Section: Obstetrics & Gynaecology

Original Research Article

A STUDY ON PREVALENCE OF POLYCYSTIC OVARIAN SYNDROME IN MEDICAL STUDENTS IN A MEDICAL COLLEGE

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Abstract

Background: An endocrine and metabolic condition called polycystic ovarian syndrome (PCOS) is characterised by an excess of testosterone, ovulatory failure, and/or polycystic ovaries. The most prevalent endocrine problem in women of reproductive age is polycystic ovarian syndrome. Genetic and environmental factors are both involved. There are 4 to 21% of PCOS cases worldwide. The objectives are to assess the prevalence of PCOS in MBBS students, to know the various types of presentation like: A) Menstrual irregularities, B) Hirsutism, C) Acne, D) obesity. **Materials and Methods:** Study Design: cross-sectional study. Study area: Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research. Study Period: September 2021 to November 2021. Study population: Sample size: A total of 200 girls studying MBBS in the age group of 18 to 24 years are enrolled for the study. Sampling Technique: Simple Random technique. Study tools and Data collection procedure: A questionnaire is given to the inclusive group regarding childhood obesity, recent weight gain, duration of sleep, age of menarche, any menstrual irregularities, hirsutism, acne, history of hypothyroidism. Family history of PCOS, menstrual irregularities, hirsutism, acne, Acanthosis Nigricans and obesity is taken. Their height, weight, BMI will be measured by using standard scales. The purpose of this study is explained prior to collection of data. All the questions in the questionnaire are explained prior to taking response from students. Ultra sound scan is done for the subjects having irregular menstrual cycles. **Result:** A total of 200 female medical students participated in the study and completed the given questionnaire. The mean age of these students turned out to be 20.1 ± 1.1. Among the 200 subjects 58% of them are in the age group of 18 to 20 while the remaining 42% are between 21 to 24 years of age. According to my study in medical students, the prevalence of PCOS is 10%. **Conclusion:** Based on the observations in this study, the prevalence of PCOS is increasing at a rapid pace in India and it might be a major public health challenge in future. According to my study in medical students, the prevalence of PCOS is 10%. Medical students are the future healthcare providers. Their health is of utmost importance. This study serves to sensitize the students about the increasing prevalence of this metabolic disorder and also to initiate the appropriate treatment intervention.

INTRODUCTION

An endocrine and metabolic condition called polycystic ovarian syndrome (PCOS) is characterised by an excess of testosterone, ovulatory failure, and/or polycystic ovaries. The most prevalent endocrine problem in women of reproductive age is polycystic ovarian syndrome. Genetic and environmental factors are both involved. There are 4 to 21% of PCOS cases worldwide.[1] Up to 1 in 5 women of reproductive age have PCOS.[2] PCOS is a syndrome with four key characteristics: a chronic course, androgen excess, ovulatory failure, and a traditional polycystic ovarian morphology as seen on sonography.

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A major problem in women's health is PCOS. With implications for a wide range of illnesses, including diabetes, cardiovascular disease, mental health issues, infertility, pregnancy-related difficulties, and an increased risk of endometrial cancer, this condition can have serious long-term health effects.[3-5] The AE-PCOS society (2006) states that ovarian dysfunction (oligo-anovulation and polycystic ovarian morphology) and clinical and/or biochemical evidence of hyperandrogenism are required for the diagnosis of PCOS.[6]

Menstrual cycle irregularities, ovulatory failure, infertility, pubertal menorrhagia, and signs of hyperandrogenism such hirsutism and acne are all clinical signs of PCOS.[2,7] While female pattern hair loss (also known as androgenetic alopecia) is more prevalent in women with PCOS than in the general population, its connection to androgen excess or signalling is still unknown. Hirsutism is characterised by an overabundance of terminally differentiated hair distributed in a masculine pattern. Another common manifestation of hyperandrogenism in PCOS-affected women is acne. It is known that androgens have exaggerated effects at the level of the pilosebaceous unit, highlighting a propensity for acne in this population. Common locations for acne lesions include the forehead, chin, chest, and upper back. These lesions can range from papules to pustules, cysts, and nodules. Women with PCOS frequently admit to a long history of acne of some severity and mention trying one or more over-the-counter, non-prescription products.

Women may see doctors for menstrual disruption and symptoms of hyperandrogenism, but many are also worried about their fertility, and this issue deserves consideration. As the majority of women seek treatment during their reproductive years and because menstrual disorder is caused by ovulatory dysfunction, infertility will eventually be a problem. PCOS may be present in over 80% of women with anovulatory infertility and is the most prevalent underlying diagnosis in women with ovulatory infertility. There is no one pathognomic sign or symptom for PCOS.

Obesity-related insulin resistance has a special connection with PCOS because it dramatically exacerbates all of its symptoms.[2] Impaired glucose tolerance, type 2 diabetes, coronary heart disease, cerebrovascular morbidity, obstructive sleep apnea, anxiety, depression, psychosexual dysfunction, and eating disorders are some of the short- and long-term problems of PCOS.[1,2,8] These women are at higher risk of perinatal mortality, preeclampsia, gestational diabetes mellitus, and small for gestational age (SGA) babies during pregnancy.[1,7]

Management should place a strong emphasis on supportive education, psychological aspects, a healthy lifestyle, and specialised medical treatment. Future doctors are medical students. So, this issue was selected to help medical students recognise PCOS and begin thorough management, which is crucial for those who are providing care.

Objectives

1. To assess the prevalence of PCOS in MBBS students.
2. To know the various types of presentation like: A) Menstrual irregularities, B) Hirsutism, C) Acne, D) obesity.

MATERIALS AND METHODS

Study Design: cross-sectional study.

Study area: Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research

Study Period: September 2021 to November 2021.

Study population:

Sample size: A total of 200 girls studying MBBS in the age group of 18 to 24 years are enrolled for the study.

Sampling Technique: Simple Random technique.

Inclusion Criteria

MBBS girls of age 18-24 years.

Exclusion Criteria

MBBS girls with

1. Diabetes
2. Chronic Hypertension
3. Other causes of hyperandrogenism

Ethical Consideration

Institutional Ethical committee permission was taken prior to the commencement of the study.

Study tools and Data collection procedure: A questionnaire is given to the inclusive group regarding childhood obesity, recent weight gain, duration of sleep, age of menarche, any menstrual irregularities, hirsutism, acne, history of hypothyroidism. Family history of PCOS, menstrual irregularities, hirsutism, acne, Acanthosis Nigricans and obesity is taken. Their height, weight, BMI will be measured by using standard scales. The purpose of this study is explained prior to collection of data. All the questions in the questionnaire are explained prior to taking response from students. Ultra sound scan is done for the subjects having irregular menstrual cycles.

Statistical Analysis

The data is entered into excel sheet and statistical analysis is done. Comparison is done between subjects diagnosed with PCOS and the remaining normal subjects regarding their age, BMI, presence of childhood obesity, any history of recent weight gain, age of menarche, associated dysmenorrhea, presence of Acanthosis Nigricans, acne, hirsutism, family history of PCOS, Diabetes Mellitus, hypertension, their duration of sleep and duration of physical activity. The information collected from the study participants is scored and tabulated and the mean, percentage and standard deviation are calculated. Student's t-test is used to compare the demographics variables with risk levels. $P<0.05$ is considered statistically significant.

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RESULTS

A total of 200 female medical students participated in the study and completed the given questionnaire. The mean age of these students turned out to be 20.1 ± 1.1. Among the 200 subjects 58% of them are in the age group of 18 to 20 while the remaining 42% are between 21 to 24 years of age. According to my study in medical students, the prevalence of PCOS is 10%.

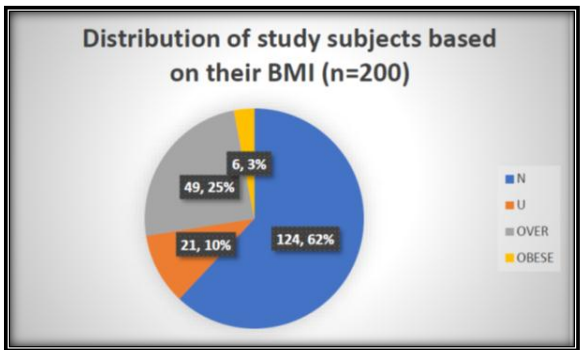

Figure 1: The BMI of the participants is represented in the following pie chart

BMI of 62% of the subjects is within the normal range i.e; between 18.5 to 24.9kg/m2. 10% are under weight and 25% are overweight. 3% of the participants came under Class 1 obesity. 8(4%) of the participants had childhood obesity. Out of the total, 45 girls (22.5%) have history of recent weight gain.

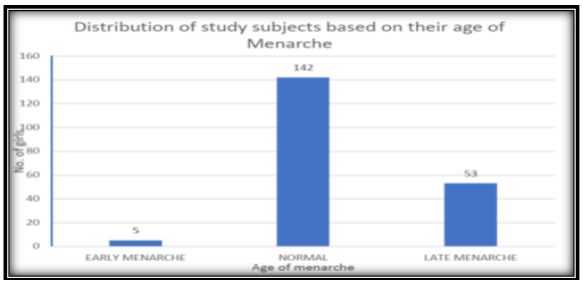

Figure 2: Distribution of study subjects based on their age of Menarche

In this study 2.5% had early menarche and 71% had normal menarche while 26.5% had late menarche. Menstrual cycles are irregular in 16.5% of the participants out of the total 200. PCOS is diagnosed in 20 subjects by pelvic ultra sound scan.

152 participants (76%) have associated dysmenorrhea during menses. Only 1% have Acanthosis Nigricans. Family history of PCOS is present in 2.5% of the subjects. 52 participants have family history of diabetes mellitus. While 49 subjects have family history of hypertension. 15 subjects (7.5%) have oligomenorrhea while 5 subjects (2.5%) have amenorrhea.

Acne is present in 61 girls out of 200. Among all the subjects, 7(3.5%) of them have mild degree of hirsutism and 2 subjects (1%) have moderate degree of hirsutism. 83 subjects reported no daily physical activity, 18 subjects reported 30 minutes of regular exercise while 7 subjects exercise for about 45 minutes per day. 80 subjects reported 1hour physical exercise regularly and 12 subjects workout 2 hours per day. Normal duration of sleep for people between 18 to 24 years is 7 hours and the study subjects reported average sleep of 6-7 hours per day.

Table 1: Parameters of study subjects with and without PCOS

	Subjects with PCOS (n=20)	Subjects without PCOS (n=180)	Total Subjects (n=200)
AGE	20.1±1.07	20.1±1.1	20.1±1.1
BMI	24±3.5	22.7±3.4	22.8±3.4
Normal	25%	63%	62%
Under weight	10%	11%	10.50%
Over weight	35%	23.30%	24.50%
Obese	5%	2.70%	3%
Childhood obesity	15%	3.80%	5%
History of recent weight gain	30%	21.60%	22.50%
Age of menarche	12.65±0.9	12.8±1.1	12.8±1.1
Acanthosis nigricans	5%	1.60%	2%
Associated dysmenorrhea	40%	22.20%	24%
Acne	50%	28.30%	30.50%
hirsutism: Absent	85%	96.60%	95.50%
Mild	15%	2.20%	3.50%
Moderate	0%	1.10%	1%
Family history of PCOS	10%	1.60%	2.50%
Diabetes mellitus	45%	23.80%	26%
Hypertension	40%	22.70%	24.50%
Physical activity	48±34.4	34±34.6	35.4± 34.6
Duration of sleep	6.8±0.8	7±0.9	7±0.9

Table 2: Age group vs characteristics of menstrual cycle

	MENSTRUAL CYCLE		Total
	IR	R	
Count	25	91	116
% within AGE GROUP 18 TO 20	21.6%	78.4%	100.0%

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% within MENSTRUAL CYCLE	75.8%	54.5%	58.0%
AGE GROUP			
Count	8	76	84
% within AGE GROUP 21 TO 24	9.5%	90.5%	100.0%
% within MENSTRUAL CYCLE	24.2%	45.5%	42.0%
Count	33	167	200
% within AGE GROUP	16.5%	83.5%	100.0%
Total			
% within MENSTRUAL CYCLE	100.0%	100.0%	100.0%

Among study subjects who have irregular cycles, 75.8% belong to the age group of 18 to 20 compared to 24.2% who belong to age group of 21 to 24 which was found to be statistically significant with p value of 0.02. (chi square value= 5.116, df=1, p=0.02)

Table 3: Age group vs Daily physical activity

	DAILY PHYSICAL ACTIVITY IN MINUTES			
	0	**30**	**45**	**60**
Count	56	8	3	42
% within AGE GROUP 18 TO 20	48.3%	6.9%	2.6%	36.2%
% within PHYSICAL ACTIVITY IN HOURS	67.5%	44.4%	42.9%	52.5%
AGE GROUP				
Count	27	10	4	38
% within AGE GROUP 21 TO 24	32.1%	11.9%	4.8%	45.2%
% within PHYSICAL ACTIVITY IN HOURS	32.5%	55.6%	57.1%	47.5%
Count	83	18	7	80
% within AGE GROUP	41.5%	9.0%	3.5%	40.0%
Total				
% within PHYSICAL ACTIVITY IN HOURS	100.0%	100.0%	100.0%	100.0%

Among study subjects who work out for 30 minutes daily, 55.6% belong to age group of 21 to 24 when compared to 44.4% who belong to age group of 18 to 20. ($\chi 2$ value= 6.066, df=4, p value=0.194)

Table 4: PCOS vs Acne

	Acne Present	**Acne Absent**	**Total**
PCOS Absent	129(71.7%) 92.8%	51(28.3%) 83.6%	180(100%) 90%
PCOS Present	10(50%) 7.2%	10(50%) 16.4%	20(100%) 10%
Total	139(69.5%) 100%	61(30.5%) 100%	200(100%) 100%

Among the study subjects with PCOS, 50% have acne when compared to study subjects having acne, 16.4% have PCOS. (Chi square value=3.986, df=1, p value=0.04)

Table 5: PCOS vs Menstrual irregularities

	Menstrual irregularities Present	**Menstrual irregularities Absent**	**Total**
PCOS	169(93.9%)	11(6.1%)	180(100%)
Absent	93.3%	55%	90%
PCOS	11(55%)	9(45%)	20(100%)
Present	6.1%	45%	10%
Total	180(90%)	20(10%)	200(100%)
	100%	100%	100%

Among the study subjects with PCOS, 45% have menstrual irregularities when compared to 6.1% who do not have PCOS which was found to be statistically significant with p value 0. (Chi square value=30.247, df=1, p value= 0).

DISCUSSION

One of the most prevalent endocrine and metabolic illnesses in premenopausal women is polycystic ovarian syndrome (PCOS). In the absence of other particular diagnoses, PCOS is classified as a heterogeneous condition characterised by a mix of androgen excess and ovarian dysfunction symptoms. PCOS may be a complicated multigenic condition with significant environmental, including dietary and behavioural, and epigenetic impacts. Abdominal adiposity, insulin resistance, obesity, metabolic diseases, and cardiovascular risk factors are usually linked to PCOS.[9] Stress and extended study sessions can contribute to PCOS in medical students.

In a study conducted by Beena Joshi et al, the prevalence of PCOS among their subjects was 22.5% by Rotterdam and 10.7% by Androgen Excess Society criteria. Non-obese comprised 71.8% of PCOS diagnosed by Rotterdam criteria.

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Obese girls with PCOS were more hirsute and hypertensive compared with non- obese PCOS.[10] Ram Nidhi et al., in 2011, conducted a prospective study involving 460 girls of 15 to 18 years from a residential college in South India and reported a prevalence rate of 19.3%.[11]

According to the study conducted by Madhumati Chatterjee, the prevalence of PCOS in her study was determined to be 28% which is greater than the prevalence determined in my study. Their results indicated that roughly 85% of the PCOS cases had oligomenorrhea, 19% of them were hirsute and 41% had acne while in my study 15% of the study subjects with PCOS were hirsute and 50% had acne. Reports indicate that menstrual irregularity in the early postmenarchal years maybe an early sign of PCOS and about 50% of the oligomenorrheic adolescents develop PCOS as adults. BMI as a measure of general obesity/adiposity was significantly higher in students confirmed with PCOS.[12]

Ganie et al. published the first Indian case-control study using Rotterdam criteria in 2010, which reported a higher prevalence rate of 46.8% as the study was conducted in 176 chronic lymphocytic thyroiditis (CLT) patients.[13] A study conducted by Gupta et al. in 500 college girls aged 17 to 24 years reported a prevalence rate of 8.2%.[14]

A meta-analysis conducted by Ding et al., in 2017, reviewed the prevalence of PCOS across different ethnic groups and concluded that Caucasian females are less likely to develop PCOS compared with middle east and non-white female populations.[15] In 2018, Wolf et al. reported the prevalence of PCOS in Mexico also.[16]

In 2019, Ganie et al. concluded the prevalence of PCOS in India ranging from 3.7% - 22.5% depending on the population studied and criteria used for diagnosis.[13] He also reported that 170 girls (46 years age) with euthyroid CLT had higher hirsutism score, the lower number of annual menstrual cycles as well as higher insulin resistance score when compared to control girls, under the high prevalence of PCOS.

A report from this laboratory showed that overall 71% of the women with PCOS resided in urban regions, while 29% in rural regions in the Haryana state of India.[17]

Shim et al., in 2015, conducted pathway-based GWAS to elucidate significant biological pathways and candidate genes involved in pathogenesis of PCOS.[18] The study identified three top rank pathways (insulin secretion, ovulation and calcium signalling) associated with PCOS. INSR gene was observed in all three pathways. Variations in INSR gene can result in abnormal regulation of insulin and disordered glucose homeostasis which enhances insulin resistance, type 2 diabetes and obesity deteriorating metabolic profile of PCOS.[18]

A positive family history has also been indicated in 10% of PCOS cases, which is in accordance with the study conducted by Moini A et al.[19] A cross-sectional study conducted by Sharma P et al., the overall prevalence of different menstrual problems was 60.61%, with dysmenorrhea (50.64%) being the most common problem, where as in my study dysmenorrhea was present in 40% of the subjects with PCOS. Body mass index, age of menarche, physical activity and mental health status are significant($p<0.05$) predictors of menstrual problem both in rural and urban population.[20]

CONCLUSION

Based on the observations in this study, the prevalence of PCOS is increasing at a rapid pace in India and it might be a major public health challenge in future. According to my study in medical students, the prevalence of PCOS is 10%. Medical students are the future healthcare providers. Their health is of utmost importance. This study serves to sensitize the students about the increasing prevalence of this metabolic disorder and also to initiate the appropriate treatment intervention.

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