduate students in the University of Benin was low, with significant misconceptions and reliance on non-medical information sources. Academic background and socioeconomic status significantly influenced understanding levels and so there is a need for focused efforts to improve PCOS-related education, resources and awareness-building through schools, community initiatives, online platforms and partnerships. This will empower female undergraduate students to achieve early diagnosis and management of this prevalent women's reproductive health condition.

RECOMMENDATIONS

To The Federal Government through the National Universities commission(NUC)

1. Integrate PCOS education into university health programs, especially targeting non-medical faculties.
2. Incorporate PCOS education into general curriculum requirements to reach students across all faculties.
3. Implement comprehensive health education that includes information on the long-term complications of PCOS.

To The University Management through the Director of Health Centre

1. Develop awareness campaigns utilizing social media and peer education to disseminate accurate information.
2. Collaborate with healthcare providers to offer seminars and workshops on PCOS for students.
3. Encourage routine health screenings for early detection and management of PCOS-related complications.
4. Promote mental health support services for individuals affected by PCOS to address psychological impacts.
5. Offer workshops and seminars accessible to all students, regardless of their academic discipline.
6. Establish university health centers as accessible points for students to obtain credible health information.

Health Care Facilities

1. Develop official social media campaigns led by healthcare professionals to provide accurate PCOS information.
2. Train healthcare providers to proactively discuss PCOS with patients and provide reliable resources.

To The Female Students

1. Schedule periodic visits to the university health center or a gynecologist, especially if you notice irregular periods, excessive hair growth, acne, or unexplained weight gain.
2. Rely on accurate sources such as healthcare professionals, reproductive health clubs, or verified online medical platforms instead of unverified social media posts.
3. Maintain a balanced diet rich in fruits, vegetables, lean proteins, and whole grains to help regulate hormones and weight and engage in at least 150 minutes of moderate physical activity weekly.
4. Build supportive peer networks and seek counseling services when feeling overwhelmed.

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APPENDIX I

PROPORTIONAL ALLOCATION PER FACULTY, DEPARTMENT AND LEVEL

1. Faculty of Law (Department of Law, 300 level):

$\frac{415}{866} \times 197 = 94$

2. Faculty of Basic Medical Sciences (Department of Nursing, 100 level):

$\frac{415}{866} \times 150 = 72$

3. Faculty of Management Science (Department of Banking and Finance 300 level):

$\frac{415}{866} \times 122 = 58$

4. Faculty of Arts (Department of Linguistics, 200 level):

$\frac{415}{866} \times 106 = 50$

5. Faculty of Social Science (Department of Public Administration, 400 level):

$\frac{415}{866} \times 97 = 46$

6. Faculty of Medicine (Department of Medicine, 600 level):

$\frac{415}{866} \times 122 = 58$

7. Faculty of Agriculture (Department of Crop Science, 500 level):

$\frac{415}{866} \times 42 = 20$

8. Faculty of Education (Department of Human Kinetics, 200 level):

$\frac{415}{866} \times 36 = 17$

APPENDIX II

QUESTIONNAIRE

ASSESSING THE KNOWLEDGE, AWARENESS OF THE CAUSES, SYMPTOMS AND LONG TERM COMPLICATIONS OF POLYCYSTIC OVARY SYNDROME (PCOS) AMONG UNIVERSITY OF BENIN FEMALE UNDERGRADUATE STUDENTS

I am a 500 level student of the University of Benin, Benin City and this study aims at assessing the knowledge of university students towards PCOS. All information given will be treated as confidential. Please mark and fill any areas as appropriate. Thank you.

SOCIODEMOGRAPHIC CHARACTERISTICS

1. Age (In years at last birthday)
2. Marital status: Single [ ] Married [ ] Divorced [ ] Co-habiting [ ] Others [ ]
3. Tribe: Igbo [ ] Hausa [ ] Yoruba [ ] Bini [ ] Estako [ ] Others, specify_____
4. Religion: Christian [ ] Muslim [ ] ATR [ ] Others, specify_____
5. Department ……
6. Level: 100 [ ] 200 [ ] 300 [ ] 400 [ ] 500 [ ]
7. Monthly allowance (in naira): less than 20,000 [ ] 21,000 - 50,000 [ ] 51, 000 – 100,000 [ ] 100,000 and above [ ]

BASELINE KNOWLEDGE AND PERCEPTION OF THE CAUSES AND SYMPTOMS OF PCOS

1. Have you heard of PCOS Yes [ ] No [ ]
2. PCOS is characterized by multiple cysts in the ovaries that can be diagnosed by ultrasound Disagree [ ] Neutral [ ] Agree [ ]
3. PCOS is characterized by the following (multiple responses) An increase in acne in a clear and a higher than expected manner [ ] An increase in hair growth in places like on the upper lip, around nipples and belly [ ] Abnormal menstruation [ ]
4. PCOS is characterized by fever [ ] Change in voice to a more masculine voice [ ] Diarrhoea [ ] Weight gain [ ] Loss of scalp hair [ ]
5. PCOS can be treated by (multiple responses) Drugs [ ] Surgery [ ] Loosing weight [ ] Healthy diet [ ]
6. PCOS can be caused by the following (multiple responses) Genetics [ ] Over production of hormones [ ] Diet [ ] Aging [ ]
7. PCOS can be caused by the following (multiple responses) Infections [ ] Lack of sleep [ ] Exposure to chemicals [ ]

AWARENESS LEVEL REGARDING THE COMPLICATIONS OF PCOS

1. The disease is not serious and not related to being able to have children Disagree [ ] Neutral [ ] Agree [ ]
2. Polycystic ovary syndrome is a chronic disease and requires life-long treatment Disagree [ ] Neutral [ ] Agree [ ]
3. What major organ is affected by Polycystic ovary syndrome Uterus [ ] Ovaries [ ] Lungs [ ] Heart [ ] Kidney [ ]

4. Untreated PCOS can lead to cardiovascular diseases Disagree [ ] Neutral [ ] Agree [ ]
5. PCOS patients have an increased risk of depression and] anxiety Disagree [ ] Neutral [ ] Agree [ ]
6. PCOS patients have increased blood sugar levels Disagree [ ] Neutral [ ] Agree [ ]

SOURCES FROM WHICH STUDENTS GATHER INFORMATION AND THE POTENTIAL MISCONCEPTIONS AND GAPS IN KNOWLEDGE REGARDING PCOS

1. Where did you hear of PCOS from (multiple responses) Friends and family [ ] Medical professionals [ ] Campaigns [ ] PCOS support groups [ ] Social media [ ] Newspapers and magazines [ ] Tv and radio [ ]
2. Where did you hear of the causes of PCOS (multiple responses) Friends and family [ ] Medical professionals [ ] Campaigns [ ] PCOS support groups [ ] Social media [ ] Newspapers and magazines [ ] Tv and radio [ ]
3. Where did you hear of the symptoms of PCOS from (multiple responses) Friends and family [ ] Medical professionals [ ] Campaigns [ ] PCOS support groups [ ] Social media [ ] Newspapers and magazines [ ] Tv and radio [ ]
4. Which social media applications did you come across any information concerning PCOS (multiple responses) Whatsapp [ ] Twitter [ ] Instagram [ ] Facebook [ ] Tiktok [ ] LinkedIn [ ] Reddit [ ]
5. When was the last time you came across information concerning PCOS from these sources (multiple responses) This week [ ] Last week [ ] A month ago [ ] Not at all [ ]
6. How often do you receive messages from information sources on PCOS Often [ ] Very often [ ] Not often [ ]
7. How often are the messages on PCOS informative Often [ ] Very often [ ] Not often [ ]
8. Is there a need for information sources to improve messages on PCOS Yes [ ] No [ ]
9. Has this questionnaire improved your awareness about PCOS Yes [ ] NO [ ]
10. Which of the following do you think can be do to prevent PCOS Healthy exercise [ ] Good diet [ ] Vaccines [ ] Weight control [ ] Good hygiene [ ] Quitting smoking [ ]

FACTORS THAT INFLUENCE THE KNOWLEDGE LEVELS OF PCOS AMONG FEMALE UNIVERSITY STUDENTS

Which of the following factors contribute to knowledge levels of PCOS among female University students (select all that apply)

1. Being a PCOS patient: Disagree [ ] Neutral [ ]Agree [ ]
2. Knowing someone diagnosed with PCOS: Disagree [ ] Neutral [ ]Agree [ ]
3. Academic Major: Disagree [ ] Neutral [ ]Agree [ ]
4. Marital status: Disagree [ ] Neutral [ ]Agree [ ]
5. Age: Disagree [ ] Neutral [ ]Agree [ ]
6. Others (please specify) _____

APPENDIX III

INFORMED CONSENT FORM

TITLE OF RESEARCH: ASSESSING THE KNOWLEDGE, AWARENESS OF THE CAUSES, SYMPTOMS AND LONG TERM COMPLICATIONS OF POLYCYSTIC OVARY SYNDROME (PCOS) AMONG UNIVERSITY OF BENIN FEMALE UNDERGRADUATE STUDENTS

NAMES AND AFFILIATIONS OF INVESTIGATORS:

Chioma Precious Ogbonna

Department of Public Health and Community Medicine,

University of Benin Teaching Hospital,

PMB 111,

Benin City,

Edo State.

Email: ogbonnachiomaprecious@gmail.com

PURPOSE OF RESEARCH: To assess the awareness, perception and knowledge levels of the causes, symptoms and long term complications of Polycystic ovary syndrome among University of Benin female undergraduate students with a view to improving the public awareness of Polycystic ovary syndrome.

PROCEDURES INVOLVED IN THE STUDY: In this study, questions will be asked regarding the knowledge, perception, long term complications, sources of information and factors that influence the knowledge levels of Polycystic ovary syndrome.

CONFIDENTIALITY: All data collected will be treated with utmost confidentiality. Students who volunteer to participate in this study will be given a unique study number, and data will be collected. Participants' information will be stored safely secured by codes in

computers using only the study identification number. All those handling data will not at any time reveal participants' identity.

FINANCIAL COMPENSATION: There shall be no monetary compensation for participation

in this study.

VOLUNTARY PARTICIPATION: Your participation in this study is entirely voluntary. If you desire to withdraw from this study at any time, no punitive measures will be meted against you for your withdrawal. Your refusal to participate or withdraw from the study will not involve any negative consequences or loss of benefits to which you are otherwise entitled.

RISK: It is not expected that any harm will come to you because of your participation in this study. The study does not entail any activity that would harm you.

BENEFIT: The study will help assess the awareness, perception, knowledge of the causes symptoms and long term complications of PCOS among university of Benin undergraduate students.

FINANCIAL SPONSORSHIP: This study will be sponsored by the principal investigator.

The investigator may be contacted in case you have any clarifications to make.

The under-listed may be contacted in case you have any clarifications to make.

Chioma Precious Ogbonna

Department of Public Health and Community Medicine,

P. M. B. 1111,

Benin City,

Nigeria.

Email: ogbonnachiomaprecious@gmail.com

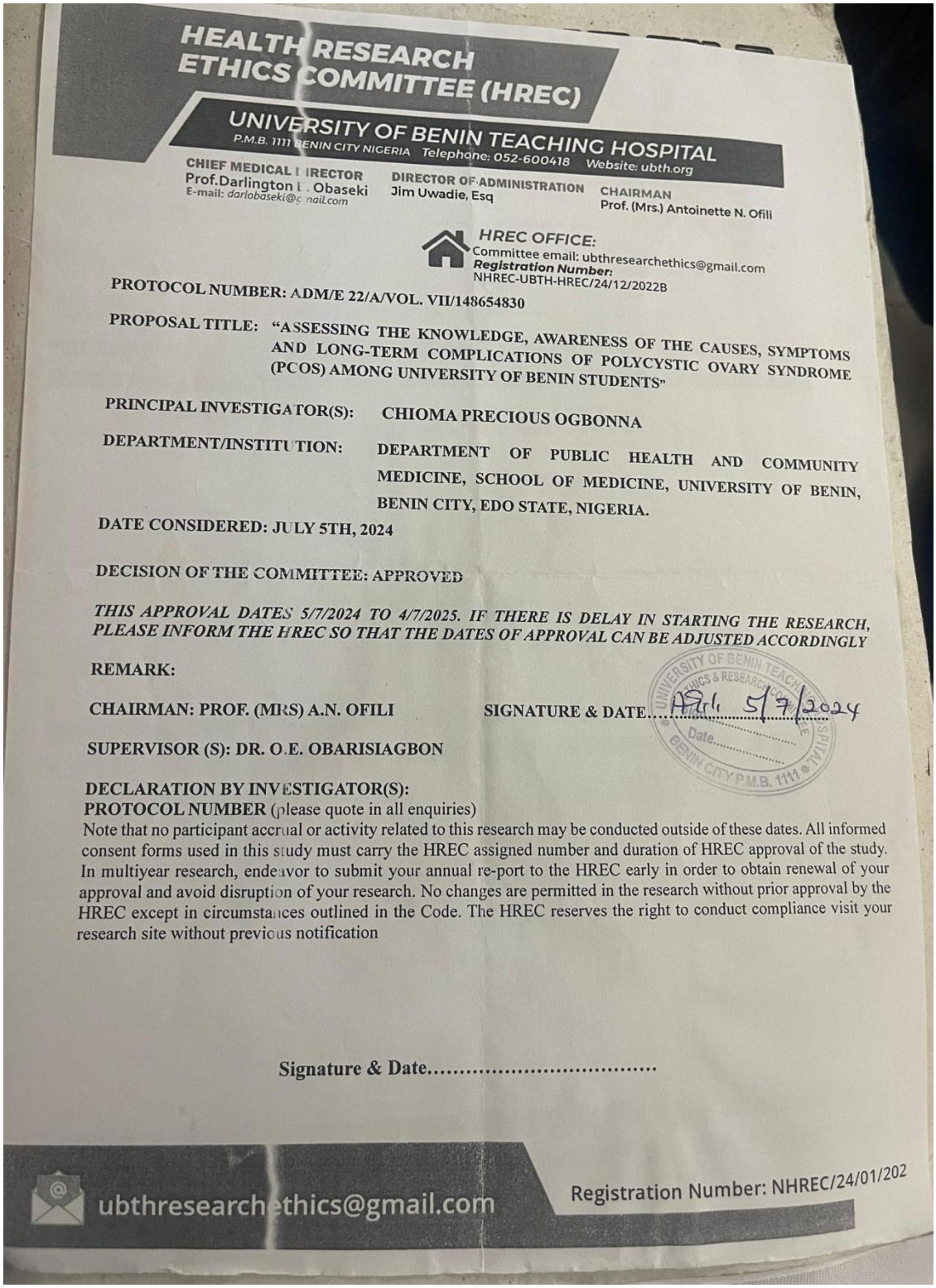
Cell: +2349061142614

OR

Ethics and Research Committee,
University of Benin Teaching Hospital
Phone Number: +234 802 352 1840

APPENDIX III

ETHICAL CLEARANCE FORM



HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

CHIEF MEDICAL DIRECTOR
Prof. Darlington E. Obaseki
E-mail: darlobaseki@gmail.com

DIRECTOR OF ADMINISTRATION
Jim Uwadie, Esq

CHAIRMAN
Prof. (Mrs.) Antoinette N. Ofili

HREC OFFICE:
Committee email: ubthresearchethics@gmail.com
Registration Number:
NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/148654830

PROPOSAL TITLE: "ASSESSING THE KNOWLEDGE, AWARENESS OF THE CAUSES, SYMPTOMS AND LONG-TERM COMPLICATIONS OF POLYCYSTIC OVARY SYNDROME (PCOS) AMONG UNIVERSITY OF BENIN STUDENTS"

PRINCIPAL INVESTIGATOR(S): CHIOMA PRECIOUS OGBONNA

DEPARTMENT/INSTITUTION: DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF MEDICINE, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA.

DATE CONSIDERED: JULY 5TH, 2024

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 5/7/2024 TO 4/7/2025. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI SIGNATURE & DATE..... 5/7/2024

SUPERVISOR (S): DR. O.E. OBARISIAGBON

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date.....

ubthresearchethics@gmail.com Registration Number: NHREC/24/01/202

APPENDIX IV
UNIVERSITY OF BENIN, BENIN CITY STUDENTS COUNT (UNDERGRADUATE FULL TIME)

University Of Benin, Benin City

Students Count (Undergraduate Full Time) as at 26th May, 2025.

Faculty	Department	Level						Row Total
		100	200	300	400	500	600	
Agriculture	Agricultural Economics & Ext. Services	81	47	67	39	55		289
	Animal Science	82	46	64	32	82		306
	Aquaculture and Fisheries Management	64	20	37	7	23		151
	Crop science	42	50	61	10	30		193
	Food Science and Nutrition	53						53
	Management	40	31	39	8	17		135
	Soil Science	49	43	53	11	22		178
Arts	English and Literature	182	126	142	153			603
	Foreign Languages	62	46		45			153
	History And International Studies	377	313	250	316			1256
	Linguistics Studies	219	106	79	95			499
	Mass Communication	232	179	156	163			730
	Philosophy	108	60	42	61			271
	Religions	38	27	15	2			82
	Theatre Arts	149	141	109	106			505
Basic Medical Sciences	Anatomy	112	108	89	47			356
	Medical Biochemistry	138	119	110	74			441
	Medical Laboratory Science	110	101	122	165			498
	Nursing Sciences	150	163	176	308			797
	Physiology	129	116	105	56			406
	Physiotherapy	123	123	127	263			636
	Radiography	73	81	136	273			563
Dentistry	Preventive Dentistry	45	34	23	23	24	14	163
Education	Studies	132	73	74	47			326
	Curriculum and Instructional Technology	315	226	191	158			890
	Pgveramgs	132	96	88	51			367
	Educational Foundations	281	178	151	138			748
	Educational Management	201	152	204	92			649

University Of Benin, Benin City

Students Count (Undergraduate Full Time) as at 26th May, 2025.

Faculty	Department	Level						Row Total
		100	200	300	400	500	600	
	Education	194	128	99	124			545
Education	Human Kinetics and Sports Science	81	36	69	34			220
	Vocational & Technical Education				7			7
Engineering	Agricultural Engineering	78	40	25	17			160
	Chemical Engineering	91	66	51	126			334
	Civil Engineering	107	113	69	180			469
	Computer Engineering	105	84	93	152			434
	Electrical/Electronics	95	90	88	295			568
	Industrial Engineering	92	47	30	74			243
	Marine Engineering	79	38	27	66			210
	Materials & Metallurgical Engineering	94	45	20	33			192
	Mechanical Engineering	83	81	62	157			384
	Mechatronics Engineering	90	55	67	136			348
	Petroleum Engineering	105	69	67	125			366
	Production Engineering	70	55	36	85			246
	Structural Engineering	99	45	30	69			243
	Surveying & Geoinformatics	1	28					29
Environmental Sciences	Architecture	70	62	53	38	5		228
	Estate Management	99	46	29	14	23	3	214
	Fine and Applied Art	118	37	54	38	1		248
Environmental Sciences	Geomatics	94	23	35	7	26	2	187
	Quantity Surveying	66	47	46	10	26	3	198
Institute of Education	Education	58	35	52	15			160
Law	Law	194	188	197	369			948
Life Sciences	Animal and Environmental Biology	148	92	81	65			386
	Biochemistry	169	155	128	146			598
	Toxicology	163	140	141	189			633
	Microbiology	209	144	153	146			652

University Of Benin, Benin City

Students Count (Undergraduate Full Time) as at 26th May, 2025.

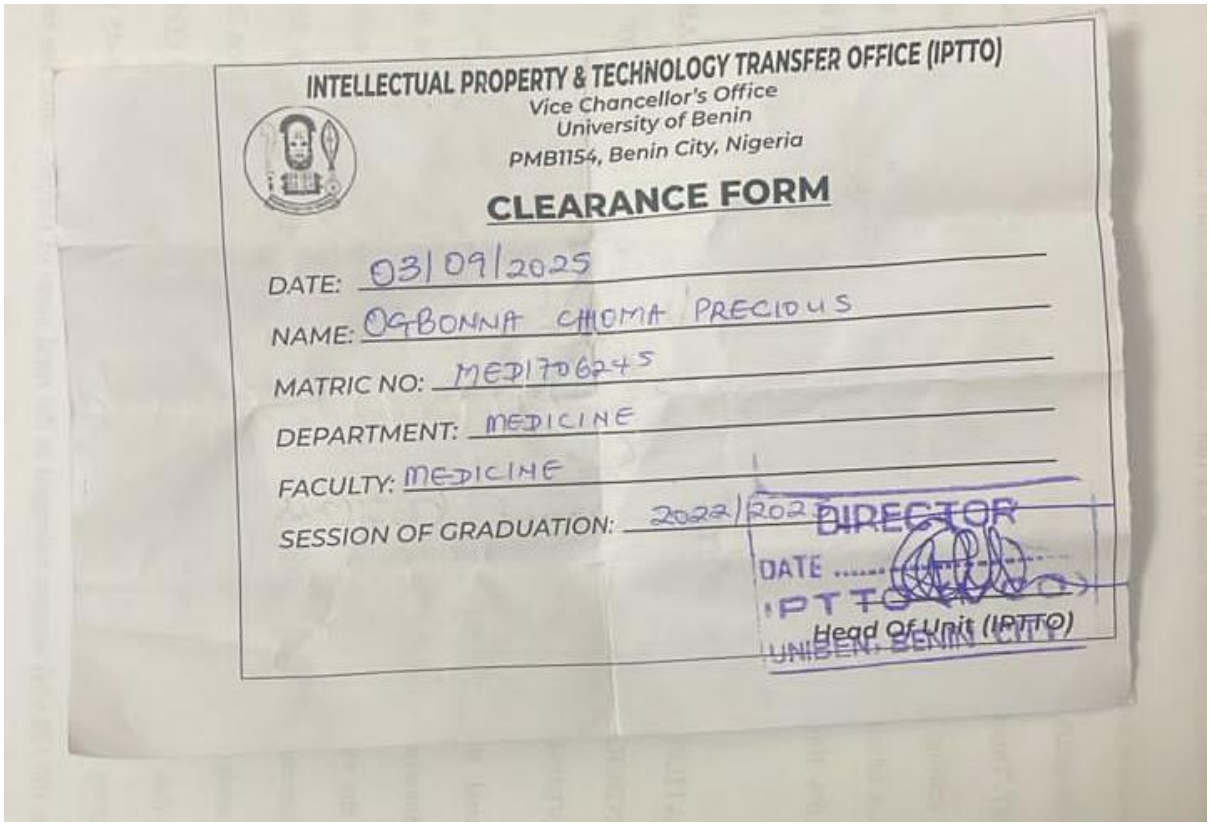
Faculty	Department	Level						Row Total
		100	200	300	400	500	600	
	Optometry	121	135	120	112	107	60	655
	Plant Biology and Biotechnology	154	105	95	66			420
	Science Laboratory Technology	189	195	198	355			937
Management Sciences	Accounting	245	224	229	245			943
	Actuarial Science	83	47	52	7			189
	Banking and Finance		1	122	90			213
	Business Administration	133	120	133	117			503
	Entrepreneurship	105	53	57	56			271
	Finance	180	114					294
	Human Resource Management	96	62	66	39			263
	Insurance	74	47	63	14			198
	Marketing	106	69	58	45			278
Medicine	Medicine	212	183	139	134	128	122	918
Pharmacy	Pharmacy	191	181	184	204	193	166	1119
Physical Sciences	Chemistry	263	161	144	143			711
	Computer Science	184	196	189	177			746
Physical Sciences	Geology	111	110	67	37			325
	Mathematics	126	71	39	32			268
	Physics	204	105	82	44			435
	Statistics	125	78	24	23			250
Social Sciences	Economics	148	140	124	137			549
	Geography and Regional Planning	29	4	5	8			46
	Political Science	166	160	149	121			596
	Public Administration	151	115	97	99			462
	Social Work	130	103	73	157			463
	Sociology & Anthropology	149	102	88	93			432

University Of Benin, Benin City

Students Count (Undergraduate Full Time) as at 26th May, 2025.

Faculty	Department	Level						Row Total
		100	200	300	400	500	600	
SUSTAINABLE PROCUREMENT, ENVIRONMENTAL & SOCIAL STANDARDS	SPESSE	216	79					295
Veterinary Medicine	Veterinary Medicine	1	26	29	15	28	16	115
Vocational and Technical Education	Agricultural Science Education and Fine and Applied Arts Education	106	56	30	11			203
	Business Education	146	60	35	18			259
	Tourism Education	53	34	27	3			117
	Industrial and Technical Education	54	23	35	2			114
Grand Total		**10,823**	**7,956**	**7,268**	**8,064**	**790**	**386**	**35,287**

APPENDIX V
PLAGIARISM TEST FORM



INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER OFFICE (IPTTO)
Vice Chancellor's Office
University of Benin
PMB1154, Benin City, Nigeria

CLEARANCE FORM

DATE: 03/09/2025
NAME: OGBONNA CHIOMA PRECIOUS
MATRIC NO: MED1706245
DEPARTMENT: MEDICINE
FACULTY: MEDICINE
SESSION OF GRADUATION: 2022/2023

DIRECTOR
DATE .....
IPTTO
Head Of Unit (IPTTO)
UNIBEN, BENIN CITY