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Original Research Article

A cross sectional study on prevalence of PCOS and risk factors associated with it among medical students

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ABSTRACT

Polycystic ovary syndrome is a common female endocrine disorder, complex for managing clinicians and a scientific challenge for researchers. It is a multifaceted disease arising from hereditary, non-hereditary intra and extra uterine environmental influences. The exact pathophysiology of PCOS is complex and remains unclear.

The objective of this study is to find the prevalence of PCOS and also the risk factors associated with it among women aged 17-24 years of age so as to identify young women at a risk of developing PCOS. This cross -sectional study was conducted in a medical college in Nerul, Navi Mumbai situated in Maharashtra among 456 medical, dental, physiotherapy students in the age group of 17-24 years. A prevalence rate of 21.05 % was identified. Among those with PCOS, the mean age was 21.18 years. 22.22% of the subjects were at high risk and 77.77% were at low risk for PCOS. Most of the ones diagnosed with PCOS had a waist to hip ratio greater than 0.8 ($P<0.05$) and were either obese or overweight (BMI>25 kg/m2) ($P<0.01$), suffered from menstrual irregularities ($P<0.05$), hirsutism ($P<0.05$) and emotional problems like feeling moody and easy fatigability ($P<0.05$). The study reveals that PCOS is a common problem among young women that demands lifestyle modification, better awareness and early diagnosis among the masses to prevent further complications.

1. Introduction

Polycystic ovary syndrome is a common female endocrine disorder, complex for managing clinicians and a scientific challenge for researchers. PCOS is of clinical and public health importance as it is very common, affecting 116 million women worldwide in 2012 according to WHO.[1]

This syndrome exhibits a variety of symptoms including oligomenorrhoea, hirsutism, obesity, acne, and infertility[2] all of which are not necessarily present in one woman. It is a multifaceted disease arising from hereditary, non-hereditary intra and extra uterine environmental influences. The exact pathophysiology of PCOS is complex and remains largely unclear.

The diagnosis of PCOS is offered by three groups until now, namely the National institute of Health, the European Society for Human Reproduction and Embryology (Rotterdam criteria) and the Androgen Excess and PCOS society. Due to these different diagnostic criteria, there can be many potential phenotypes[2] and resulting in fewer prevalence studies in the community.

The previous study conducted in India reported a prevalence of 8.1 percent[3] and 10.97 percent[4] respectively.

PCOS may manifest itself in adolescence but may not be diagnosed at that time because most adolescents have irregular menstrual cycles and is diagnosed much later in adulthood. Thus, there is a need to identify young women at a risk of developing PCOS to improve the quality of life and provide adequate treatment.

Thus, this cross-sectional study aimed to find the prevalence of PCOS and also the risk factors associated with

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it among women aged 17-24 years of age conducted in a medical college in Navi Mumbai.

The main aim of this study is to perform a risk assessment by means of a survey among young women and identify those at a higher risk encouraging them to modify their lifestyle and lead a better reproductive life.

2. Materials and Methods

This cross -sectional study was conducted in a medical college in Nerul, Navi Mumbai situated in Maharashtra among 456 medical, dental, physiotherapy students in the age group of 17-24 years.

A detailed, self-administered questionnaire was prepared on the basis of the Cronin et al questionnaire.[5] The questions were asked on weight, hirsutism, menstrual irregularity, emotional problems like feeling moody and easy fatigability, acne and brownish/blackish discoloration of skin. Each question was judged on a 7-point Likert scale, in which optimum level of functioning was scored as 1 and poorest form of functioning was scored as 7. Likert mean was calculated and a mean of 3.71 and higher was regarded as high risk for PCOS and lesser than 3.71 as low risk for PCOS. Question relating to sociodemographic details, anthropometric details, family history of diabetes mellitus type 2, and age at menarche was also asked. The time frame was taken as 2 weeks for the symptoms. Information about past diagnosis Of PCOS and treatment of PCOS along with the investigations done were also asked. BMI was categorized as per WHO criteria.[6]

The questionnaire was given to medical, nursing, dental students in the age group of 17-24 years. Informed consent was taken from the participants. Participants with thyroid disorders, Cushing's syndrome, congenital adrenal hyperplasia, androgen secreting tumour, renal and liver disorders was excluded from the study.

Based on the findings of a previous study (3), where proportion of college students with PCOS was 8.1%, the sample size was calculated at 95% confidence level and relative precision of 20 percent, the final sample size was calculated as 400 students. Pearson chi square test was used to find the association between the determinants and risk/ presence of PCOS. $P<0.05$ was considered as significant.

3. Results

456 students were eligible for the study out of which 96 had been diagnosed with PCOS giving a prevalence of 21.05%. Out of the 360 who didn't have PCOS, 80 (22.22%) were at high risk and 280 (77.77%) were at a low risk of developing PCOS. (Figure 1)

The sociodemographic features are as shown in Table 1. The mean age of the students who had PCOS were 21.5, all of them resided in an urban setting (100%) and a majority of them were pursuing MBBS (91.67%). Out of the 96 who had PCOS, 60 (62.5%) were either obese or overweight while among the high risk, 56 (70%) were either obese or overweight.

Table 2 shows an a association between determinants and PCOS. BMI >24.9 Kg/m^2 was significantly associated with PCOS ($P<0.005$). 75 (78.12%) of those who had PCOS and all (100%) of those who were at high risk had a waist to hip ratio greater than 0.8.

Among those with PCOS, 56 (58.3%) had a positive family history of diabetes mellitus type 2. Among those who were at high risk, 28 (35%) had a positive family history of diabetes. It was significantly associated with PCOS. ($P<0.005$)

Figure 2 shows the subscale scores for students with PCOS, with 7 being severe problem and 1 being no problem. It can be inferred that, subjects with PCOS, controlling weight was the most problematic with a score of 4.7 while excessive hair growth was the least problematic with a score of 3.2.

Hyperpigmentation of skin was noted by 20 (20.8%) of the PCOS students was significantly associated with PCOS ($P<0.05$). Among those diagnosed with PCOS, 28 (29.1%) were on OC pills, 24 (25%) were on metformin and OC pills, 16 (16.6%) were on metformin alone and 28 (29.1%) were on no medications.

Table 3 depicts an association between obesity and PCOS. 86 (89.5%) out of 96 students who had PCOS and 74 (92.5%) out of 80 who were at high risk had troubles controlling their weight. Similarly, Table 4 illustrates an association between menstrual problems and PCOS. 64 (93.75%) of the ones who had PCOS while 72 (90%) of the high-risk students suffered from irregular menstrual cycles and menstrual cramps. 75% of the ones with PCOS and 72.5% of the high-risk students suffered from emotional problems like feeling moody and feeling easily tired. (Table 5). 72 (75%) of the ones with PCOS complained of hirsutism and this was significantly associated with PCOS ($P<0.05$).

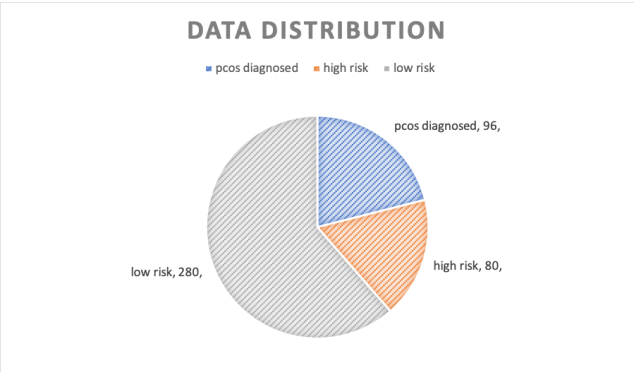

Fig. 1: Data distribution

Table 1: Socio demographic information

Variables	PCOS cases (n=96)	Controls (n=360)
Age (years)	21.5	21.17
Weight (kg)	67.75	61
Height (cm)	156.97	161.54
BMI (kg/m^2)	23.436	22.079
Age at menarche (years)	12.5	12
Native place		
Urban	100%	91.11%
Rural	0%	8.89%
Course		
MBBS	91.67%	78%
Dental	4.16%	6%
Physiotherapy	4.17%	16%

Table 2: Association between determinants and PCOS

Characteristics	PCOS Cases (n=96)	Control Cases (n=360)	High Risk	P value
BMI				
Lean (<18.5 KG/m2)	8	40	8	0.00019
Normal (<24.9 KG/m2)	28	244	16	
Overweight (<29.9 Kg/m2)	24	16	30	
obese (>30 KG/m2)	36	60	26	
Total	96	360	80	
Waist t o HIP Ratio (>0.8)				
Yes	75	212	80	0.005
No	21	148	0	0.005
Family history Diabetes mellitus				
Yes	56	148	28	0.005
No	40	148	28	
Family History PCOS				
Yes	5	24	11	0.574
No	91	336	69	
Total	96	360	80	

Table 3: Association between obesity and PCOS

Obesity A Problem	PCOS Cases (n=96)	Control Cases (n=360)	High Risk	P Value <0.001
No problem	10	92	6	
Hardly any problem	4	54	3	
Little problem	14	58	18	
Some problem	14	42	5	
Moderate problem	14	32	12	
Major problem	16	56	6	
Severe problem	24	26	30	
Total	96	360	80	

Table 4: Association between menstrual problems and PCOS

Problems related to menstruation	PCOS Cases (n=96)	Control Cases (n=360)	High Risk	P Value
				0.0005
No problem	6	86	8	
Hardly Any problem	26	62	9	
Little problem	20	72	8	
Some problem	14	50	28	
Moderate problem	14	36	12	
Major problem	2	26	5	
Severe problem	14	28	10	
Total	96	360	80	

Table 5: Association between emotional problems and PCOS

Emotional Problems	PCOS Cases (n=96)	ControlCases (n=360)	High Risk	P Value
No problem	24	116	22	0.0008
Hardly any problem	18	72	5	
Little problem	6	56	8	
Some problem	14	38	15	
Moderate problem	10	40	10	
Major problem	10	24	14	
Severe problem	14	14	6	
Total	96	360	80	

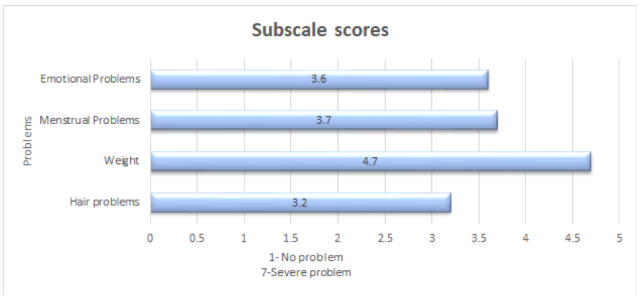

Fig. 2: PCOS subscale scores for students with PCOS

4. Discussion

The prevalence of PCOS was found to be 21.05% in this study which is higher as compared to previous Indian studies which reported a prevalence of 8.1%[3] in a study done in south India and 10.97% in a study done in Andhra Pradesh.[4]

The higher prevalence in this study could be due majority of the students residing in an urban setting. The sedentary lifestyle, access to high calorie diet and machineries for all the household work in the urban population contributes to the higher prevalence.

Also, this study reports that 58.3% of the students confirmed with PCOS have a positive family history of diabetes mellitus. Thus, a higher prevalence could be expected as there is an etiological link between PCOS and insulin resistance[7] and India has been tagged as the diabetic capital of the world.[8]

Previous studies have shown that insulin resistance occurs in 50 to 80 % of the women with PCOS.[7] Thus, there is a need for genetic studies to unravel the genetic pathology of this multifaceted disease. There is also a need for early detection of PCOS to prevent the long-term complications.

In this study, 62.5% of the students with PCOS were either obese or overweight which agrees with previous studies. Thus, obesity could be an important contributor to the development of PCOS. Thus, there is a need to encourage women at the time of diagnosis to engage in a diet and exercise plan that will help them lose weight and regulate their menstrual cycles, improve emotional outcomes and reduce insulin resistance.[2]

In this study, Women with PCOS reported controlling weight as the concern with the greatest impact on their quality of life followed by menstrual irregularities, emotional problems and hirsutism. 75% of the women with PCOS reported hirsutism and emotional problems.

This is of significance in management of PCOS as previous study has shown hirsute women have higher psychological distress and feelings of low self-esteem.[9] No significant association were found out between PCOS and acne ($P>0.05$) and between PCOS and presence of family history of PCOS. ($P>0.05$)

Thus, from the observations in this study we can say that PCOS is a common disorder among young women that requires better awareness among the masses, early diagnosis and management to prevent the long-term complications

and lifestyle modification for weight reduction and dietary modifications to improve the quality of life.

5. Author contribution

MA distributed the surveys, collected and analysed the data. She drafted the manuscript and gave the study its design. PY aided in the statistical analysis, drafting of the manuscript and formulating the results. All authors read and approved the final manuscript.

6. Competing interests

All authors declare no competing interests.

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