



## **Knowledge and Awareness of Polycystic Ovarian Syndrome (PCOS) among medical students**

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**Citation this Article:** Ms Naheed Khan, Dr. Kanchan Dwidmuthé, “Knowledge and Awareness of Polycystic Ovarian Syndrome (PCOS) among medical students”, IJMSIR- January - 2022, Vol – 7, Issue - 1, P. No. 370 – 378.

**Type of Publication:** Review Article

**Conflicts of Interest:** Nil

### **Abstract**

PCOS is a medical disorder associated with impaired hypothalamo-pituitary-ovarian axis. This disruption leads to an abnormal effect on gonadotropin secretion causing an array of signs and symptoms. The prevalence depends on the population under study and the various diagnostic criteria used. India accounts for about 3.7 to 22.5 per cent cases depending on the population group under study. Various clinical manifestations of PCOS include infertility, amenorrhea, hirsutism, and irregular menses. Some of the complications of PCOS are insulin resistance, type I, II and gestational diabetes

The research study is based on a stratified random sample taken from a definite region. It covers only students of medical colleges in Nagpur. The study is based on primary data collected as a response to an online questionnaire floated using the Google platform. Simple statistical tools are used along with excel to interpret the data.

The study finds that awareness about this disorder could be a result of the sample being medical students who have better understanding of the medical terms. It may

not be true of such a sample that comes from a non-medical background. The results of the study are not only governed by the amount of awareness present among medical students about PCOS but also from female correspondents who have been facing the manifestations of the disorder.

**Keywords:** PCOS, NIH, Syndrome

### **Introduction**

Polycystic ovarian syndrome, also called Stein-Leventhal syndrome, is an endocrine disorder affecting women mostly during the reproductive age. PCOS has seen to affect about 5-10% women in the reproductive age globally. [1] The prevalence depends on the ethnic groups and the diagnostic criteria. Various diagnostic criteria include the National Institutes of Health (NIH), the Androgen Excess Society and the newly recognized Rotterdam criterion. Prevalence of PCOS in India ranges from 3.7 to 22.5% depending on the population studied and the criteria used for diagnosis.[2] The cause of the condition, with no single diagnostic feature, is still under investigation which makes it a condition whose diagnosis is reached by a process of elimination. This exclusion

process is essential when the presence can't be established with complete confidence of history, examination or testing. Being an endocrine disorder it is associated with many morbidities including increased risk of myocardial infarction. [3] Some authors believe that there is a relation between leptin, a hormone produced by adipocytes, and the reproductive health of the women. High levels of leptin have been found to be associated with the markers of IR (insulin resistance) in PCOS patients. [4,5] A small case series of patients with both PCOS and Grave's disease also suggested a possible autoimmune etiology of PCOS. [6]

PCOS is now recognized as a common heterogeneous, heritable disorder affecting women throughout their lifetime. [7] Researchers have proposed that PCOS is related with hereditary transmission as a past pathophysiology and the mechanism is associated with various other comorbid risk factors. [8] Apart from the causes stated above, unhealthy eating habits and lack of exercise lead to PCOS as well. [9]

The syndrome is characterized by chronic anovulation, development of cysts in ovaries, visceral adiposity, hyperandrogenism and deviation from the normal ovarian morphology. During infancy, PCOS may manifest as premature pubarche while menstrual irregularities and hyperandrogenism are the main symptoms in the adolescents. Anxiety and depression may be significant in adolescents with PCOS. Breast or endometrial cancers are a possible long term health risk for patients with PCOS due to chronic anovulation and obesity. [10] Women with PCOS have a three times more risk than other women of developing endometrial cancer.

These symptoms arise due to a dysfunctional hypothalamo-pituitary-ovarian axis, which regulates the hormones of the menstrual cycle, thus disrupting the

normal cycle. The disruption of the cycle is caused by high levels of luteinizing hormone, androgen or estrogen which has an abnormal effect on gonadotropin secretion. A few other symptoms of PCOS include acne, reduced fertility, hirsutism and obesity. In some women with PCOS conception becomes a problem and they have a higher miscarriage rate compared to other sub-fertile women. PCOS is also characterized by the presence of insulin resistance along with hyperinsulinemia. [11] High insulin is both a symptom of PCOS and an underlying physiological driver. High insulin can impair ovulation and cause the ovaries to make excess testosterone. [12,13]

To prevent any further undesirable complications, it is necessary that PCOS be diagnosed at the earliest. The women diagnosed of PCOS should be screened for metabolic abnormalities like type -2 diabetes, dyslipidemia, and hypertension regardless of BMI.

The different views on PCOS and its diagnosis make one think if there is adequate awareness about PCOS among the medical students. This study is being conducted to understand the level of awareness among medical students about PCOS and their attitude towards it. This particular aspect is essential so that more attention of the general public can be drawn towards PCOS through medical students. Awareness will help the public understand that irregular menstrual cycle and pelvic pain are not to be ignored as they could be the signs of serious medical complications. Some other complications of PCOS are endometrial hyperplasia and cancer, obstructive sleep apnea, and infertility. Women with PCOS are at increased risk for infertility, endometrial hyperplasia and cancer, abnormal glucose metabolism, obstructive sleep apnea, depression, and anxiety. [14]

## Objective

To evaluate the knowledge and awareness among medical students about PCOS

## Methodology

The research will be carried out using primary data in the form of a questionnaire circulated online to the respondents. The data collected will be analyzed using appropriate statistical tools and excel applications to get the best possible results. The sample is a random sample as it aims to take only the first and second year students of the MBBS. The respondents for the purpose will be both males and females from the first and second year MBBS class of three colleges from Nagpur. The colleges being NKP Salve Institute of Medical Sciences, Government Medical college, Nagpur and Indira Gandhi Government Medical College and Hospital, Nagpur.

**Study design-** Quantitative observational cross sectional study

**Sampling method-** Volunteer students of first and second MBBS from three medical institutes from Nagpur were selected using random sampling according to the inclusion criteria.

## Inclusion criteria -

(1) Students from NKP Salve Institute of Medical Sciences, Government Medical college, Nagpur and Indira Gandhi government medical college and hospital.

(2) Students from first and second year MBBS

## Exclusion criteria

(1) Students other than from the aforementioned institutes.

(2) Participants other than first and second year MBBS.

## Implications

To increase the awareness of PCOS such that the condition can be detected early and the complications be prevented.

## Outcome

Out of the total strength of first and second year students from the three institutes viz,

1. N.K.P. Salve Institute of Medical Sciences and Research Centre

2. Government medical College, Nagpur and

3. IGGMC, Nagpur a total of 300 students were surveyed. This number represents 50 per cent of the population desired to be tested.

The study aims at finding the knowledge and awareness about PCOS among the first and the second year medical students studying in colleges of Nagpur.

The survey is based on very pointed questions relating to awareness of PCOS.

## Data Classification

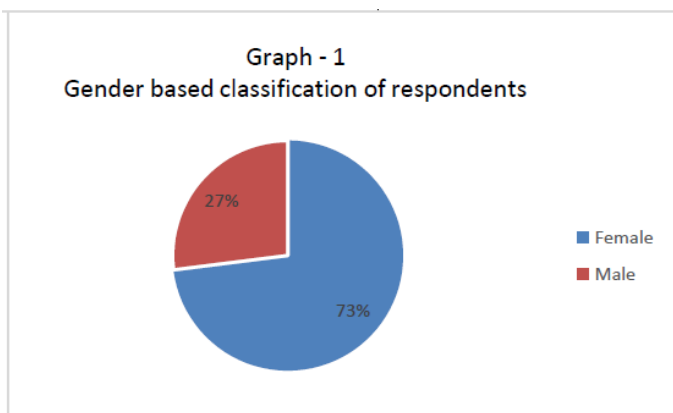
The survey has attempted to give a fair representation to both gender and space (geographic coverage). A gender bias could be seen for two reasons – 1) There is a gender bias, favouring females, in admissions where more girl students are admitted to each class by virtue of their merit and 2) More female students have responded to this survey than male students. This can be taken positively as we can even infer from this the awareness among females specifically. The gender based classification is explained below

## Gender based classification of the respondents -

The 300 respondents include 219 females and 81 males. Females represent 73 per cent of the total respondents while males constitute 27 per cent.

Table 1: Gender based classification of the respondents

Gender	Responses
Female	219
Male	81
Grand Total	300

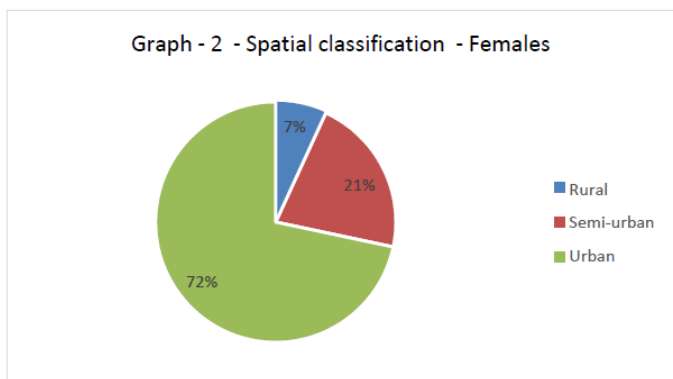


**Spatial classification of respondents –**

The data collected is classified into urban, semi urban and rural respondents. Of the total female respondents 71.69 per cent represent the urban area, while 21.46 per cent represent semi urban area. This leaves us with a little over 7 per cent of the total female population representing the rural area.

Table 2: Spatial classification of females

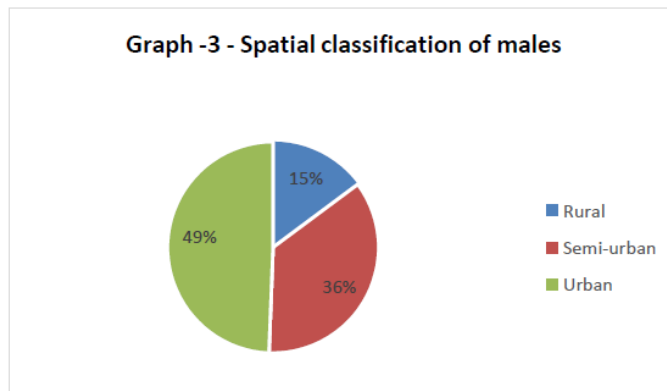
Females – Spatial Classification				
Geography	Rural	Semi-urban	Urban	Total
Response	15	47	157	219
Percent	6.85	21.46	71.69	100.00



For male respondents urban, semi urban and rural representation as a percent of their total population stands at 49.38 per cent, 35.80 percent and 14.81 percent respectively.

Table 3: Spatial classification of males

Males				
Geography	Rural	Semi-urban	Urban	Total
Response	12	29	40	81
Percent	14.81	35.80	49.38	100.00

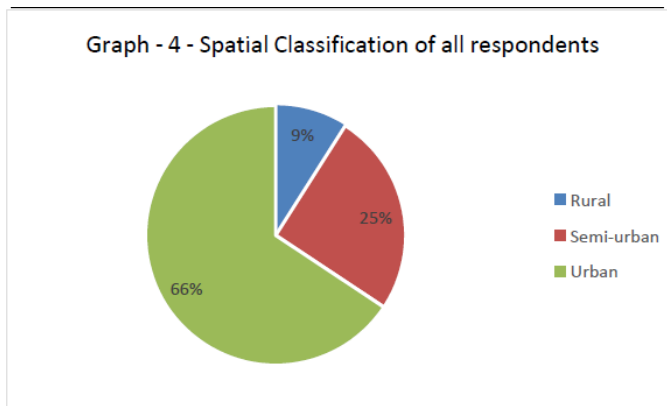


**Total respondents and their spatial classification –**

The overall urban representation stands at 65.66 per cent, a quarter of the total sample collected is from the semi urban areas and rural representation stands at 9 per cent of the total sample surveyed.

Table 4: spatial classification of all respondents

Rural	Semi-urban	Urban	Total
27	76	197	300



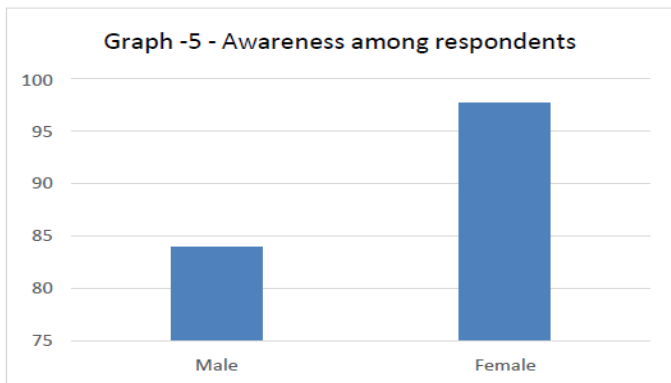
**Observations – Awareness about PCOS**

It is a very promising observation that 214 out of 219 female respondents and 68 out of 81 male respondents have heard about PCOS. This represents 97.71 per cent

and 83.95 per cent females and males respectively who have heard about PCOS.

Table 5: Awareness among respondents

	Male	Female	Total
No	13	5	18
Yes	68	214	282
Total	81	219	300



**Which of the following are the symptoms of PCOS?**

A sample group of respondents does endorse that the syndrome is characterized by the aforesaid symptoms. This endorsement is with varying degrees of emphasis on symptoms. The general awareness about the symptoms seems inclined in favour of irregular menses while weight gain/obesity occupies the second position of importance. Anxiety, depression and Hirsutism are rightly considered as vital symptoms. The study group under consideration has rightly rejected early menarche to be a probable symptom of PCOS.

Table 6: Awareness about symptoms of PCOS

	Symptom	I don't know	% total	No	% total	Yes	% total
1	Early menarche	120	40	91	30.33	89	29.67
2	Irregular menses	22	7.33	7	2.33	271	90.33
3	History of hypertension	96	32	51	17	153	51
4	Abortion /miscarriage	105	35	54	18	141	47
5	Hirsutism	66	22	19	6.33	215	71.67
6	Hair loss	78	26	58	19.33	164	54.67
7	Weight gain/obesity	37	12.33	11	3.67	252	84
8	Anxiety,depression	66	22	14	4.67	220	73.33
9	Pelvic pain	88	29.33	20	6.67	192	64

**Source of Information**

The survey tried to identify the sources of information among the respondents which is a valuable information which one can use to lay emphasis on so that these sources can be referred to those who need to be educated on different health related issues. Internet sources, health care awareness articles and friends have been the prominent sources information for the respondents getting to know of PCOS. These three sources put together constitute 71 per cent of the information sharing among males and female respondents.

Table 7: Source of information

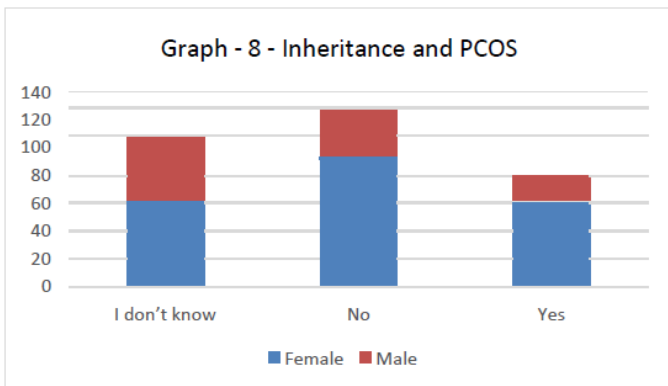
Source of Information	Count	Percent
All of the above	1	0.33
Book	13	4.3
By doctor	3	1
Don't Know	3	1
During Neet UG Preparation	1	0.33
Friends	53	17.67
Healthcare awareness articles	73	24.33
I was diagnosed with it at early stage of life.	4	1.33
Internet	90	30
Mother	1	0.33
Not heard yet	1	0.33
Someone I know about	56	18.67
Teacher	1	0.33
Grand Total	300	100

**PCOS and its linkages with inheritance -**

Empirical evidences reveal that 20-40 percent of women with PCOS have an affected mother or sister. So influences shared by family members are likely to play a role though many studies reveal that there is no clear pattern of inheritance. This uncertainty about whether or not it is inherited is observed even among the respondents. It was observed that 60 female and 24 male respondents feel that PCOS is inherited while 93 females and 27 males feel that it is not. The remaining have no idea about PCOS being inherited or not. Those who do not know whether it is inherited or not represent 32 per cent of the total respondents.

Table 8: Inheritance and PCOS

	I don't know	No	Yes
Female	66	93	60
Male	30	27	24
Total	96	120	84



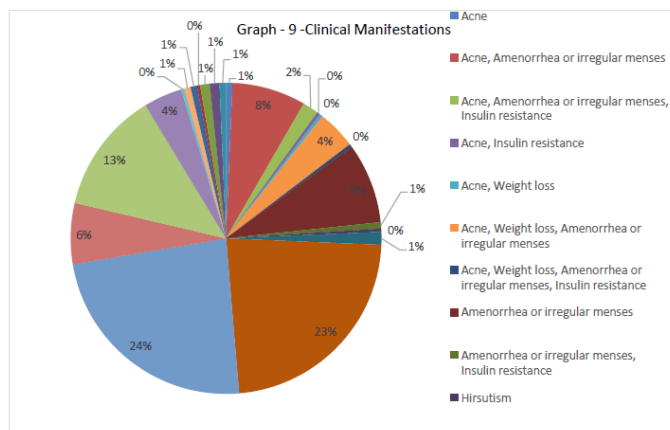
While 68 per cent of the total respondents have some clue regarding it being inherited or not 32 per cent feel that they are not sure of its links with inheritance.

Clinical manifestation of PCOS and awareness about these manifestations among the respondents

- Acne is a proven symptom of PCOS. Of the total sample size of 300, 246 respondents feel that acne among many other manifestations is an important clinical manifestation of PCOS. This constitutes 82% of the respondents.
- 289 out of 300 which is 96 per cent of the total respondents are of the opinion that irregular menses is the clinical manifestation of PCOS.
- 219 out of 300 which is 73 per cent of the total respondents express hirsutism to be the clinical manifestation of PCOS.
- 197 out of 300 respondents (65.66 per cent of the total respondents) feel that all three viz, hirsutism, irregular menses, and acne are the clinical manifestations of PCOS.

Table 9: Clinical manifestations of PCOS

Clinical manifestations of PCOS	Count	Percent
Acne	2	0.67
Acne, Amenorrhea or irregular menses	23	7.67
Acne, Amenorrhea or irregular menses, Insulin resistance	5	1.67
Acne, Insulin resistance	1	0.33
Acne, Weight loss	1	0.33
Acne, Weight loss, Amenorrhea or irregular menses	12	4.00
Acne, Weight loss, Amenorrhea or irregular menses, Insulin resistance	1	0.33
Amenorrhea or irregular menses	25	8.33
Amenorrhea or irregular menses, Insulin resistance	2	0.67
Hirsutism	1	0.33
Hirsutism, Acne	4	1.33
Hirsutism, Acne, Amenorrhea or irregular menses	69	23.00
Hirsutism, Acne, Amenorrhea or irregular menses, Insulin resistance	71	23.67
Hirsutism, Acne, Weight loss, Amenorrhea or irregular menses	19	6.33
Hirsutism, Acne, Weight loss, Amenorrhea or irregular menses, Insulin resistance	38	12.67
Hirsutism, Amenorrhea or irregular menses	12	4.00
Hirsutism, Amenorrhea or irregular menses, Insulin resistance	1	0.33
Hirsutism, Weight loss, Amenorrhea or irregular menses	2	0.67
Hirsutism, Weight loss, Amenorrhea or irregular menses, Insulin resistance	2	0.67
Insulin resistance	1	0.33
Weight loss	3	1.00
Weight loss, Amenorrhea or irregular menses	3	1.00
Weight loss, Amenorrhea or irregular menses, Insulin resistance	2	0.67
Grand Total	300	100.00



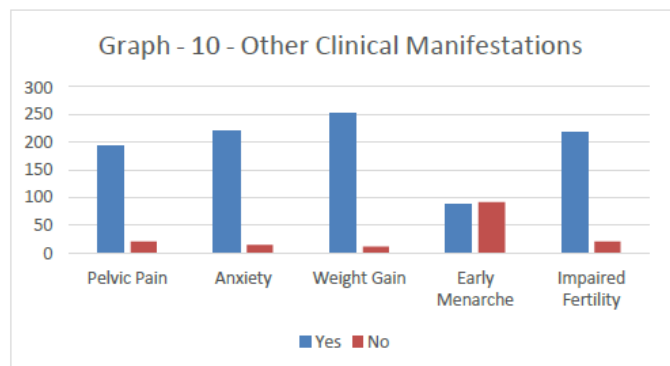
**Other Clinical Manifestations of PCOS –**

- A total of 220 respondents feel anxiety to be one of the clinical manifestations.
- 192 out of 300 respondents feel that pelvic pain as one of the clinical manifestations of PCOS.
- 252 respondents feel that weight gain is an important cause of clinical manifestation of PCOS.
- The other symptoms such as early menarche, impaired fertility do not seem to be prominent manifestations of PCOS.



Table 10: Other clinical manifestations

	Pelvic Pain	Anxiety	Weight Gain	Early Menarche	Impaired Fertility
Yes	192	220	252	89	218
No	20	14	11	91	20

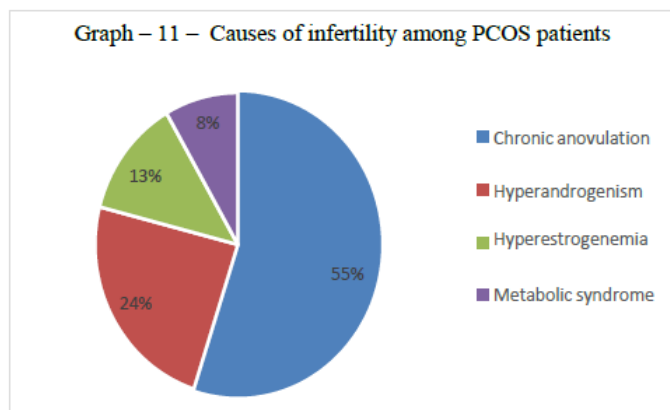


**Awareness about causes behind infertility among PCOS patients**

Study reveals that 165 respondents feel that infertility among PCOS patients is due to chronic anovulation while 252 respondents feel that infertility among PCOS patients is due to obesity. Hyperestrogenemia and metabolic syndrome don't seem to be the causes behind infertility among PCOS patients.

Table 11: Causes of infertility among PCOS patients

Why are most of the patients with PCOS infertile?	Count
Chronic anovulation	165
Hyperandrogenism	72
Hyperestrogenemia	38
Metabolic syndrome	25
Grand Total	300



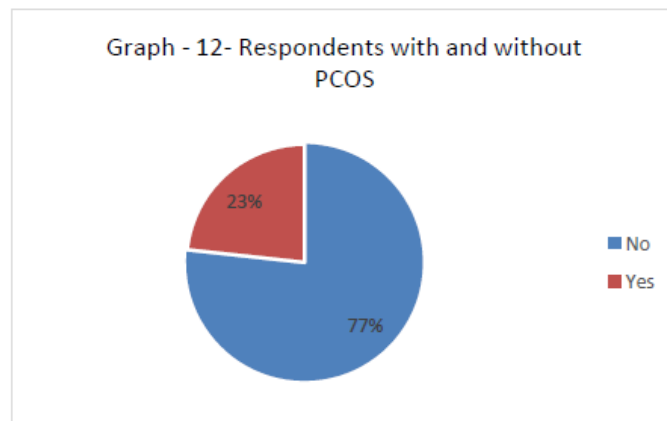
**Respondents with PCOS**

The survey tries to identify those respondents who already had PCOS. This will help us isolate those who naturally know about this disease so as to classify the respondents further into those who know because they already have it from those who know without having acquired this disease. Of the 219 female respondents 51 had PCOS which represents 23.28 percent of the total female respondents. So

23.28 per cent may have known of this disease on account of the acquiring the same. Obviously 76 per cent of the total female respondents did not have PCOS and their awareness could be attributed to they getting to know about it from various sources.

Table 12: Respondents with PCOS

Did you have PCOS anytime in your life?	Count
No	168
Yes	51
Grand Total	219



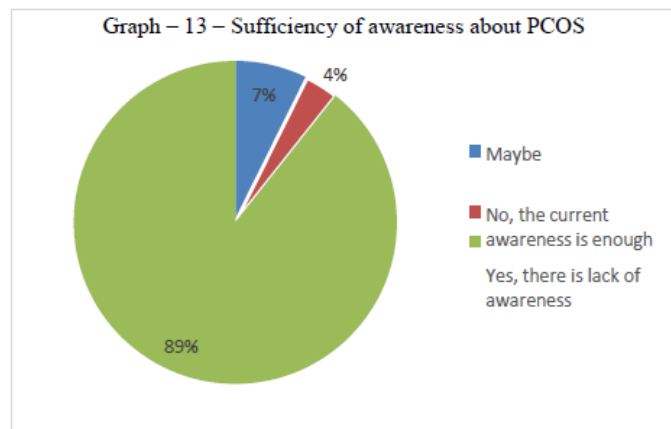
Is there awareness among people about PCOS?

The respondents feel that there is lack of awareness among the people about PCOS. This could be their observation because the respondents are medical students and they want this awareness to be enhanced among non medical students. Of 300 respondents 268 feel that greater awareness about PCOS among people is essential

while 10 do not feel the need. The remaining is indifferent about it.

Table 13: Sufficiency of awareness about PCOS

Do you think more awareness must be spread among medical students about PCOS?	Count
Maybe	22
No, the current awareness is enough	10
Yes, there is lack of awareness	268
Grand Total	300



### Discussion

There are number of research papers finding the awareness about PCOS. These research papers dwell over a varied number of respondents, from a restricted to a large geographical coverage and with respondents varying across disciplines. Taking a clue from these research papers I ventured into this topic and directed my study towards niche respondents. I decided to take up students within a particular city, with a definite academic background and studying in definite years of a certain course. So I decided to select Nagpur as the study area. In Nagpur I decided to take only first and second year students from the three medical colleges of Nagpur.

This kind of a study restricted to a definite class and discipline of students was carried out for the first time. There have been attempts to study awareness among the students but not restricted to medical students. For example, Jaya Patel and Shailesh Rai have written a

paper on similar topic but their set of respondents is young women of central India. Their paper differs from my study because I have attempted to find the awareness among both the genders. The sample size for the paper written by Jaya Patel and Shailesh Rai is 400, a 100 more than the sample size under consideration in my research paper. The observations for research papers on similar topics are based on sample size fluctuating between 300 and 500. This validates the size of sample selected for this paper too.

The only possible limitation of the research paper is the class of students from medical stream who would have some understanding of PCOS.

The study reveals that, a number of students know about the syndrome. They even know the clinical manifestations of PCOS. The responses received satisfy the Rotterdam criteria. Rotterdam criteria used for the diagnosis of PCOS, confirms the same by accepting 2 out of 3 criteria given for PCOS.

They being-

1. Oligo-and /or anovulation,
2. Biochemical and/or clinical signs of Hyperandrogenism (Acne, Hirsutism, acanthosis nigrans) and
3. Polycystic Ovaries (greater than or equal to 12 follicles in each ovary)

### Conclusion

This study throws light on the existence of awareness about PCOS among the medical students by virtue of them being in the field of medicine. A non-medical student may not have heard of such a disease and that is a big limitation of my study. This study can be extended further by taking non-medical faculty students as respondents. This is obviously a scope for further research.



## References

1. Michael Ntumy, Ernest Maya, Daria Lizneva, Richard Adanu & Ricardo Azziz (2019) The pressing need for standardization in epidemiologic studies of PCOS across the globe, *Gynecological Endocrinology*, 35:1, 1-3, DOI: 10.1080/09513590.2018.1488958
2. 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
3. S.S. Guraya / *Journal of Microscopy and Ultrastructure* 1 (2013) 30–34
4. Nasrat H, Patra SK, Goswami B, Jain A, Raghunandan C. Study of association of leptin and insulin resistance markers in patients of PCOS. *Indian J Clin Biochem* 2016; 31 : 104-7
5. Chakrabarti J. Serum leptin level in women with polycystic ovary syndrome: Correlation with adiposity, insulin, and circulating testosterone. *Ann Med Health Sci Res* 2013; 3 : 191- 6.
6. Nisar S, Shah PA, Kuchay MS, Bhat MA, Rashid A, Ahmed S, et al. Association of polycystic ovary syndrome and Graves' disease: Is autoimmunity the link between the two diseases. *Indian J Endocrinol Metab* 2012; 16 : 982-6
7. Sirmans SM, Pate KA. Epidemiology, diagnosis, and management of polycystic ovary syndrome. *Clin Epidemiol.* 2013 Dec 18;6:1-13. doi: 10.2147/CLEP.S37559. PMID: 24379699; PMCID: PMC3872139.
8. Pritam Kumar Panda, Riya Rane, Rahul Ravichandran, Shrinkhla Singh, Hetalkumar Panchal, Genetics of PCOS: A systematic bioinformatics approach to unveil the proteins responsible for PCOS, *Genomics Data*, Volume 8, 2016, Pages 52-60, ISSN 2213-5960
9. S. Rahman, A. Parvez, A. Sabur and S. Ali, "Study of the Effect of Food Habit, Lifestyle and Daily Trip on Physical and Mental Status of Subjects at Islamic University in Kushtia, Bangladesh," *Open Journal of Statistics*, Vol. 2 No. 2, 2012, pp. 219-223. doi: 10.4236/ojs.2012.22027.
10. Soni K R, Agarwal S. To Evaluate the Knowledge and Awareness of PCOS among Women of Known Population: A Hospital Based Study. *J Adv Med Dent Scie Res* 2019;7(10): 147-149.
11. Dunaif A. Insulin resistance and the polycystic ovary syndrome: mechanism and implications for pathogenesis. *Endocr Rev.* 1997 Dec;18(6):774-800. doi:10.1210/edrv.18.6.0318. PMID: 9408743.
12. Corbould A, Kim YB, Youngren JF, Pender C, Kahn BB, Lee A, Dunaif A. Insulin resistance in the skeletal muscle of women with PCOS involves intrinsic and acquired defects in insulin signaling. *Am J Physiol Endocrinol Metab.* 2005 May;288(5):E1047-54.
13. Nestler JE, Jakubowicz DJ, de Vargas AF, Brik C, Quintero N, Medina F. Insulin stimulate testosterone biosynthesis by human thecal cells from women with polycystic ovary syndrome
14. Solomon C G; McCartney C R; Marshall J C, 2016, Polycystic ovary syndrome. *NEJM*, 375(1), 54-64.
15. Patel Jaya; Rai Shailesh. (2018). Polycystic ovarian syndrome (PCOS) awareness among young women of central India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology.* 7. 10.18203/2320-1770.ijrcog20183853.