frontiers in Medicine

TYPE Original Research
PUBLISHED 20 April 2026
DOI 10.3389/fmed.2026.1782062

Check for updates

OPEN ACCESS

EDITED BY
Florian Recker,
University Hospital of Cologne, Germany

REVIEWED BY
Nazmul Kabir Qureshi,
National Healthcare Network (NHN), Bangladesh
Sri Chandana Mavulati,
Shri Vishnu College of Pharmacy, India

*CORRESPONDENCE
Thamer Alsufayan
✉ Talsufayan@ksu.edu.sa
Thamir Al-khlaiwi
✉ talkhlaiwi@ksu.edu.sa

RECEIVED 06 January 2026
REVISED 03 March 2026
ACCEPTED 16 March 2026
PUBLISHED 20 April 2026

CITATION
Alsufayan T, Alsahly M, Aloraini HK and Al-khlaiwi T (2026) High prevalence of poly cystic ovary syndrome among young Saudi medical students: an observational cross-sectional study. *Front. Med.* 13:1782062. doi: 10.3389/fmed.2026.1782062

COPYRIGHT
© 2026 Alsufayan, Alsahly, Aloraini and Al-khlaiwi. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

# High prevalence of poly cystic ovary syndrome among young Saudi medical students: an observational cross-sectional study

Thamer Alsufayan[1]*, Musaad Alsahly[1], Hoor K. Aloraini[2] and Thamir Al-khlaiwi[1]*

[1]Department of Physiology, College of Medicine, King Saud University, Riyadh, Saudi Arabia, [2]College of Medicine, King Saud University, Riyadh, Saudi Arabia

**Introduction:** Polycystic ovary syndrome (PCOS) is a common endocrine disorder among women of reproductive age. This study aimed to determine self-reported prevalence of physician-diagnosed PCOS among young medical students at King Saud University and to compare it with reported rates from Western and international populations of similar age. In addition, it assessed the awareness among female medical students at King Saud University.

**Methods:** A cross-sectional study was conducted using a structured self-administered questionnaire distributed to female medical students at King Saud University between December 2024 and March 2025. The survey contained sociodemographic data, PCOS-related signs and symptoms, past medical history, lifestyle factors, knowledge about PCOS and its complications. Statistical analyses included bivariate analysis and multivariable logistic regression.

**Results:** We collected 303 responses. The self-reported prevalence of physician-diagnosed PCOS was 18.5%. Common symptoms included hair loss (60.7%), acne (49.8%), and weight gain (32%). PCOS diagnosis was significantly associated with age group ($p = 0.015$), BMI ($p = 0.038$), menstrual irregularities ($p < 0.001$), hirsutism ($p < 0.001$), weight gain ($p = 0.004$), diabetes mellitus ($p < 0.001$), and family history ($p < 0.001$). Multivariable logistic regression identified hirsutism (OR = 4.36, $p = 0.005$) to be significantly associated with self-reported physician-diagnosed PCOS.

**Conclusion:** The observed prevalence in young medical students in this study was higher than that reported in several Western populations of similar age. Recognition of contributing factors such as genetic susceptibility and lifestyle patterns is essential. Greater emphasis on early screening and targeted health education is recommended.

KEYWORDS
**awareness, medical students, polycystic ovary syndrome (PCOS), prevalence, Saudi Arabia**

# Introduction

Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders affecting women of reproductive age worldwide and is considered a multifaceted hormonal and metabolic condition that influences several organ systems (1). It is classified as a multisystem disorder because it affects adrenal, reproductive, and pituitary hormonal pathways, including abnormalities in adrenocorticotropic hormone (ACTH), gonadotropins, and growth hormone regulation (2).

Clinically, PCOS is characterized by menstrual irregularities, acne, hirsutism, alopecia, anovulation, infertility, and recurrent miscarriages. Hormonally, it presents with elevated androgens, luteinizing hormone, and prolactin. Metabolic features include insulin resistance, obesity, dyslipidemia, and increased risk of impaired glucose tolerance progressing to type 2 diabetes mellitus (3). Approximately, worldwide, half of affected women are obese with excess weight which has been shown to exacerbate the condition (4). Additionally, PCOS has been linked to higher rates of anxiety and depression (5).

Global prevalence estimates vary widely, ranging from 4 to 21% depending on the diagnostic criteria and population studied (6). Regional studies further demonstrate this variability; a prevalence of 6.3% was reported in Sri Lanka (7), 9.13% among Indian adolescents (8), and 4.7–4.8% among White women and 3.4–8% among Black women in the United States (9, 10). In Saudi Arabia, previous research reported a self-reported prevalence of approximately 16% (11). These estimates generally include women across the entire reproductive age span. PCOS prevalence may vary across different age groups within the reproductive period (2, 6). Globally, PCOS prevalence and burden have increased over the past decades, with 65.77 million cases in 2021 and higher rates in middle Socio-Demographic Index regions, especially among women aged 45–49 (12). Exploring PCOS prevalence among younger women specific groups—especially medical students—is essential, as they represent future healthcare providers who will diagnose and manage this condition. In addition, evaluating their knowledge and health-seeking behaviors may also reflect broader cultural and regional influences (13, 14).

Therefore, this study aimed to determine the self-reported prevalence of physician-diagnosed PCOS among young medical students at King Saud University, assess their awareness of PCOS and its complications, and compare these findings with prevalence reported in Western and global populations. Additionally, the study assessed potential associations between PCOS diagnosis and lifestyle factors, BMI, and family history, which may provide context for understanding regional patterns in prevalence.

# Methods

## Study design

This observational cross-sectional study was conducted in the Department of Physiology, College of Medicine at King Saud University (KSU), Riyadh, Saudi Arabia. Data were collected electronically from female medical students between December 2024 and March 2025 using a structured, close-ended online questionnaire. Using a convenient sampling technique, the study targeted all female medical students enrolled at medical college of KSU during the data collection period who voluntarily agreed to participate. Inclusion criteria: female medical students at King Saud University. Exclusion criteria: non-medical female students and those who did not consent to participate. The online questionnaire was distributed via social media platforms such as WhatsApp, Instagram, X platforms, and university email. It was developed in English and consisted of five sections: 1. Sociodemographic characteristics (age, medical year, weight, height, social status). 2. PCOS-related signs and symptoms. 3. Past medical history. 4. Lifestyle factors. 5. Knowledge about PCOS and its complications. PCOS diagnosis was self-reported by participants based on a prior physician or gynecologist diagnosis. Students who reported a diagnosis were asked to confirm that it had been established during follow-up at King Khalid University Hospital, where the Rotterdam criteria are routinely applied in clinical practice. The investigators did not independently verify diagnoses, and no direct clinical assessment was performed as part of this study. In addition, the questionnaire assessed factors that may be associated with PCOS diagnosis, including BMI, menstrual irregularities, hirsutism, family history, and lifestyle habits, allowing comparison of prevalence with previously published international data. Ethical approval was obtained from the Institutional Review Board (IRB) of King Saud University, Riyadh, Saudi Arabia (reference: E-24-9389). The minimum required sample size was calculated using the single-proportion formula:

$$n = \frac{Z^2 P(1-P)}{d^{2.}}$$

where Z = 1.96 (95% confidence level), d = 0.05, and P = estimated prevalence (19–20%) based on previous studies (15). The calculated sample size was 246 participants. A total of 303 student responses were ultimately collected.

## Statistical analysis

Data were analyzed using IBM SPSS Statistics (Version 27; Armonk, NY, United States). Visualization of results was performed using Microsoft Excel 365. Quantitative variables were summarized using minimum, maximum, mean, and standard deviation. Qualitative variables were presented as frequencies and percentages. Associations between categorical variables were examined using the Pearson chi-square test. Multivariable logistic regression was performed to identify independent predictors of PCOS diagnosis. A $p$-value < 0.05 was considered statistically significant.

# Results

## Sociodemographic characteristics of study participants

A total of 303 female medical students at King Saud University participated in this study. Table 1 shows the sociodemographic characteristics of the 303 medical student participants. The majority of participants were in their first ($n$ = 30.0%), or fourth year ($n$ = 18.8%) of medical school, and most were between 21 and 23 years old (49.8%). Nearly all participants were single (98.7%). The distribution of BMI categories showed that more than half of participants (57.8%)

TABLE 1 Characteristics of study participants ($N$ = 303).

| Characteristic | Frequency, n (%) |
|---|---|
| **Medical school year** | |
| First year | 91 (30) |
| Second year | 54 (17.8) |
| Third year | 52 (17.2) |
| Fourth year | 57 (18.8) |
| Fifth year | 44 (14.5) |
| Internship year | 5 (1.7) |
| **Age group** | |
| 18–20 years old | 132 (43.6) |
| 21–23 years old | 151 (49.8) |
| ≥ 24 | 20 (6.6) |
| **Social status** | |
| Divorced | 1 (0.3) |
| Married | 3 (1) |
| Single | 299 (98.7) |
| **Body mass index (BMI)** | |
| Underweight (< 18.5) | 48 (15.8) |
| Normal weight (18.5–24.9) | 175 (57.8) |
| Overweight (25.0–29.9) | 51 (16.8) |
| Obese (≥ 30) | 23 (7.6) |

were within the normal weight range, while a smaller proportion were underweight (15.8%), overweight (16.8%), or obese (7.6%).

## Signs and symptoms of PCOS among participants

Table 2 shows the self-reported signs and symptoms of PCOS among the participants. Regarding menstrual cycle length, 84.8% reported a normal cycle (21–35 days), while 13.2% experienced oligomenorrhea (cycles longer than 35 days), and 2.0% reported menorrhagia (heavy or prolonged bleeding). Excessive hair growth on the face or chest (hirsutism) was reported by 22.8% of participants, while a larger proportion (60.7%) reported experiencing hair loss (alopecia). Almost half of the participants reported having acne (49.8%), and 19.8% reported skin discoloration (acanthosis nigricans) in the neck or underarm areas. Weight increase was reported by 32.0% of the sample.

Regarding diabetes status, 96.0% reported no diagnosis of diabetes mellitus, 3.0% reported being prediabetic, and 1.0% reported having diabetes. Only 2.3% reported using antidiabetic medications. Finally, a family history of PCOS symptoms or similar symptoms was reported by 42.2% of the participants, while 57.8% reported no such family history.

Figure 1 displays the proportion of participants who reported undergoing various hormonal tests relevant to PCOS evaluation. A considerable percentage of participants (30.6%) reported that they had not performed any of these tests. Among the tests conducted, thyroid-stimulating hormone (TSH) was the most frequently reported (12.4%), followed by follicle-stimulating hormone (FSH) at 11.2%, and luteinizing hormone (LH) at 9.5%. Prolactin was tested in 8.2% of participants, estrogen in 6.7%, and testosterone in 6.2%. Tests for plasma insulin, progesterone, androsterone, and androstenedione were reported by smaller percentages of participants (5.5, 4.7, 3.0, and 2.0%, respectively).

Figure 2 illustrates the distribution of abnormal results among the participants who reported having undergone hormonal testing. Among those with abnormal results, prolactin abnormalities were the most frequently reported (5.9%), followed by TSH abnormalities (3.0%). FSH, LH, and plasma insulin abnormalities were each reported by 2.3% of this subgroup. Testosterone abnormalities were slightly less common (1.6%), and estrogen abnormalities were reported by 1.3% of the participants. Androstenedione, Progesterone, and Androsterone abnormalities were the least frequently reported, each at 1.0%.

## Past medical history of participants

Table 3 shows the past medical history related to PCOS among the participants. Regarding ovarian ultrasound examination, 30.0% reported having undergone the procedure, while 70.0% had not. Of those who had an ultrasound, 20.1% had results indicating polycystic ovaries, 14.2% had normal results, and 65.7% of the total sample reported not having done the ultrasound. Concerning glucose testing, 26.4% of participants reported having undergone an oral glucose tolerance test or fasting blood glucose test, while 73.6% had not. Among those who had glucose testing, 25.1% had normal results, 1.7% had abnormal results and most of the sample, 73.3% reported not having had the test. Finally, regarding a prior PCOS diagnosis, 18.5% reported having been diagnosed with PCOS by a doctor or gynecologist, 23.4% reported not having been diagnosed, and a majority (58.1%) reported not having visited a doctor or gynecologist for PCOS evaluation.

## Lifestyle of participants

Table 4 shows the lifestyle factors of the participants. Regarding physical activity, 25.1% reported no physical activity, 44.6% reported less than 5 h per week, 23.1% reported 5–10 h per week, and 7.3% reported more than 10 h per week. For fast food consumption, 8.6% reported not eating fast food, 72.6% reported consuming it less than 5 times per week, 18.2% reported 5–10 times per week, and 0.7% reported more than 10 times per week. Concerning soft drink consumption, 31.0% reported not drinking soft drinks, 53.8% reported consuming them less than 5 times per week, 10.6% reported 5–10 times per week, and 4.6% reported more than 10 times per week.

Figure 3 presents the types of physical activity that participants reported engaging in most frequently. Cycling was the most commonly reported activity; 51.9% of participants indicated it as their usual choice. Resistance exercise was the second most frequent, reported by 17.0% of the physically active participants. Other activities were reported by 11.7%, followed by running (8.1%), swimming (5.6%), and walking (3.6%). A small proportion (2.0%) reported having no physical activity.

## Knowledge of PCOS and its complications

Table 5 assesses participants' knowledge regarding PCOS and its potential complications. A large majority of participants correctly recognized that a healthy diet and regular exercise can help manage PCOS symptoms (93.1%) and that weight loss can decrease PCOS symptoms and signs (87.5%). Most participants were aware that PCOS

10.3389/fmed.2026.1782062

TABLE 2 Prevalence of polycystic ovary syndrome signs and symptoms.

| Signs and symptoms | Answer | Frequency | Percentage |
|---|---|---|---|
| How long is the usual duration of time between the start of your 2 periods? | Normal (21–35 days) | 257 | 84.8% |
| | Menorrhagia (Heavy or prolonged menstrual bleeding) | 6 | 2.0% |
| | Oligomenorrhea (Longer than 35 days between periods) | 40 | 13.2% |
| Do you experience excessive hair growth on your face or chest? | No | 234 | 77.2% |
| | Yes | 69 | 22.8% |
| Do you complain of an increase in your weight? | No | 206 | 68.0% |
| | Yes | 97 | 32.0% |
| Do you have hair loss? | No | 119 | 39.3% |
| | Yes | 184 | 60.7% |
| Do you have acne? | No | 152 | 50.2% |
| | Yes | 151 | 49.8% |
| Do you have black discoloration in your neck or underarm? | No | 243 | 80.2% |
| | Yes | 60 | 19.8% |
| If you are married, do you have difficulty getting pregnant? | No | 6 | 2.0% |
| | Not married | 294 | 97.0% |
| | Yes | 3 | 1.0% |
| If you are married, did you undergo any medical intervention to get pregnant? | No | 8 | 2.6% |
| | Not married | 293 | 96.7% |
| | Yes | 2 | 0.7% |
| Have you been diagnosed with Diabetes Mellitus? | No | 291 | 96.0% |
| | Prediabetic | 9 | 3.0% |
| | Yes | 3 | 1.0% |
| Do you take any medications for diabetes? | No | 152 | 50.2% |
| | Not diabetic | 144 | 47.5% |
| | Yes | 7 | 2.3% |
| Do you have any women in your family with PCOS symptoms or the symptoms mentioned above? | No | 175 | 57.8% |
| | Yes | 128 | 42.2% |

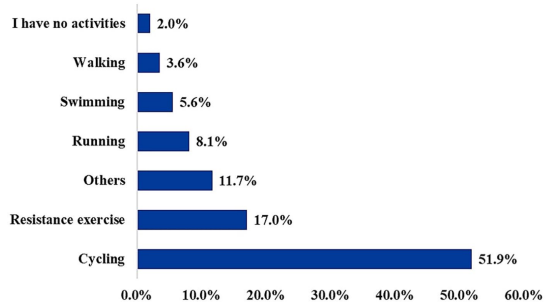



FIGURE 1
Types of physical activities performed by participants.

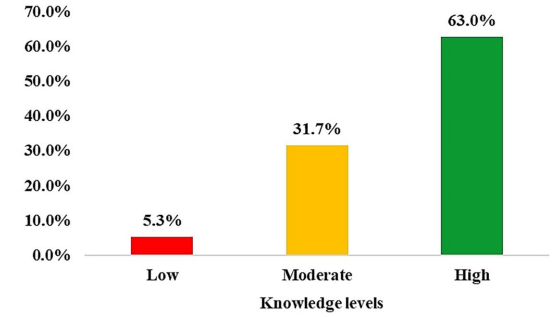



FIGURE 2
Distribution of knowledge levels regarding PCOS among participants.

can lead to diabetes (73.3%) and increase the risk of infertility (94.1%). Knowledge regarding the link between PCOS and cardiovascular disease (heart disease and hypertension) was slightly lower; 64.4% answered correctly. Awareness of the potential association between PCOS and breast/uterine cancer was the lowest; 63.0% answered correctly. The mean total knowledge score (out of a possible 6) was 4.75 ± 1.41, indicating a generally good level of knowledge.

Figure 4 demonstrates the distribution of participants across three categorized knowledge levels: low, moderate, and high. The majority of participants (63.0%) were classified as having high knowledge about PCOS and its complications. An extensive proportion (31.7%) demonstrated moderate knowledge. A small percentage of participants (5.3%) were categorized as having low knowledge.

TABLE 3 Past medical history related to polycystic ovary syndrome.

| Items | Answer | Frequency | Percentage |
|---|---|---|---|
| Did you undergo ovaries examination with ultrasound? | No | 212 | 70.0% |
| | Yes | 91 | 30.0% |
| If the answer was yes, did the ultrasound results pointed to polycystic ovaries?? | I did not do it | 199 | 65.7% |
| | No | 43 | 14.2% |
| | Yes | 61 | 20.1% |
| Did you undergo oral glucose tolerance test or fasting blood glucose test before? | No | 223 | 73.6% |
| | Yes | 80 | 26.4% |
| If the answer was yes, was it normal or abnormal? | Abnormal | 5 | 1.7% |
| | I did not do it | 223 | 73.3% |
| | Normal | 75 | 25.1% |
| Have you been diagnosed with PCOS by any doctor or gynecologist? | I did not go to a doctor or gynecologist for PCOS | 176 | 58.1% |
| | No | 71 | 23.4% |
| | Yes | 56 | 18.5% |

TABLE 4 Lifestyle factors of study participants.

| Items | Answer | Frequency | Percentage |
|---|---|---|---|
| What is the duration of your physical activity? | I have no physical activity | 76 | 25.1% |
| | < 5 h/ week | 135 | 44.6% |
| | 5–10 h/ week | 70 | 23.1% |
| | > 10 h/ week | 22 | 7.3% |
| How often do you eat fast food during the week? | I do not eat fast food | 26 | 8.6% |
| | < 5 times/ week | 220 | 72.6% |
| | 5–10 times/ week | 55 | 18.2% |
| | > 10 times/ week | 2 | 0.7% |
| How often do you drink soft drinks during the week? | I do not drink soft drinks | 94 | 31.0% |
| | < 5 times/ week | 163 | 53.8% |
| | 5–10 times/ week | 32 | 10.6% |
| | > 10 times/ week | 14 | 4.6% |

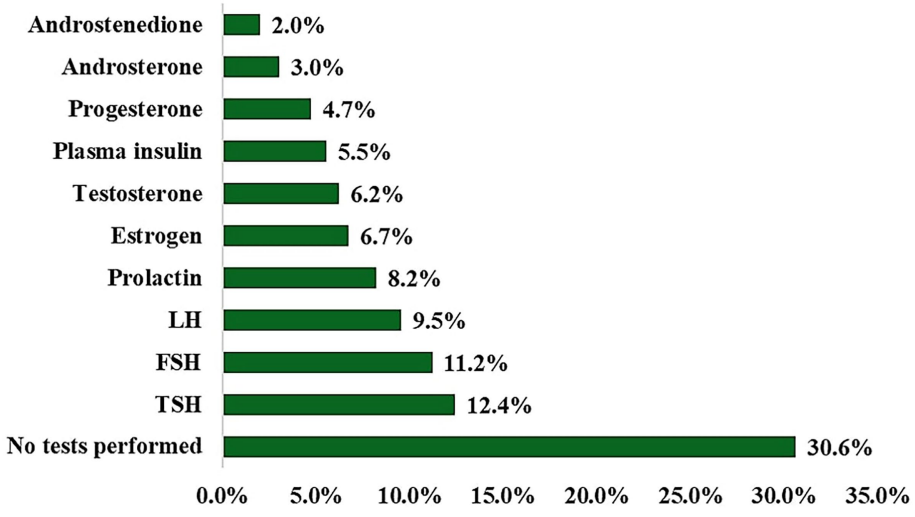



FIGURE 3
Frequency of hormonal tests performed among participants.

TABLE 5 Participant knowledge of polycystic ovary syndrome and its complications.

| Items | No | | Yes | |
|---|---|---|---|---|
| | N | % | N | % |
| A healthy diet and exercise help manage PCOS | 21 | 6.9% | 282 | 93.1% |
| Weight loss decreases PCOS symptoms | 38 | 12.5% | 265 | 87.5% |
| PCOS can lead to Diabetes? | 81 | 26.7% | 222 | 73.3% |
| PCOS can lead to heart disease/hypertension | 108 | 35.6% | 195 | 64.4% |
| PCOS can increase infertility risk | 18 | 5.9% | 285 | 94.1% |
| PCOS can lead to breast/uterine cancer | 112 | 37.0% | 191 | 63.0% |
| Total knowledge score (of 6) | Mean ± SD | | 4.75 ± 1.41 | |

TABLE 6 Association between demographic factors and polycystic ovary syndrome diagnosis.

| Demographic factor<br>Overall PCOS diagnosis | Answer | Diagnosis with PCOS: No<br>*N* = 247 (81.5%) | Diagnosis with PCOS: Yes<br>*N* = 56 (18.5%) | *p*-value |
|---|---|---|---|---|
| Year of Medical School | First Year | 78 (85.7%) | 13 (14.3%) | 0.290 |
| | Second Year | 45 (83.3%) | 9 (16.7%) | |
| | Third Year | 39 (75.0%) | 13 (25.0%) | |
| | Fourth Year | 49 (86.0%) | 8 (14.0%) | |
| | Fifth Year | 33 (75.0%) | 11 (25.0%) | |
| | Internship Year | 3 (60.0%) | 2 (40.0%) | |
| Age Group | 18–20 years old | 114 (86.4%) | 18 (13.6%) | **0.015*** |
| | 21–23 years old | 121 (80.1%) | 30 (19.9%) | |
| | 24 and above | 12 (60.0%) | 8 (40.0%) | |
| BMI categories | Underweight | 40 (83.3%) | 8 (16.7%) | **0.038*** |
| | Normal weight | 148 (84.6%) | 27 (15.4%) | |
| | Overweight | 39 (76.5%) | 12 (23.5%) | |
| | Obese | 14 (60.9%) | 9 (39.1%) | |

The *p*-value is calculated by a Pearson Chi-square test. *significant at $p \leq 0.05$. Bold values indicate statistically significant results ($p \leq 0.05$).

## Association between variables and PCOS diagnosis

Table 6 presents the association between demographic factors and PCOS diagnosis. A statistically significant association was found between age group and PCOS diagnosis ($p = 0.015$). Participants in the 18–20 age group had a lower prevalence of PCOS (13.6%) compared to those in the 21–23 age group (19.9%) and the 24 and above age group (40.0%). BMI was also significantly associated with PCOS diagnosis ($p = 0.038$). Obese participants had a considerably higher prevalence of PCOS (39.1%) compared to overweight (23.5%), normal weight (15.4%), and underweight (16.7%) participants. No significant association was found between the year of medical school and PCOS diagnosis ($p = 0.290$).

Table 7 shows the association between reported signs and symptoms and PCOS diagnosis. Several signs and symptoms were significantly associated with a PCOS diagnosis. Menstrual cycle irregularities were strongly associated with PCOS ($p < 0.001$). Specifically, all participants reporting menorrhagia (100%) and a significant proportion reporting oligomenorrhea (42.5%) had a PCOS diagnosis, compared to only 12.8% of those with a normal cycle. Excessive hair growth (face/chest) was also significantly associated with PCOS ($p < 0.001$); 49.3% of those reporting this symptom had a diagnosis, compared to only 9.4% of those without. Reported weight increase was significantly more common in the diagnosed group (27.8% vs. 14.1%, $p = 0.004$).

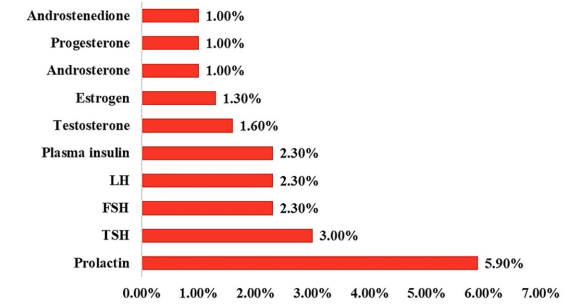



FIGURE 4
Distribution of abnormal hormonal test results among participants.

TABLE 7 Association between polycystic ovary syndrome signs and symptoms and diagnosis.

| Signs and symptoms<br><br>Overall PCOS diagnosis | Answer | Diagnosis with PCOS: No<br><br>*N* = 247 (81.5%) | Diagnosis with PCOS: Yes<br><br>*N* = 56 (18.5%) | *p*-value |
|---|---|---|---|---|
| Menstrual Cycle Length | Normal | 224 (87.2%) | 33 (12.8%) | **<0.001*** |
| | Menorrhagia | 0 (0.0%) | 6 (100.0%) | |
| | Oligomenorrhea | 23 (57.5%) | 17 (42.5%) | |
| Excessive Hair Growth (Face/Chest) | No | 212 (90.6%) | 22 (9.4%) | **<0.001*** |
| | Yes | 35 (50.7%) | 34 (49.3%) | |
| Weight Increase | No | 177 (85.9%) | 29 (14.1%) | **0.004*** |
| | Yes | 70 (72.2%) | 27 (27.8%) | |
| Hair Loss | No | 102 (85.7%) | 17 (14.3%) | 0.130 |
| | Yes | 145 (78.8%) | 39 (21.2%) | |
| Acne | No | 121 (79.6%) | 31 (20.4%) | 0.389 |
| | Yes | 126 (83.4%) | 25 (16.6%) | |
| Skin Discoloration (Neck/Underarm) | No | 202 (83.1%) | 41 (16.9%) | 0.146 |
| | Yes | 45 (75.0%) | 15 (25.0%) | |
| Difficulty Getting Pregnant (If married) | No | 5 (83.3%) | 1 (16.7%) | 0.797 |
| | Not married | 240 (81.6%) | 54 (18.4%) | |
| | Yes | 2 (66.7%) | 1 (33.3%) | |
| Medical Intervention for Pregnancy (If married) | No | 6 (75.0%) | 2 (25.0%) | **0.010*** |
| | Not married | 241 (82.3%) | 52 (17.7%) | |
| | Yes | 0 (0.0%) | 2 (100.0%) | |
| Diabetes Mellitus Diagnosis | No | 242 (83.2%) | 49 (16.8%) | **<0.001*** |
| | Prediabetic | 5 (55.6%) | 4 (44.4%) | |
| | Yes | 0 (0.0%) | 3 (100.0%) | |
| Diabetes Medication Use | No | 132 (86.8%) | 20 (13.2%) | **<0.001*** |
| | Not diabetic | 115 (79.9%) | 29 (20.1%) | |
| | Yes | 0 (0.0%) | 7 (100.0%) | |
| Family History of PCOS Symptoms | No | 161 (92.0%) | 14 (8.0%) | **<0.001*** |
| | Yes | 86 (67.2%) | 42 (32.8%) | |

The *p*-value is calculated by a Pearson Chi-square test. *significant at $p \leq 0.05$. Bold values indicate statistically significant results ($p \leq 0.05$).

A significant association was also found between the use of medical intervention to get pregnant and PCOS diagnosis ($p = 0.010$). A diagnosis of diabetes mellitus ($p < 0.001$) and the use of diabetes medication ($p < 0.001$) were strongly associated with PCOS diagnosis. All participants with either condition was in the PCOS-diagnosed group. A family history of PCOS symptoms was also significantly more common among those diagnosed with PCOS (32.8% vs. 8.0%, $p < 0.001$). In contrast, no statistically significant associations were found between PCOS diagnosis and hair loss, acne, skin discoloration, or difficulty getting pregnant, $p > 0.05$.

Table 8 shows the association between past medical history variables and PCOS diagnosis. A highly significant association was found between ovarian ultrasound examination and PCOS diagnosis ($p < 0.001$). Only 1.4% of participants without a PCOS diagnosis had undergone an ultrasound, compared to 58.2% of those with a diagnosis. Among those who had an ultrasound, the results were also strongly associated with PCOS diagnosis ($p < 0.001$). Of participants with a polycystic ultrasound result, 86.9% had a PCOS diagnosis, whereas 2.3% with a normal ultrasound had a diagnosis. Conversely, there was no statistically significant association between having had an OGTT or fasting blood glucose test and PCOS diagnosis ($p = 0.080$); however, a higher percentage of those diagnosed with PCOS had undergone testing (25.0% vs. 16.1%). The results of the glucose tests (if performed) also showed no statistically significant association with PCOS diagnosis ($p = 0.092$).

Table 9 shows the association between lifestyle factors (physical activity, fast food consumption, soft drink consumption), knowledge level, and PCOS diagnosis. No statistically significant associations were found between any of these factors and PCOS diagnosis. The distribution of physical activity duration ($p = 0.909$), fast food consumption ($p = 0.602$), and soft drink consumption ($p = 0.961$) were similar between those with and without a PCOS diagnosis. Similarly, knowledge level (low, moderate, or high) was not significantly associated with PCOS diagnosis ($p = 0.554$).

TABLE 8 Association between past medical history and polycystic ovary syndrome diagnosis.

| Diagnostic Test/Result<br>Overall PCOS diagnosis | Answer | Diagnosis with PCOS: No<br>*N* = 247 (81.5%) | Diagnosis with PCOS: Yes<br>*N* = 56 (18.5%) | *p*-value |
|---|---|---|---|---|
| Ovarian Ultrasound Examination | No | 209 (98.6%) | 3 (1.4%) | **<0.001*** |
| | Yes | 38 (41.8%) | 53 (58.2%) | |
| Ultrasound Result (If Performed) | I did not do it | 197 (99.0%) | 2 (1.0%) | **<0.001*** |
| | No (Normal) | 42 (97.7%) | 1 (2.3%) | |
| | Yes (Polycystic) | 8 (13.1%) | 53 (86.9%) | |
| Oral Glucose Tolerance Test (OGTT) or Fasting Blood Glucose Test | No | 187 (83.9%) | 36 (16.1%) | 0.080 |
| | Yes | 60 (75.0%) | 20 (25.0%) | |
| OGTT/Fasting Blood Glucose Result (If Performed) | Abnormal | 3 (60.0%) | 2 (40.0%) | 0.092 |
| | I did not do it | 187 (84.2%) | 35 (15.8%) | |
| | Normal | 57 (75.0%) | 19 (25.0%) | |

(%) represents the number and percentage within each PCOS diagnosis group. *significance at $p \leq 0.05$. Bold values indicate statistically significant results ($p \leq 0.05$).

TABLE 9 Association between lifestyle factors, knowledge level, and polycystic ovary syndrome diagnosis.

| Items<br>Overall PCOS diagnosis | Answer | Diagnosis with PCOS: No<br>*N* = 247 (81.5%) | Diagnosis with PCOS: Yes<br>*N* = 56 (18.5%) | *p*-value |
|---|---|---|---|---|
| Physical Activity Duration (per week) | < 5 h/week | 111 (82.2%) | 24 (17.8%) | 0.909 |
| | 5–10 h/week | 55 (78.6%) | 15 (21.4%) | |
| | > 10 h/week | 18 (81.8%) | 4 (18.2%) | |
| | I have no physical activity | 63 (82.9%) | 13 (17.1%) | |
| Fast Food Consumption (per week) | < 5 times/week | 180 (81.8%) | 40 (18.2%) | 0.602 |
| | 5–10 times/week | 46 (83.6%) | 9 (16.4%) | |
| | > 10 times/week | 1 (50.0%) | 1 (50.0%) | |
| | I do not eat fast food | 20 (76.9%) | 6 (23.1%) | |
| Soft Drink Consumption (per week) | < 5 times/week | 132 (81.0%) | 31 (19.0%) | 0.961 |
| | 5–10 times/week | 27 (84.4%) | 5 (15.6%) | |
| | > 10 times/week | 11 (78.6%) | 3 (21.4%) | |
| | I do not drink soft drinks | 77 (81.9%) | 17 (18.1%) | |
| Knowledge level | Low | 12 (75.0%) | 4 (25.0%) | 0.554 |
| | Moderate | 76 (79.2%) | 20 (20.8%) | |
| | High | 159 (83.2%) | 32 (16.8%) | |

Table 10 presents the results of a multivariable logistic regression model predicting PCOS diagnosis. The model was statistically significant ($\chi^2(9) = 176.281$, $p < 0.001$). The model explained a real proportion of the variance in PCOS diagnosis, with a Cox & Snell R-Square of 0.448 and a Nagelkerke R-Square of 0.722. The model showed an overall accuracy of 90.9%, correctly classifying 94.2% of those without PCOS and 76.8% of those with PCOS.

After adjusting for other factors, excessive hair growth on the face or chest (hirsutism) was significantly associated with increased odds of PCOS (OR = 4.36, 95% CI: 1.57–12.1, $p = 0.005$). On the contrary, menstrual cycle length ($p = 0.058$), weight increase ($p = 0.052$), and family history of PCOS or its symptoms ($p = 0.064$) approached statistical significance; however, it is still not significant, $p > 0.05$ threshold. Age group and BMI were not significantly associated in the multivariable model.

## Discussion

The present study revealed, through self-reported physician-diagnosed, a prevalence of 18.5% in young Saudi medical students, which is notably higher than rates commonly reported in Western populations for similar age groups, where estimates typically range between 3.4 and 8% (9, 10). Similar prevalence rates have been reported in studies conducted in Middle Eastern and South Asian

TABLE 10 Multivariable logistic regression analysis of factors associated with polycystic ovary syndrome diagnosis.

| Predictors | OR (95% CI.) | SE. | Wald | *p*-value |
|---|---|---|---|---|
| Age group (Ref = 18–20 years old) | | | 1.077 | 0.584 |
| Age group (21–23 years old) | 1.70 (0.601–4.81) | 0.531 | 0.999 | 0.318 |
| Age group (24 and above) | 1.79 (0.214–15.1) | 1.086 | 0.289 | 0.591 |
| BMI | 0.980 (0.488–1.97) | 0.356 | 0.003 | 0.956 |
| Menstrual Cycle Length (Ref = Normal) | 3.09 (0.963–9.95) | 0.596 | 3.600 | 0.058 |
| Excessive hair growth on face/chest (Ref = No) | 4.36 (1.57–12.1) | 0.520 | 7.999 | **0.005*** |
| Weight Increase (Ref = No) | 3.62 (0.991–13.2) | 0.661 | 3.785 | 0.052 |
| Family history of PCOS/symptoms (Ref = No) | 2.74 (0.941–7.99) | 0.546 | 3.419 | 0.064 |

OR, Odds Ratio; CI, Confidence Interval; SE, Standard Error. Ref, Reference Category. *significance at $p \leq 0.05$. Bold values indicate statistically significant results ($p \leq 0.05$).

populations, where prevalence is frequently elevated, often ranging from 16 to 27% (16–18). Such regional variability highlights the importance of considering demographic, genetic, cultural, and lifestyle contexts when interpreting PCOS prevalence across populations. Recent national population-based data from Saudi Arabia also reported a high PCOS prevalence of 22.5% and demonstrated significant associations with sociodemographic and lifestyle factors, further supporting the regional pattern observed in our finding (19).

In line with previous research, several symptoms and factors in our study were significantly associated with PCOS diagnosis. Menstrual irregularities, especially oligomenorrhea, were strongly associated with PCOS ($p < 0.001$), which is consistent with studies identifying menstrual disturbance as one of the most reliable clinical indicators of the disorder (17, 20, 21). Hirsutism was also highly associated with PCOS in the multivariable regression model (aOR = 4.36). This finding aligns with the central role of hyperandrogenism in the pathophysiology and clinical presentation of PCOS, as described in multiple studies (17, 21). Weight gain and obesity were also more common among the PCOS group in the univariable analysis, reflecting the well-established association between adiposity, hyperandrogenism, and insulin resistance (4, 22). Recent findings have noted lipid profile alterations among PCOS patients, aligning with its broader metabolic changes (23).

Family history of PCOS or related symptoms was significantly associated with diagnosis in univariable analysis, consistent with studies demonstrating familial aggregation and a possible genetic predisposition (17, 24). This observation may reflect underlying genetic or environmental differences compared with Western cohorts; however, such interpretations should be made cautiously. While our study did not directly investigate genetic markers, the significant association with family history emphasizes the importance of hereditary influence in PCOS risk.

Interestingly, lifestyle variables—including physical activity, fast-food consumption, and soft-drink intake—showed no significant association with PCOS diagnosis. This finding differs from some international studies that have identified lifestyle as an important modifiable contributor to PCOS severity or progression (22). However, lifestyle influences are complex and may act cumulatively or at the population level rather than being detectable within a single student cohort. Despite the lack of statistical significance in our study, lifestyle patterns common in the region, such as lower physical activity and higher caloric intake, may still contribute to the broader epidemiological differences observed between the Middle East and Western countries.

The participants demonstrated a high overall level of knowledge, with a mean score of 4.75/6 and 63% categorized as having high knowledge. This is consistent with other studies involving medical or health sciences students, who generally possess better understanding of PCOS symptoms and consequences (25–27). However, certain gaps were evident—particularly in knowledge related to long-term complications such as cardiovascular disease and cancer. Similar gaps have been reported in regional studies among Saudi women diagnosed with PCOS (28). This highlights the need for enhanced educational programs that emphasize the chronic nature of PCOS and its systemic health consequences, rather than focusing solely on reproductive aspects.

Overall, the higher prevalence observed in young medical students in our study compared with Western cohorts may reflect a multifactorial interplay between genetic predisposition, higher regional rates of obesity, metabolic risk factors, and cultural or environmental factors. Although lifestyle variables did not reach statistical significance within our cohort, their potential broader population-level impact cannot be dismissed. The findings underscore the importance of early screening, improved awareness of long-term complications, and targeted public health strategies to address PCOS in young women—particularly in regions where prevalence appears elevated.

## Limitations

This study has several limitations. First, its cross-sectional design precludes causal inference. Second, the use of convenience sampling through social media and email may have introduced selection bias and limits generalizability. Third, PCOS diagnosis was self-reported and not independently verified by the investigators, which introduces potential recall and reporting bias. Additionally, the exclusive inclusion of female medical students—who may have higher health literacy and distinct health-seeking behaviors compared with the general population—further limits external validity. Finally, the study was conducted at a single academic center, and findings should not be extrapolated to all young Saudi women.

## Conclusion

This study identified a self-reported PCOS prevalence of 18.5% among young medical students at King Saud University—a rate

noticeably higher than the global and Western estimates commonly reported for women of similar age. This observed prevalence within this study population suggests a potentially higher burden compared with some international reports; however, findings should be interpreted within the context of the study population.

These findings underscore the importance of locally derived data when evaluating PCOS prevalence within specific academic populations. Early screening for menstrual irregularities and hyperandrogenic symptoms is therefore essential in this population.

Although awareness among students was generally high, gaps remained regarding long-term metabolic and cardiovascular risks. Strengthening targeted health education and improving access to timely clinical evaluation may help reduce delayed diagnosis and prevent future complications.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Ethics statement

Ethical approval was obtained from the Institutional Review Board (IRB) of King Saud University, Riyadh, Saudi Arabia (Reference No: E-24-9389). Participation was voluntary, and informed consent was obtained electronically from all participants prior to questionnaire completion. No interventional procedures were performed, and data were collected anonymously.

## Author contributions

TA: Conceptualization, Formal analysis, Supervision, Writing – review & editing. MA: Data curation, Writing – review & editing. HA: Data curation, Writing – original draft, Writing – review & editing. TA-k: Supervision, Validation, Writing – review & editing.

## Funding

The author(s) declared that financial support was not received for this work and/or its publication.

## Acknowledgments

We would like to thank Ongoing Research Funding Program (ORF-2026-1396), King Saud University, Riyadh, Saudi Arabia for their support.

## Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Generative AI statement

The author(s) declared that Generative AI was not used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

## Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

## References

1. Gul S, Zahid SA, Ansari A. PCOS: symptoms and awareness in urban Pakistani women. *Int J Pharma Res Health Sci*. (2014) 2:356–60.

2. Bassam NMA, Ali S, Rahman SR. Polycystic ovarian syndrome(pcos), awareness among female students, Qassim university, Qassim region, Saudi Arabia. *Int J Res-Granthaalayah*. (2018) 6:395–406. doi: 10.29121/granthaalayah.v6.i9.2018.1252

3. Tsilchorozidou T, Overton C, Conway GS. The pathophysiology of polycystic ovary syndrome. *Clin Endocrinol (Oxf)*. (2004) 60:1–17. doi: 10.1046/j.1365-2265.2003.01842.x

4. Cai X, Liu C, Mou S. Association between fat mass- and obesity- associated (FTO) gene polymorphism and polycystic ovary syndrome: a meta-analysis. *PloS One*. (2014) 9:e86972. doi: 10.1371/journal.pone.0086972

5. Pastore LM, Patrie JT, Morris WL, Dalal P, Bray MJ. Depression symptoms and body dissatisfaction association among polycystic ovary syndrome women. *J Psychosom Res*. (2011) 71:270–6. doi: 10.1016/j.jpsychores.2011.02.005

6. Lizneva D, Suturina L, Walker W, Brakta S, Gavrilova-Jordan L, Azziz R. Criteria, prevalence, and phenotypes of polycystic ovary syndrome. *Fertil Steril*. (2016) 106:6–15. doi: 10.1016/j.fertnstert.2016.05.003

7. Kumarapeli V, Seneviratne RDA, Wijeyaratne CN, Yapa RMSC, Dodampahala SH. A simple screening approach for assessing community prevalence and phenotype of polycystic ovary syndrome in a semi urban population in Sri Lanka. *Am J Epidemiol*. (2008) 168:321–8. doi: 10.1093/aje/kwn137

8. Nidhi R, Padmalatha V, Nagarathna R, Amritanshu R. Prevalence of polycystic ovarian syndrome in Indian adolescents. *J Pediatr Adolesc Gynecol*. (2011) 24:223–7. doi: 10.1016/j.jpag.2011.03.002

9. Azziz R, Woods KS, Reyna R, Key TJ, Knochenhauer ES, Yildiz BO. The prevalence and features of the polycystic ovary syndrome in an unselected population. *J Clin Endocrinol Metab*. (2004) 89:2745–9. doi: 10.1210/jc.2003-032046

10. Knochenhauer ES, Key TJ, Kahsar-Miller M, Waggoner W, Boots LR, Azziz R. Prevalence of the polycystic ovary syndrome in unselected black and white women of the southeastern United States: a prospective study. *J Clin Endocrinol Metab*. (1998) 83:3078–82.

11. Aldossary K, Alotaibi A, Alkhaldi K, Alharbi R. Prevalence of polycystic ovary syndrome, and relationship with obesity/overweight: cross-sectional study in Saudi Arabia. *J Adv Pharm Educ Res*. (2020) 10:186–90.

12. Meng Y, Zhao T, Zhang R, Zhu X, Ma C, Shi Q. Global burden of polycystic ovary syndrome among women of childbearing age, 1990-2021: a systematic analysis using the global burden of disease study 2021. *Front Public Health*. (2025) 13:1514250. doi: 10.3389/fpubh.2025.1514250

13. Ding T, Hardiman PJ, Petersen I, Wang F-F, Qu F, Baio G. The prevalence of polycystic ovary syndrome in reproductive-aged women of different ethnicity: a systematic review and meta-analysis. *Oncotarget*. (2017) 8:96351–8. doi: 10.18632/oncotarget.19180

14. Gaferi SM, Al-Harbi MF, Yakout SM, Soliman AT. Knowledge, attitude and practice related to reproductive health among female adolescents. *J Nurs Educ Pract*. (2018) 8:53. doi: 10.5430/jnep.v8n8p53

15. Mohmed FES, Aljuhaysh RM, Alonze SK, Alhagbani MA. Prevalence and risk factors of polycystic ovarian syndrome PCOS: cross-sectional study. *J Pharm Res Int*. (2023) 35:13–9. doi: 10.9734/jpri/2023/v35i27311

16. Alqasem MH, Alfaifi HM, Alqarni AM, Alnefaie W, Alshahrani RR. Prevalence and knowledge of polycystic ovary syndrome (PCOS) among female medical students, King Khalid University. *Bahrain Med Bull*. (2024) 46:2290–5.

17. Alkhezi F, AlNemash N, AlMutairi J, Saleh S, AlMutairi M, Saleh S, et al. Prevalence of and risk factors associated with polycystic ovary syndrome among female university students of health sciences in a middle eastern country. *Womens Health Rep (New Rochelle)*. (2024) 5:579–87. doi: 10.1089/whr.2023.0176

18. Ghazzawi RA, Taher FH, Sayed RA, Ghazzawi RA, Alsulaimani HM, Barnawi WI, et al. Prevalence of polycystic ovarian syndrome and its relation to urinary tract symptoms among female medical students of umm Al-Qura University. *J Obstet Gynecol Reprod Sci*. (2024) 8:1–8.

19. Alenzi EO, Alqntash NH, Almajed EH, AlZabin AK. Risk of polycystic ovary syndrome: a population-based analysis of sociodemographic factors, healthcare access, health behaviors, and health status. *BMC Womens Health*. (2024) 24:623. doi: 10.1186/s12905-024-03446-9

20. Tahir H, Hassan A, Khan QU, Hafeez F. Prevalence of polycystic ovary syndrome awareness among female medical students. *Discoveries Reports*. (2020) 3:e10. doi: 10.15190/drep.2020.4

21. Habiburrahman S, Fedre RW, Hernandez S, Rodriguez SL, Mursyid F, Nettles I. The prevalence and risk factors for polycystic ovary syndrome (PCOS) among adolescents in Indonesia: implications for early intervention. *Sriwij J Obstet Gynecol*. (2023) 2:34–47.

22. Ganie MA, Vasudevan V, Wani IA, Baba MS, Arif T, Rashid A. Epidemiology, pathogenesis, genetics & management of polycystic ovary syndrome in India. *Indian J Med Res*. (2019) 150:333–44. doi: 10.4103/ijmr.IJMR_1937_17

23. Wang K-Y, Yang T, Ding Y-F, Zeng A-R, Li Y, Qiang J-W. Ovarian lipid metabolic alterations in polycystic ovary syndrome: insights from proton magnetic resonance spectroscopy. *Front Med (Lausanne)*. (2025) 12:1652954. doi: 10.3389/fmed.2025.1652954

24. Khatun H, Rahman R, Halim T, Khan A, Hasan MM. Prevalence and risk factors of polycystic ovary syndrome among reproductive-aged women. *Int J Reprod Contracept Obstet Gynecol*. (2025) 14:1081–5. doi: 10.18203/2320-1770.ijrcog20250847

25. Sruthi VL, Bindu PM, Lakshmi YS. A study on prevalence of polycystic ovarian syndrome in medical students in a medical college. *Int J Acad Med Pharm*. (2023) 5:117–22.

26. Malin MV, Surekha T. A study to assess the knowledge of female medical students on polycystic ovary syndrome in NRI institute of medical sciences. *Int J Res Med Sci*. (2022) 11:243–7. doi: 10.18203/2320-6012.ijrms20223644

27. Thabet H, Alsharif F, Garoot L, Yousef M, Almutairi L, Kutbi R. The level of awareness of nursing students regarding polycystic ovarian syndrome in king Abdulaziz university. *Assiut Sci Nurs J*. (2021) 9:172–81.

28. Aljuaid A, Sindi HA, Alhadi W, IAA Z, Althobaiti L, Imran I. Knowledge, attitude, and practice of lifestyle modifications among Saudi women diagnosed with polycystic ovary syndrome (PCOS). *Cureus*. (2023) 15:e49398