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# FREQUENCY OF POLYCYSTIC OVARIAN SYNDROME IN FEMALE MEDICAL STUDENTS OF COMBINED MILITARY HOSPITAL LAHORE MEDICAL COLLEGE.

**Date:** Feb. 29, 2020

**From:** Pakistan Armed Forces Medical Journal(Issue 1)

**Publisher:** Knowledge Bylanes

**Document Type:** Article

**Length:** 2,619 words

**Lexile Measure:** 1490L

Full Text:

Byline: Maria Ahmad, Shazia Tufail, Fatima Ayub, Pakeeza Aslam and Nilofar Mustafa

Keywords: Body mass index, Hirsutism, Oligomenorrhea, Polycystic ovarian syndrome.

## INTRODUCTION

Polycystic ovarian syndrome (PCOS) is the most common endocrine disorder in different ethnic groups<sup>1</sup>. The reported overall prevalence of PCOS according to diagnostic criteria of National Institute of Health (NIH), Rotterdam and the Androgen excess and PCOS Society (AE-PCOS) is 6%, 10% and 10% respectively<sup>2</sup>. The differences in prevalence estimates show the wide range of clinical spectrum of this disorder. A systematic review and meta-analysis by Skiba et al also showed differences among study populations as one of the factors for heterogeneity in prevalence rates<sup>3</sup>. South Asian population is considered to be at high risk of this cardiometabolic disorder<sup>4</sup>. There are multiple studies on prevalence of PCOS in South Asian women with gestational diabetes<sup>5</sup> and infertility<sup>6</sup> highlighting the impact of PCOS on future reproductive outcome of these women.

PCOS is usually considered a diagnosis of exclusion, when other endocrinological disorders like thyroid, adrenal, etc are excluded. Its exact etiology is unknown and pathogenesis usually involves ovarian and adrenal [hyperandrogenism], neuro-endocrine and hypothalamic-pituitary dysfunction and insulin resistance<sup>7</sup> with long term health implications.

PCOS presents with symptoms of ovulatory dysfunction (irregular periods, oligomenorrhea) or hyperandrogenism (alopecia, hirsutism, acne). Women diagnosed with PCOS are not only at risk of reproductive issues like infertility, miscarriages, gestational diabetes, pregnancy induced hypertension but also at long term risks of type 2 diabetes, dyslipidemia, cardiovascular events, sleep apnea and endometrial cancer. Management of PCOS includes assessment and treatment of specific reproductive, metabolic and psychological issues with lifestyle interventions and pharmacological therapy<sup>8</sup>.

We noticed an increased attendance of female medical students to our gynaecology outpatient department with symptoms of this complex metabolic disorder hence we decided to study our local population for its frequency and associated factors. These factors may later be studied as either risk or causative factors for high prevalence of this cardiometabolic disorder.

## METHODOLOGY

We conducted a cross-sectional study of female medical students, studying in CMH Lahore Medical College from 1st April, till 31st December 2017. Epi info sample size calculator was used for the estimation of sample size using confidence interval 95%, margin of error 5%, reported prevalence of 30% in a local study<sup>9</sup>. The minimum sample size came out to be 166. However, we enrolled 242 medical students in this study. Study was started after approval from Ethical Review Committee (ref. no. 116/ ERC/ CMHLMC). Informed verbal consent was obtained from students, who were ensured about confidentiality. Non-probability consecutive sampling technique was used for the study. Female medical students of all five academic years, aged 17-26 years were included in the study while all dental students were excluded from the study. There were 339 enrolled female medical students for all five academic years in 2017.

After counseling, a structured knowledge questionnaire was distributed among the participants, inquiring about symptoms of polycystic ovarian syndrome. This exercise was repeated several times with each academic year to minimize the number of

absentees. 242 female students filled and returned the questionnaire. Out of these 242 students, 78 students were identified to have replied in affirmative for either irregular periods or hirsutism or both. These 78 students were then invited to gynaecology outpatient department for individual interviews. They were reviewed in detail clinically, and relevant investigations were requested and checked, to see if they fit Rotterdam Consensus Criteria<sup>10</sup> for diagnosis of polycystic ovarian syndrome. The Rotterdam Criteria require the presence of two of the following three features: oligo/anovulation, hyperandrogenism (clinical or biochemical) and polycystic ovaries on ultrasound.

We also looked at the age, BMI, family history, physical activity pattern and dietary preference of these females along with treatment. Dietary preference was assessed through the food consumption questionnaire based on The Food Guide Pyramid. The pyramid illustrates the research-based food guidance system developed by USDA and supported by the Department of Health and Human Services (HHS), USA. Data was analysed using SPSS version 21. Frequency and percentages were used for the qualitative variables while mean and standard deviation was used for age.

## RESULTS

A total of 242 students were included in the study with mean age of 21  $\pm$  1.6 years. The frequency of polycystic ovarian syndrome was 19.4% as 47 female students out of 242 fit the Rotterdam Consensus Criteria for PCOS. Out of 242 female students, 78 (32%) were identified to have symptoms of either irregular periods or hirsutism or both but only 47 (19%) fit the criteria for PCOS. 12 (5%) had thyroid dysfunction, 5 (2%) had hyperprolactinemia and rest of 14 (6%) had their symptoms due to other reasons. The mean age of the students diagnosed with PCOS was 21 years. 34 (72%) were between 18-22 years of age and only 13 (28%) were between the ages of 23-26 years. The highest percentage (28%) was from final year MBBS (13 students) and an almost equal distribution among hostilities (22) and day-scholars (25) was seen. Surprisingly, only 6 out of 47 patients (13%) had BMI>30. Majority of students 29 (61.7%) had normal BMI between 18.5-24.9 and 8 (17%) had a BMI between 25-29.9.

An important feature was positive family history of Diabetes Mellitus that was positive in 34 out of 47 students (72%) (figure). Compared to diabetes mellitus, there was no significant family history of polycystic ovarian syndrome and hypothyroidism in diagnosed cases of PCOS (<30%). Out of 47 students who fit the criteria of PCOS, 36 students (76.6%) were not taking any pharmacological treatment. Rest was taking hormonal treatment (combined oral contraceptive, progestogens), metformin alone or both hormonal treatment and metformin (table-I). The study revealed that 9 (19%) of students did not do any physical exercise, approx. 8 (17%) did it on daily basis and the rest did it one to three times a week. The commonest exercise was walking and jogging 29 (62%), 6 (13%) went to gym and the rest either did yoga or swimming. The duration of physical exercise varied with most students (32) (68%) spending 15-60 minutes on physical exercise.

37 out of 47 students (78%) used fats/oils/ sweets daily or more than once a day. 32 (68%) used dairy daily or more than once daily. 38 (81%) students with polycystic ovarian syndrome ate meat daily or more than once. Legumes were used by majority 41 (87%) either once daily or weekly. 30 (64%) ate vegetables/ fruits once daily or more than once a day, 14 (30%) ate vegetables only once a week. 44 (94%) students with polycystic ovarian syndrome used chapatti/bread/ rice/pasta once or more than once daily (table-II). Use of fast food was found to be very common as 6 (12%) ate it more than once a day, 8 (17%) ate it once daily, 28 (60%) ate it weekly and 5 (11%) monthly.

Table-I: Treatment of polycystic ovarian syndrome.

Parameter	Frequency	Percentage
None	36	76.6
Yes, but not specified	2	4.3
Metformin	1	2.1
Oral Contraceptive		
Pills/other hormonal treatment	5	10.6
Acne treatment and	1	2.1
Metformin		
Oral Contraceptive Pills	1	2.1
and metformin		
Lifestyle changes	1	2.1

Table-II: Use of fast food in students with PCOS.

Frequency	Percentage
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More than once a day###5###10.6

Once daily###8###17

Weekly###28###59.6

Monthly###5###10.6

No Response###1###2.1

## DISCUSSION

We used Rotterdam Criteria for diagnosis of polycystic ovarian syndrome and found a frequency of 19.4% among the female medical students at CMH Lahore Medical College, which was almost double the prevalence quoted by Bozdag et al<sup>2</sup> in their systematic review and metaanalysis in 2016. However, Ding et al<sup>1</sup> in 2017 found that there was no established prevalence of PCOS for different ethnic groups (5.5% for Caucasians, 7.4% for Africans, 5.6% for Chinese and 16% for Middle East) and called for ethnicity specific guidelines to prevent under or overdiagnosis. There are many studies confirming high prevalence of insulin resistance and type 2 Diabetes Mellitus in South Asian women<sup>11</sup> but very few on higher prevalence of PCOS in South Asian women. Some studies from India quoted a prevalence rate from 9% to as high as 36%<sup>9,12</sup>. Nidhi et al in 2011 studied 460 girls aged 15 to 18 years studying in a local college and found that 42 girls (9.13%) fit Rotterdam's criteria for PCOS.

In 2012, Nair et al studied 136 adolescent girls from a cohort of 301 girls, with confirmed menstrual irregularity and assessed them in detail after a gap of two years. Out of 136 cases, 36.0% were found to have PCOS as per Rotterdam's criteria. Kudesia et al<sup>6</sup> found six folds greater odds of PCOS in younger South Asian patients with normal BMI attending infertility clinic compared to Caucasians. Our population was also young females with normal BMI (<25), who had not come across reproductive issues yet. Positive family history of diabetes mellitus in majority of participants 34 (72%) reiterated a strong genetic basis of this cardiometabolic disorder<sup>13</sup>. The high frequency of PCOS in this young female population has long-term implications for health care in South Asian Women<sup>14</sup>.

Considering that polycystic ovary syndrome has long-term health consequences, high prevalence in this young age group prompted us to look into their dietary habits and exercise patterns. 80% of our female medical students suffering from polycystic ovarian syndrome had an exercise regime with only 20% not doing any exercise. Although exercise may improve cardiometabolic profiles of women with polycystic ovary syndrome<sup>15</sup>, we did not find its relevance in prevalence of this disorder. Animal studies (Patel et al, 2018, Roberts et al, 2017) have shown that a high fat and a high sugar diet at pre-puberty age produces metabolic and ovarian changes similar to that observed in patients of PCOS and offers an opportunity to look into its genesis, rather than following it after symptom development<sup>16,17</sup>. Interestingly use of fast food, which is usually high in fat and calories, is very common among these students with PCOS.

However, their diet as young children was not a part of our study and as mentioned before that may play a role in development of disease. The most common dietary pattern in these female medical students was the use of chappati, bread, rice and pasta on almost daily basis; hence carbohydrates seem to be the main constituent of their diet. McGrice and Porter<sup>18</sup> in 2017 suggested in their systematic review that low carbohydrate diets warrant further research on their effects on hormonal and fertility outcomes. It is also important to note that their systematic review was mainly on studies in overweight and obese women, but majority of our students had normal BMI. The treatment of this disorder is usually symptomatic with lifestyle interventions as the first line of management. Only 23% of our students were taking pharmacological treatment for their symptoms as majority had normal BMI and haven't come across fertility issues yet.

They were taking hormonal treatment mainly for cycle regulation. Metformin is an insulin-sensitizing agent and although it is used as an ovulation induction agent in patients with polycystic ovarian syndrome<sup>19</sup>, our students were taking it for correction of metabolic abnormalities. There is some evidence of metformin with lifestyle modification in management of PCOS<sup>20</sup> but further research is being done to clarify its role in PCOS management and long term safety. International evidence-based guideline for the assessment and management of polycystic ovary syndrome 2018 recommended that specific phenotypes should be reported explicitly in all research i.e. Phenotype A (androgen excess + ovulatory dysfunction + polycystic ovarian morphology), Phenotype B (androgen excess + ovulatory dysfunction), Phenotype C (androgen excess + polycystic ovarian morphology) and Phenotype D (ovulatory dysfunction + polycystic ovarian morphology)<sup>21</sup>.

Although we did not divide our population into these phenotypes, they were picked up because of symptoms of either androgen excess or ovulatory dysfunction and some of them were later found to have polycystic ovarian morphology.

## Disclosure

Poster presentation was given in RCOG (Royal College of Obstetrician and Gynaecologist) International World Congress, June 17-19, 2019, UK.

## CONCLUSION

Our study showed a high frequency of PCOS in female medical students at CMH Lahore Medical College. However, it was a small study, carried out in one institution. Further multicenter studies are needed to generate local data for the frequency and its related risk factors in our young female population, as it has long-term consequences for their reproductive and metabolic health. Preventive strategies through health education may then be generated to improve the cardiometabolic profile in our young women.

## CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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**Source Citation** (MLA 9th Edition)

"FREQUENCY OF POLYCYSTIC OVARIAN SYNDROME IN FEMALE MEDICAL STUDENTS OF COMBINED MILITARY HOSPITAL LAHORE MEDICAL COLLEGE." *Pakistan Armed Forces Medical Journal*, no. 1, 29 Feb. 2020, p. 180. *Gale Academic OneFile*, link.gale.com/apps/doc/A617173297/AONE?u=cuny\_centraloff&sid=bookmark-AONE&xid=3c958ca2. Accessed 23 Mar. 2023.

**Gale Document Number:** GALE|A617173297