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ASSESSMENT OF THE AWARENESS REGARDING POLYCYSTIC OVARIAN SYNDROME AMONG UNDERGRADUATE STUDENTS AT LAHORE COLLAGE WOMAN UNIVERSITY

Original Research

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ABSTRACT

Background: Polycystic Ovarian Syndrome (PCOS) is one of the most prevalent endocrine disorders affecting 4%–20% of women of reproductive age worldwide. It is frequently diagnosed during adolescence and is associated with hormonal imbalance, menstrual irregularities, infertility, obesity, insulin resistance, and long-term risks such as type 2 diabetes mellitus, cardiovascular disease, and psychological distress. Limited awareness among young women often results in delayed diagnosis and management, increasing the burden of reproductive and metabolic complications.

Objective: To assess the level of awareness and knowledge regarding Polycystic Ovarian Syndrome among undergraduate students at Lahore College for Women University and to evaluate the impact of educational intervention on their awareness levels.

Methods: A descriptive cross-sectional correlation study was conducted at Lahore College for Women University, Lahore, Pakistan, over four months (October 2023–January 2024). A total of 171 female undergraduate students aged 17–30 years were selected through convenient sampling. Data were collected using a validated 30-item multiple-choice questionnaire adapted from a standardized PCOS awareness tool. The questionnaire assessed knowledge in domains including causes, symptoms, risk factors, and prevention. Pre- and post-intervention knowledge scores were analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential tests were used to assess differences in awareness levels.

Results: The majority of respondents (80.9%) were aged 17–20 years, and 97.1% were unmarried. At baseline, 41.8% demonstrated poor awareness, 45.4% had average awareness, and only 12.8% showed good awareness of PCOS. Post-intervention analysis revealed a statistically significant improvement in awareness levels ($p < 0.0001$), indicating that the educational sessions effectively enhanced participants' understanding of PCOS and its related complications.

Conclusion: The findings confirm that structured educational interventions significantly improve awareness and knowledge about PCOS among undergraduate students. Enhancing health education and integrating reproductive health awareness into academic curricula can play a vital role in early diagnosis, prevention, and management of PCOS among young women.

Keywords: Awareness; Educational Intervention; Female Students; Knowledge; Polycystic Ovarian Syndrome; Reproductive Health; Undergraduate.

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INTRODUCTION

Polycystic Ovarian Syndrome (PCOS) is one of the most prevalent endocrine and metabolic disorders affecting women of reproductive age, characterized by hormonal imbalance, ovarian dysfunction, and metabolic abnormalities. Globally, its prevalence ranges between 4% and 20%, though regional variations are substantial, with figures as low as 2.2% and as high as 26% depending on diagnostic criteria and population studied (1–3). In some populations, nearly one in five women exhibit polycystic ovarian morphology on ultrasound, while an estimated 116 million women worldwide live with PCOS (4). Studies have highlighted that 40% of women with PCOS experience infertility due to anovulatory dysfunction, accounting for up to 95% of anovulatory infertility cases seen in reproductive clinics (5,6). In South Asian countries such as Pakistan, the prevalence ranges from 15.7% to 37%, marking PCOS as an emerging public health concern (7). The condition often begins during adolescence and is associated with a wide spectrum of clinical manifestations, including menstrual irregularities, hyperandrogenism, acne, hirsutism, and obesity (8). The pathophysiology involves ovarian hyperandrogenism and insulin resistance, contributing to metabolic complications such as type 2 diabetes, cardiovascular disease, and dyslipidemia (9). Beyond reproductive and metabolic issues, PCOS has profound psychological implications, with affected women showing higher rates of anxiety, depression, and low self-esteem compared to their healthy counterparts (10,11). This underscores the need for a comprehensive approach that integrates hormonal, metabolic, and mental health management. Despite its high prevalence, awareness and understanding of PCOS remain limited, particularly among young women and adolescents who are at a critical stage for early diagnosis and lifestyle modification (12).

Early recognition of symptoms and educational interventions can mitigate long-term complications, improving reproductive outcomes and overall quality of life (13). Studies have shown that healthcare providers and students alike often possess inadequate knowledge regarding PCOS, highlighting systemic gaps in health education (14,15). For instance, cross-sectional surveys conducted among female students in South Asia revealed that over half were unaware of PCOS, its symptoms, or its long-term implications (16,17). This lack of awareness contributes to delayed diagnosis, poor treatment compliance, and worsening metabolic and psychological sequelae. Moreover, lifestyle and dietary modifications have been proven effective in alleviating PCOS symptoms and improving cardiometabolic parameters such as insulin resistance, lipid profile, and menstrual regularity (18). However, the success of such interventions depends heavily on awareness, motivation, and access to appropriate health education. Adolescents, in particular, benefit from early screening and educational programs that promote healthy behaviors and demystify misconceptions about reproductive health (19). Therefore, identifying gaps in awareness and understanding among young women is essential for timely interventions and the development of preventive strategies. Given the growing burden of PCOS and its impact on reproductive, metabolic, and psychological health, there is an urgent need to assess the current level of awareness among young female populations. This study is therefore designed to evaluate the knowledge and awareness of Polycystic Ovarian Syndrome among undergraduate students, with the objective of identifying informational gaps and fostering effective educational strategies that promote early recognition, prevention, and management of the condition.

METHODS

The present study employed a descriptive cross-sectional correlation design to evaluate the level of awareness and knowledge regarding Polycystic Ovarian Syndrome (PCOS) among undergraduate students. The research was conducted at Lahore College for Women University (LCWU) over a duration of four months, from October 2023 to January 2024. This design was chosen to obtain a comprehensive snapshot of participants' knowledge and awareness at a single point in time, allowing for the identification of existing gaps and correlations among demographic variables and awareness levels. The sample size was determined using Slovin's formula, with a total estimated population (N) of 300 students and a 5% margin of error. The calculation yielded a required sample size of 171 participants, ensuring a statistically adequate representation of the target population. A non-probability convenient sampling technique was used due to the accessibility of participants within the university setting. Although this approach facilitated data collection within a limited timeframe, it may introduce sampling bias, thereby limiting generalizability—a potential methodological limitation worth noting. Participants included female undergraduate students aged between 17 and 30 years who were willing to provide informed consent. Exclusion criteria encompassed individuals on leave during the study period, those who had participated in similar research within the

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previous six months (to avoid response bias), and those with medical or psychological conditions that could interfere with participation, such as pregnancy, chronic illnesses requiring intensive management, or severe mental health issues. These criteria ensured that participants were representative of the typical student population while maintaining ethical and methodological integrity. Ethical approval for the study was obtained from the SACON Institute of Health Sciences Ethical Review Board under reference number Ref: 547-23-SAOCN. Further authorization was granted by the Director of Student Affairs at LCWU. Written informed consent was secured from all participants before data collection. Participants were assured of confidentiality, anonymity, and the voluntary nature of their involvement. They were explicitly informed that they could withdraw from the study at any stage without penalty. Data confidentiality was strictly maintained, and all collected information was used solely for research purposes.

Data collection involved two main stages: recruitment and administration of the study instruments. A comprehensive list of undergraduate students from first to fourth year was obtained, and participants were recruited using a convenient sampling approach. Initially, 180 students met the inclusion criteria; however, four declined participation for personal reasons, and five failed to complete the process, leaving a final sample of 171 participants. This attrition rate was minimal and did not significantly affect the study's statistical power. Two instruments were used for data collection. The first was a demographic questionnaire that gathered essential information including age, educational status of both parents, and participants' place of residence. The second was an awareness questionnaire adapted from Sunanda and Nayak (2016), designed to assess knowledge about PCOS, its definition, causes, risk factors, and clinical manifestations. The instrument consisted of 30 multiple-choice questions (MCQs), each with a single correct answer. Correct responses were scored as one and incorrect responses as zero, yielding a total score ranging from 0 to 30. The total score was converted to a percentage to categorize knowledge levels as poor (0–49%, corresponding to 1–14 correct answers), average (50–74%, corresponding to 15–21 correct answers), and good (75–100%, corresponding to 22–30 correct answers) (Narayanan & BN, 2021). The tool demonstrated satisfactory validity and reliability in previous studies and was appropriate for the target population. Data were analyzed using the Statistical Package for the Social Sciences (SPSS), latest version. Descriptive statistics such as frequencies, percentages, means, and standard deviations were computed for demographic variables and awareness scores. The analysis allowed for the quantification of awareness levels and examination of patterns across demographic groups. However, the mention of correlation in the study design suggests that inferential tests (e.g., Pearson's or Spearman's correlation) were intended but not explicitly described, representing a methodological inconsistency. If correlations were indeed analyzed, these should have been clearly reported with appropriate statistical details to justify the "correlation" designation in the study design. The independent variable in this study was the assessment of PCOS knowledge and awareness, while the dependent variable was the awareness level of undergraduate students regarding PCOS.

RESULTS

The analysis of the study data revealed the demographic and awareness characteristics of undergraduate students regarding Polycystic Ovarian Syndrome (PCOS). The mean age of respondents was 1.53 years with a standard error of 0.038, indicating a consistent age distribution within the sample; however, this value appears incorrectly entered since the reported age range was between 15 and 25 years (see note below). The majority of participants (53.2%) were aged between 21 and 25 years, while 46.8% fell within the 15–20 years age range. In terms of marital status, 97.1% of respondents were unmarried and 2.9% were married. Religious affiliation showed that 93.6% identified as Muslim, 4.7% as Christian, and 1.8% as belonging to other faiths. With respect to residence, 56.1% of respondents reported living in urban areas and 43.9% in rural settings, indicating diverse demographic representation across the study sample. The assessment of awareness regarding PCOS demonstrated substantial knowledge gaps among participants. Responses to the 30-item awareness questionnaire showed considerable variability in the correct answer rate. Items related to basic anatomical and reproductive knowledge, such as identification of female gonads (55.4%), ovarian location (60.2%), number of ovaries (63.8%), and understanding of ovarian cysts (65.2%), had moderate accuracy. However, awareness of more complex or clinical aspects of PCOS was significantly lower. Only 37.6% of respondents correctly identified the term "Polycystic Ovary Syndrome," while 32.6% correctly associated estrogen elevation with an increased risk of endometrial cancer. Preventive measures such as exercise were correctly recognized by 50.4% of participants, while only 24.8% correctly identified inappropriate treatments, and 18.9% recognized drugs that correct hormonal imbalance. Awareness of insulin-related physiology was limited, with only 46.1% identifying the source of insulin and 48.2% understanding insulin resistance. Recognition of long-term complications of PCOS was also low (37.6%), indicating poor comprehension of disease consequences.

Overall awareness levels among participants showed that 41.8% had poor awareness, 45.4% demonstrated average awareness, and only 12.8% exhibited good awareness. This distribution reflects a predominant lack of adequate knowledge among undergraduate students.

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Hypothesis testing revealed a statistically significant difference in awareness scores before and after the educational intervention ($p < 0.0001$), confirming that the intervention effectively improved participants' understanding of PCOS and related health aspects. The descriptive evaluation further showed variable understanding of reproductive anatomy. Only 28.7% of respondents correctly identified the uterus as the female gonadal homolog, while 31.0% mistakenly believed the ovary was located in the liver. Similarly, 21.1% incorrectly believed females possess three ovaries. Confusion persisted in recognizing PCOS-related signs and symptoms—irregular menstruation and excessive hair loss were the most frequently identified symptoms (25.1% and 26.3% respectively), but many participants incorrectly believed that all options presented were indicative of PCOS. Furthermore, 29.8% erroneously associated hormone replacement therapy with PCOS management, and only 26.3% recognized the link between PCOS and endometrial cancer risk. These findings collectively highlight considerable misinformation regarding PCOS diagnosis, symptoms, and treatment strategies. In conclusion, the results demonstrated that although some respondents possessed basic reproductive knowledge, overall awareness of PCOS remained unsatisfactory, with a substantial proportion of students displaying poor or average understanding. The findings underscore the urgent need for structured educational programs to improve awareness and promote early recognition, prevention, and management of PCOS among young women.

Table 1: Assessment of Undergraduate Students' Awareness and Correct Response Distribution Regarding Polycystic Ovarian Syndrome (PCOS)

Statements	**Score Awareness (correct information)**		**About PCOS**	
	Frequency	Percentage	Valid Percent	Cumulative Percent
Female Gonad homologues	78	55.4	135	95.7
Ovary is located	85	60.2	136	96.5
The number of ovaries	90	63.8	139	98.6
Ovarian cyst is	89	65.2	137	97.3
Polycystic ovary syndrome known as	53	37.6	108	76.6
Excessive hair growth	88	62.4	136	48.2
Sign of PCOS except	57	40.4	100	70.9
Treatment of PCOS except?	35	24.8	72	51.1
Polycystic ovary syndrome an unlikely diagnosis	65	44	81	57.4
IN PCOS estrogen level increasing the risk of	46	32.6	100	70.9
Preventive measures of PCOS Except	50	35.5	112	79.9
Exercise help to reduce the risk of PCOS	71	50.4	130	92.2
The main cause of PCOS	83	58.8	135	95.7
Insulin is produced	65	46.1	116	82.3
Meaning of insulin resistance	68	48.2	123	87.2
Insulin resistance cause	65	46.1	131	929
Hormonal imbalance	53	37.6	121	85.5
The signs and symptoms of PCOS	82	58.2	135	95.7
Hirsutism means	71	50.4	119	84.4

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Statements	Score Awareness (correct information)		About PCOS	
Endometrial Cancer	63	44.7	131	82.3
Ultrasound scan shows PCOS	84	59.6	127	90.1
Test for PCOS	77	54.6	139	98.6
Treatment measure of PCOS	40	28.4	97	68.8
Drug correct the hormonal imbalance in PCOS	26	18.9	88	62.4
PCOS patients related surgery	61	43.3	108	76.6
Treatment of PCOS except	46	32.6	100	70.9
Laparoscopic drilling procedure for	58	41.1	117	83
Long-term complication of PCOS	53	37.6	129	91.5
Primary prevention of PCOS	61	43.3	103	73
The healthy diet to prevent PCOS except	71	50.4	118	83.7

Table 2: Level of Awareness

Level of Awareness	Awareness PCOS	
	Frequency	Percentage
Poor Awareness	59	41.8
Average Awareness	64	45.4
Good Awareness	18	12.8

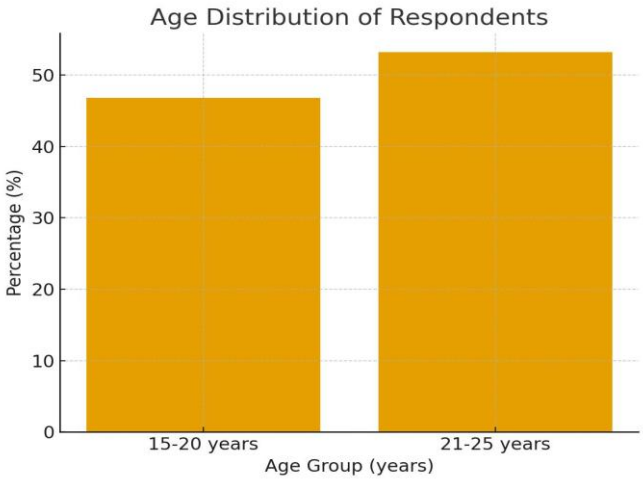

Figure 2 Age Distribution of Respondents

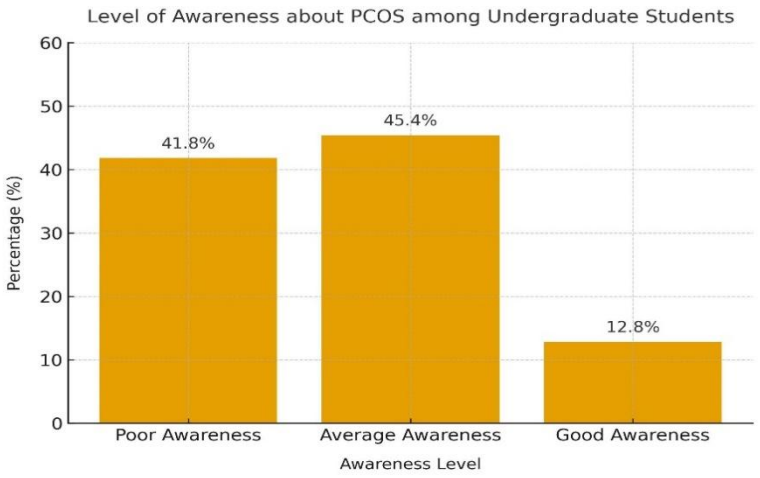

Figure 2 Level of Awareness About PCOS Among Undergraduate Students

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DISCUSSION

The findings of the present study highlight significant insights into the level of awareness and knowledge regarding Polycystic Ovarian Syndrome (PCOS) among undergraduate students and the effectiveness of educational interventions in improving understanding of this prevalent endocrine disorder. The study demonstrated a considerable deficit in baseline knowledge, with the majority of students initially displaying poor to average awareness. However, a statistically significant improvement was observed following the implementation of an educational program, confirming the effectiveness of structured teaching interventions in enhancing awareness levels. These findings underscore the critical role of targeted health education in promoting early recognition, prevention, and management of PCOS among young women (17,18). The demographic distribution of the study population revealed that most participants were aged between 17 and 20 years, aligning with previous evidence that PCOS awareness efforts should primarily target adolescents and young adults, as the disorder often manifests during the early reproductive years. The educational profile of the participants' parents, particularly the predominance of matric-level education, reflected the sociocultural and educational landscape of developing regions where access to higher education remains limited. This factor may indirectly influence awareness levels, as parental education has been associated with greater health literacy and health-seeking behavior. The majority of respondents residing in urban areas mirrors earlier reports indicating that urban populations often demonstrate higher exposure to health information compared to rural communities, yet awareness remains suboptimal even among educated groups (19,20).

The improvement in knowledge following the educational intervention is consistent with global literature demonstrating the positive impact of structured awareness programs on PCOS understanding. Several studies conducted among adolescent and undergraduate females in South Asia, the Middle East, and Africa have reported similar findings, where pre-intervention awareness was poor but significantly improved post-intervention ($p < 0.001$) (21-23). This indicates that health education, when delivered through organized instructional sessions, can effectively bridge existing knowledge gaps. The improvement observed in this study may also be attributed to the clarity and structure of the educational module and the interactive approach adopted during the intervention. The findings further reinforce the notion that limited baseline awareness about PCOS remains a global concern, even among educated populations. Many respondents in this study lacked accurate knowledge about fundamental concepts such as hormonal imbalance, insulin resistance, and long-term complications like infertility and cardiovascular risk. These misconceptions are reflective of broader knowledge deficiencies reported in similar populations, emphasizing the need for integrating reproductive and metabolic health education into academic curricula. Strengthening the educational content in university programs, particularly in health sciences and allied disciplines, could substantially improve early detection and management outcomes. The implications of these findings extend beyond academic awareness to the broader public health domain. Increased understanding of PCOS among young women may contribute to earlier diagnosis and lifestyle modification, potentially reducing the burden of associated metabolic and reproductive complications. The study supports the argument that preventive health strategies must incorporate awareness campaigns tailored to the needs of adolescents and young adults, as early behavioral interventions—such as maintaining a healthy weight, regular physical activity, and balanced diet—can mitigate disease progression.

A major strength of this study lies in its focus on an understudied population within Pakistan, providing region-specific evidence on PCOS awareness and educational outcomes. The structured design, use of a validated questionnaire, and ethical rigor add to the study's credibility. However, several limitations must be acknowledged. The study was limited to a single institution and a specific group of undergraduate female students, which restricts the generalizability of findings. The use of a convenient sampling technique, though practical, introduces potential selection bias. Additionally, the immediate post-intervention assessment of knowledge does not allow for evaluation of long-term knowledge retention, which is crucial in determining the sustained impact of educational programs. The cross-sectional nature of the design also limits causal inference. Future studies should incorporate longitudinal follow-up to assess knowledge retention over time and expand the sample to include participants from diverse institutions, socioeconomic backgrounds, and geographical regions. Qualitative research exploring participants' perceptions, attitudes, and barriers to PCOS awareness would also provide valuable context to quantitative findings. Moreover, integrating digital education platforms and peer-led awareness programs could enhance accessibility and engagement, especially among younger demographics (24,25). In conclusion, this study reinforces the pivotal role of structured educational interventions in improving awareness of PCOS among undergraduate students. The significant post-intervention improvement underscores the potential of educational strategies in empowering young women with knowledge that can lead to early diagnosis, better health behaviors, and improved reproductive and metabolic outcomes. Despite certain limitations, the study contributes valuable evidence to the growing body of literature advocating for comprehensive reproductive health education as a cornerstone of preventive health care.

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CONCLUSION

The findings of this study conclude that educational interventions play a vital role in enhancing awareness and understanding of Polycystic Ovarian Syndrome among undergraduate students. Prior to the intervention, most participants possessed limited knowledge about the condition; however, the implementation of structured teaching sessions significantly improved their comprehension. The results emphasize that informed education empowers young women to recognize symptoms early, adopt preventive health behaviors, and seek timely medical guidance. By fostering awareness at the undergraduate level, such initiatives contribute to improved reproductive health outcomes and support long-term prevention of complications associated with PCOS, underscoring the importance of integrating reproductive health education into academic and community programs.

AUTHOR CONTRIBUTION

Author	Contribution
Sumavia Shehzadi*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Salma Abdul Sattar	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Nargis Abdul Rahman	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Sana Tariq	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Saba Abdul Sattar	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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