

Knowledge, awareness & attitude towards PCOS amongst dental college students of Pune city

Mrs. Chhaya V.Jawlikar¹, Dr. Nimty Raina Ambardar², Ms. Pratiksha Dhamal³, Mr. Gourav Bharat Deshmane⁴, Mrs. Sadhana Kakaso Pawar⁵, Sanjeevani Khatake⁶, Aditi Navar⁷, Mansi Mahajan⁸

¹Assistant Professor, D.Y.Patil Dental School, Pune

²Assistant Professor, D.Y.Patil Dental School, Pune

³Assistant Professor, D.Y.Patil Dental School, Pune

⁴Assistant Professor, Bharati Vidyapeeth (DTU), Dental College & Hospital, Pune

⁵Assistant Professor, Bharati Vidyapeeth (DTU), Dental College & Hospital, Pune,

⁶BDS IInd Year Student, D.Y.Patil Dental School, Pune

⁷BDS IInd Year Student, D Y Patil Dental School, Pune,

⁸BDS Ist year student, D Y Patil Dental School, Pune. Email ID: nimtyraina.nr@gmail.com.

ABSTRACT

Introduction: Polycystic ovary syndrome (PCOS) is a common hormonal disorder affecting a significant number of women globally. It is associated with a wide range of health issues, including metabolic and psychological problems, and has a strong, bidirectional link with periodontal diseases. This connection places dental professionals in a unique position to contribute to its early detection and management. However, a general lack of awareness, particularly among future healthcare providers, delays crucial interventions. This study aimed to assess the knowledge, awareness, and attitudes of dental college students in Pune city regarding PCOS, its symptoms, risk factors, and its specific link to oral health.

Methodology: A cross-sectional, questionnaire-based study was conducted on 200 dental students. The survey was designed to evaluate their understanding of PCOS across four domains: demographic data, general awareness, knowledge of symptoms and risk factors, and awareness of diagnosis and treatment options. The questionnaire used a mix of multiple-choice and binary ("Yes"/"No") questions. The collected data was analyzed using SPSS software, with results presented as percentages.

Results & Observations: The findings indicated a moderate level of general awareness, with 60% of students having heard of PCOS and 87% being aware of its link to infertility. However, significant gaps in specific knowledge were observed. A large majority of students were unaware of the relationship between PCOS and key factors such as obesity (83% unaware), insulin resistance/prediabetes (62% unaware), or the genetic inheritance pattern (52% unaware). Knowledge of diagnostic methods, such as transvaginal ultrasound (60% unaware) and hormonal testing (77% unaware), was also low. In contrast, the students demonstrated positive and empathetic attitudes, with 95% believing in the importance of early diagnosis and 89% feeling that more awareness and support are needed for women with PCOS.

Conclusion: The study revealed that while dental students possess a supportive attitude and general awareness of PCOS, they have significant deficiencies in specific, clinically relevant knowledge, particularly regarding its metabolic and genetic links. The findings underscore a critical need for targeted educational programs within the dental curriculum to bridge these knowledge gaps, thereby equipping future dental professionals to provide more holistic care and contribute to the early detection and management of PCOS.

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1. INTRODUCTION

Polycystic ovary syndrome (PCOS) is a common hormonal disorder affecting 6% to 13% of women globally, making it a significant public health issue. It involves a combination of hormonal, metabolic, and reproductive problems.^{1,2,3} To be diagnosed with PCOS, a woman typically needs to meet at least two of the following three criteria, according to the Rotterdam consensus: signs of high male hormone levels (like excess hair or acne, or abnormal blood tests), irregular or absent ovulation, and ovaries that appear polycystic on an ultrasound. However, the effects of PCOS aren't limited to these diagnostic features; they include a broad range of symptoms and potential long-term health complications.⁴

PCOS has wide-ranging effects beyond just reproductive issues like infertility and irregular periods. Women with PCOS face a much higher risk of developing metabolic problems such as insulin resistance, metabolic syndrome, and type 2 diabetes. The ongoing inflammation and hormonal imbalances linked to PCOS also increase the risk of heart disease, non-alcoholic fatty liver disease, and certain cancers.^{5,6} Beyond the physical, PCOS also carries a significant psychological toll. Many women with PCOS experience anxiety, depression, and body image issues, often due to symptoms like excess hair growth (hirsutism) and weight gain. Given these extensive health implications, a multi-disciplinary approach to care is essential, meaning all healthcare professionals need a basic understanding of PCOS.^{7,8}

The link between PCOS and oral health is a burgeoning area of research that highlights the interconnectedness of systemic and local health. Emerging evidence suggests a strong, bidirectional relationship between PCOS and periodontal diseases, particularly gingivitis and periodontitis.^{9,10} The chronic systemic inflammation, elevated androgen levels, and insulin resistance characteristic of PCOS are all known risk factors for periodontal disease. These systemic factors can exacerbate the local inflammatory response in the gums, leading to more severe periodontal destruction. Studies have consistently shown that women with PCOS have a higher prevalence and severity of periodontal disease compared to their healthy counterparts, marked by deeper probing depths, greater clinical attachment loss, and increased bleeding on probing.^{11,12} This link is clinically significant, as it positions dental professionals at a unique juncture to contribute to the early detection and management of PCOS. During routine dental examinations, signs such as chronic gingivitis or periodontitis, especially when resistant to conventional treatment, could be a potential sign for an underlying systemic condition like PCOS.

Research indicates that women with PCOS tend to have more frequent and severe gum disease than those without the condition.^{11,12} In a study conducted by Mohammad Ehsan Rahiminejad et al similar results were found proving systemic inflammation due to PCOS was the cause for periodontal diseases.¹¹ This is clear from signs like deeper gum pockets, greater loss of tissue around the teeth, and increased bleeding. This connection is highly significant for healthcare, as it places dental professionals in a unique role for early detection and management of PCOS. During routine dental check-ups, persistent gum inflammation (gingivitis) or periodontitis that doesn't improve with standard treatments could signal an underlying condition like PCOS.¹³

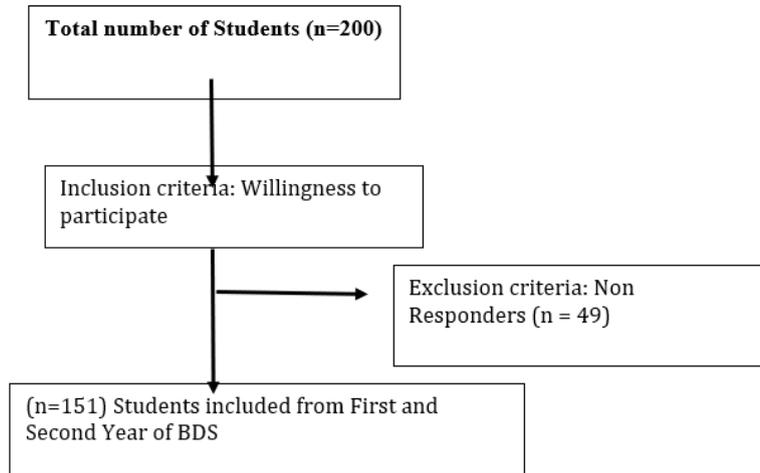
Many women with PCOS remain undiagnosed due to a lack of public and student awareness, delaying vital health interventions.¹⁴ This knowledge deficit is particularly concerning in the context of dental students, who will soon be on the front lines of patient care.

Because PCOS is linked to oral health, it's incredibly important for dental students to understand this condition. Knowing about PCOS will enable future dentists to spot potential oral symptoms, educate patients effectively, and make appropriate referrals to specialists like endocrinologists and gynaecologists. By understanding PCOS's broader health impacts, dental students can provide holistic patient care, stressing how managing systemic risk factors improves both oral and overall health.

Thus this study planned to thoroughly evaluate dental students' knowledge and awareness of PCOS. It specifically looked at their understanding of PCOS's diagnostic criteria, symptoms, associated health issues, and especially its link to oral health and gum disease. By using a questionnaire, the study aimed to gather data on their current knowledge. The results of the study were expected to highlight any gaps in their education, which can then inform the development of targeted educational programs within dental schools. These programs would help students better understand the connection between overall health and oral health, preparing them to be more effective and holistic healthcare providers. Ultimately, this effort is crucial for equipping future dental professionals to help with the early detection, prevention, and collaborative management of PCOS.

2. METHODOLOGY

This study was undertaken around dental college and hospital located in Pune district in Maharashtra, India. A total of 200 students participated in this cross-sectional questionnaire-based study. The study participants were selected on the basis of their willingness to participate in the study. The questionnaire was a google form consisting 2 sections on knowledge and attitude having 16 and 10 questions respectively. Consent was obtained via google form itself.



Survey Instrument: The Questionnaire's Structure:

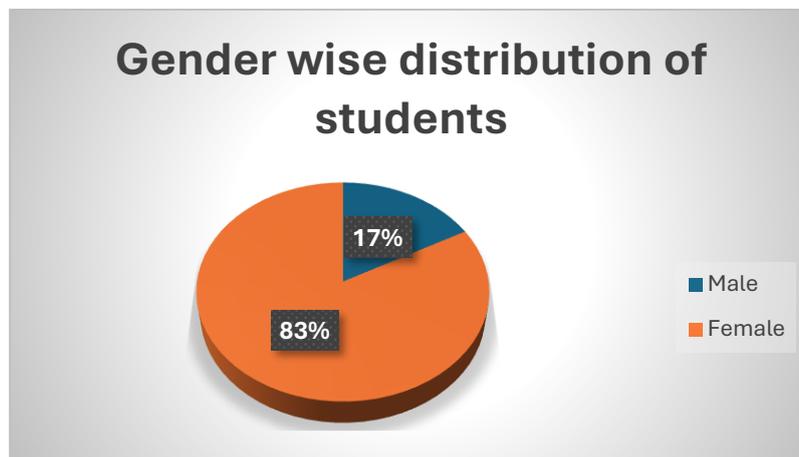
The questionnaire was designed to cover a broad range of topics related to PCOS and was divided into four key domains. The first domain, Demographic Data, gathered basic information about the participants, such as their gender and academic year. The second domain, general awareness of PCOS, assessed whether students had heard of the condition at all. The third domain, knowledge of symptoms, risk factors, and consequences, delved into more specific aspects of the syndrome, including its clinical manifestations and long-term health risks. The fourth domain, awareness of diagnosis and treatment options, evaluated their understanding of how PCOS is identified and managed. The questions were formulated in a straightforward manner, using a mix of multiple-choice and binary ("Yes"/"No") formats to facilitate quick and clear responses.

Statistical analysis:

Results for the two categories are expressed in percentages. Each response obtained was evaluated on basis of scores they obtained in sections of knowledge and attitude. The entire analysis process was done in SPSS software 9.4.

3. OBSERVATION & RESULTS

Figure 1: Demographic status of study population (gender)



Pie chart depicting distribution of study population according to gender

Table 1: Mean percentage of knowledge-based questions score responses obtained from volunteers

Sr.No	Questions	Yes (%)	No (%)
1	Have you heard about the term called polycystic ovary syndrome (PCOS)?	60%	40%
2	Have you ever come across any article on PCOS?	13%	87%

3	Do you know anyone who has been previously diagnosed with PCOS?	64%	36%
4	Do you know PCOS has a genetic inheritance pattern?	48%	52%
5	Have you heard about the androgen (male) hormone & its role in PCOS development?	43%	57%
6	Can obesity cause PCOS?	17%	83%
7	Can environmental pollutants like heavy metal lead to pathogenesis of PCOS?	34%	66%
8	Do you know there is a link between Prediabetes, insulin resistance & PCOS ?	38%	62%
9	Do you know PCOS can be diagnosed with testing levels of various hormones like testosterone, TSH, LH, Anti-mullerian hormone amongst many other?	23%	77%
10	Do you know PCOS diagnosis can be confirmed by transvaginal ultrasound?	40%	60%
11	Do you know PCOS may lead to infertility (inability to have children) or reduced fertility (reduced chance to get pregnant)?	87%	13%
12	Do you know PCOS if left untreated may lead to cancer (endometrial)?	25%	75%
13	Do you know hormonal therapy (oral contraceptives, intrauterine device etc) may be used treat PCOS?	28%	72%
14	Do you know anti-diabetic medications (metformin) may be used to treat PCOS?	48%	52%
15	Do you know surgery may be done to remove ovarian cysts?	17%	83%

Figure 2: Knowledge on treatment available for PCOS:

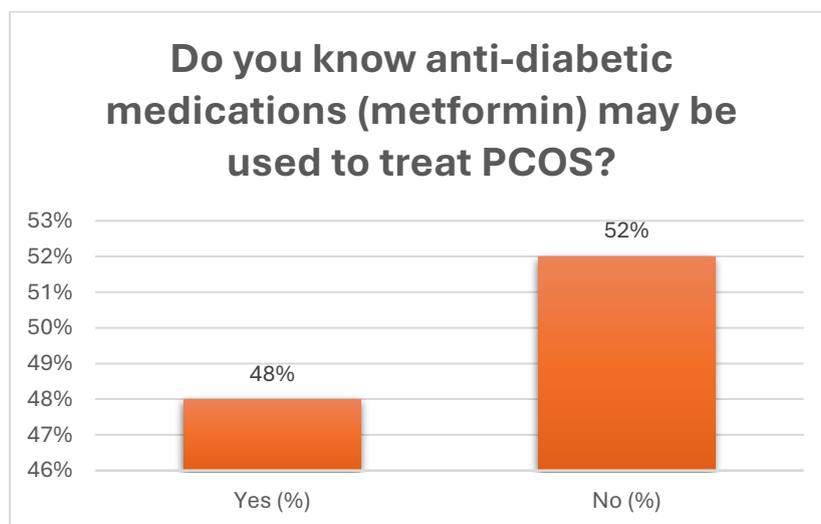
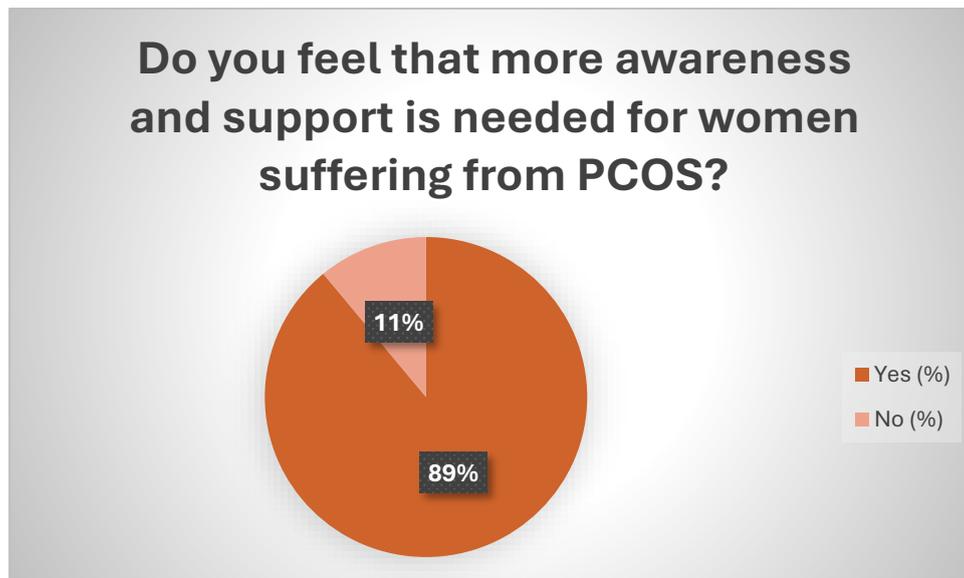


Table 2: Mean percentage of attitude-based questions score responses obtained from volunteers

Sr.No	Questions	Yes (%)	No (%)
1	Do you know sedentary life style & lack of exercise are one of the risk factors which may lead to PCOS?	13%	87%
2	Can junk food habits lead to PCOS?	15%	85%
3	Do you know PCOS may lead to psychological symptoms anxiety and depression?	9%	91%
4	Do you know life style modification & eating healthy diet is a game changer in treatment of PCOS?	60%	40%
5	Do you think PCOS can significantly affect a woman's quality of life?	74%	26%
6	Do you think women with PCOS are often misunderstood or not taken seriously by others?	60%	40%
7	Do you think females with PCOS have to face social stigma?	66%	34%
8	Would you feel comfortable discussing PCOS with a healthcare provider?	60%	40%
9	Do you think early diagnosis of PCOS can improve outcomes?	95%	5%
10	Do you feel that more awareness and support is needed for women suffering from PCOS?	89%	11%

Figure 3: Attitude & awareness-based question response:



4. DISCUSSION

The present student survey shows the level of general awareness about various aspects of Polycystic Ovary Syndrome (PCOS) amongst dental college students of either sex in Pune city. Figure no 1 show, 83% volunteers were female & 17% were male. In a study conducted by Eman Alshdaifat et al based on awareness of polycystic ovary syndrome amongst university students depicts higher educational years students has higher awareness regardless of age about PCOS.¹⁴

Table no 1, shows percentage responses based on knowledge-based question framed on PCOS, encompassing various important aspects of PCOS. A significant, 60% students were aware about the term PCOS, 40% were not aware of this term. Amongst the volunteers only 13% had come across articles highlighting PCOS. This difference is expected as the sample included male students and PCOS mainly affects females. A notable 64% of students knew someone who had been diagnosed with the condition. A cross-sectional study done by Malekzadeh F in school girls & their mothers reveals, Iranian women have low awareness of PCOS, which negatively impacts their quality of life. Health authorities should therefore create educational programs to correct misinformation and boost understanding of the condition.¹⁵

The data indicates that while general knowledge is average, specific knowledge about the causes, diagnosis, and treatment of PCOS is more varied. For example, 43% have heard about the androgen (male) hormone & its role in PCOS development. Some students correctly identified obesity but that is a low percentage around just 17%, a majority of 83% were unaware of this fact. Additionally, a high percentage i.e 87% of students were aware that PCOS can cause infertility. Around 66% of the students were not aware that environmental pollutants like heavy metal lead to pathogenesis of PCOS. This suggests that information about the more visible aspects of the condition like infertility has been effectively disseminated through public health campaigns and media, whereas other intricate details are yet to be made common amongst the dental students.

The survey also found significant gaps in more detailed knowledge. Amongst the volunteers 52% did not know that PCOS has a genetic inheritance pattern. Link of Diabetes to PCOS has been established now, Insulin resistance is the central physiological mechanism connecting the two. In women with PCOS, the body's cells don't respond effectively to insulin, causing the pancreas to produce more of it to compensate. This hyperinsulinemia not only contributes to the hormonal imbalances characteristic of PCOS, but also significantly increases the risk of developing type 2 diabetes. Studies indicate that women with PCOS are up to 4-8 times more likely to develop type 2 diabetes and are often diagnosed at a younger age. This connection highlights why managing insulin resistance is a key part of PCOS treatment. Research done by Zhu, T et al provides a comprehensive overview of the increased risk of type 2 diabetes, coronary heart disease, and stroke in women with PCOS, supported by robust data analysis.¹⁶

Our study shows a majority of 62% students were unaware that there is a link between Prediabetes, insulin resistance & PCOS. For the treatment modes anti-diabetic medications (metformin) may be used to treat PCOS, 48% volunteers responded by saying they were aware of this mode as shown in **figure no1**. Saadati S et al in their review article, have discussed the role of metformin in managing PCOS, particularly its benefits in improving insulin resistance, menstrual regularity, and androgen levels. It acknowledges that while it's a common treatment, its specific role for various outcomes is still debated, and it is not a "one-size-fits-all" solution.¹⁷

Similarly, only 40% were aware that a transvaginal ultrasound can be used for diagnosis. Knowledge of specific hormonal factor levels like testosterone, TSH, LH, Anti-mullerian hormone can be used in diagnosing of PCOS only 23% of students were knowing about this. This lower awareness of clinical details suggests a need for more targeted educational interventions that go beyond basic symptoms and risk factors.

A low knowledge on treatment modules like use of oral contraceptives and surgery in case of ovarian cysts was explored in this study. Research reveals while oral contraceptives can effectively reduce the risk of developing functional ovarian cysts, they are not effective at accelerating the resolution of cysts that have already formed. This finding challenges a common clinical practice from previous decades. Studies comparing women on oral contraceptives to those on a "watchful waiting" approach found no significant difference in the time it took for the cysts to disappear. This is because most benign, functional cysts resolve on their own within two to three menstrual cycles. Therefore, the current recommendation is not to use birth control pills to treat an existing cyst, but they may be prescribed to prevent future occurrences.¹⁸

The survey results on students' attitudes towards PCOS are positive and supportive as shown in **table no. 2**. A vast majority of students (95%) believed that early diagnosis can improve outcomes, 60% recognized that lifestyle changes and a healthy diet are crucial for treatment. This reflects a belief in proactive health management and a positive outlook on lifestyle-based interventions. The willingness to discuss PCOS with a healthcare provider was also high, with 60% of students comfortable doing so.

Students' attitudes also extended to the social and psychological aspects of PCOS. A large majority (89%) felt that more awareness and support are needed for women with PCOS. This shows a compassionate and empathetic stance towards those affected. One of the studies done in Canadian population summarizes that many women waited more than two years for a diagnosis and were not informed about the long-term health risks associated with PCOS.¹⁹

Students also demonstrated an awareness of the challenges faced by women with PCOS, with 66% believing they experience social stigma and 60% thinking they are often misunderstood or not taken seriously by others. This recognition of the social and emotional burden is crucial for creating a supportive environment. A qualitative study done by Saleem, B., & Sultana, A. reveals that women with PCOS experience a difficult emotional journey, body image issues, and social ostracism due to their symptoms.²⁰

The survey's findings provide a clear picture of the current knowledge and attitudes regarding PCOS among the students.

The purpose of this research was to assess the level of general and specific awareness about Polycystic Ovary Syndrome (PCOS) among male and female dental students in Pune. The study also aimed to understand their attitudes towards the condition, including its management, social aspects, and the challenges faced by women with PCOS.

The study found a significant gap in knowledge. While a majority of students were aware of the term PCOS and its link to infertility, their understanding of specific details was lacking. Only a small percentage of students knew about the role of obesity, environmental pollutants, or the genetic link to PCOS. Crucially, a majority were unaware of the strong connection between PCOS, insulin resistance, and diabetes. The study also highlighted a lack of knowledge regarding specific diagnostic tools like transvaginal ultrasound and the use of hormonal levels, as well as the nuanced role of oral contraceptives in treatment.

The positive outcome of the research was the students' supportive attitudes. A vast majority believed in the importance of early diagnosis, lifestyle changes, and the need for more awareness and support for women with PCOS. They also recognized the social stigma associated with the condition. The findings suggest a clear future scope for research and intervention. There is a strong need to implement targeted educational programs within the dental curriculum. These programs should focus on bridging the knowledge gap regarding the metabolic, genetic, and diagnostic aspects of PCOS. This would not only enhance the students' understanding but also prepare them to provide better, more empathetic care to their future patients, contributing to earlier diagnosis and improved outcomes.

Educational interventions should be designed to target the identified knowledge gaps. While students are well-informed about the role of diet and exercise, a curriculum could be developed to include more specific information on the hormonal and genetic aspects of PCOS.

5. CONCLUSION

This study reveals that dental students have moderate general awareness of PCOS but significant knowledge gaps regarding its metabolic and genetic links. Encouragingly, they demonstrate empathetic attitudes toward the social stigma women with PCOS face. The findings underscore the need for targeted educational programs to improve their clinical understanding.

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