

## A STUDY OF KNOWLEDGE, AWARENESS, PREVALENCE, AND RISKFACTORS OF POLYCYSTIC OVARIAN SYNDROME

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### ABSTRACT:

Polycystic ovarian syndrome (PCOS) is one of the endocrine disorders in women of reproductive age. Women with this syndrome may have infrequent menstrual periods due to excess androgen levels. It is important to make an early diagnosis in order to prevent early and late sequel of the syndrome. To assess the level of knowledge, awareness, prevalence and risk factors of PCOS among South Indian region, to identify factors that influenced the awareness, and to improve health care. This is a cross sectional online and offline study was conducted for a period of 8months (October 2021 to May 2022) among South Indian region womens whose age ranged between 18 to 45 years. Women demographic characteristics, reproductive health, knowledge, awareness, prevalence, risk factors of PCOS were analysed through an Online/Google form validated questionnaire. The outcomes of the study indicates that majority of the women 69.81 % (155) participants were under 20 years of age and 30.18% (67) were above 20 years of age, 73% (162) participants had good knowledge about PCOS, and 25.9% (42) participants were aware that menstrual irregularity is a symptom of PCOS. While only 16.2% (36) participants had believed that PCOS may lead to infertility, 13.1% (29) participants are believed that medications as treatment for PCOS, 3.2% (07) participants felt hypertension as risk factor of PCOS, 92.9% (206) participants felt none of them are risk factors of PCOS, and 41% (91) participants had believed that PCOS can treated with allopathy method. Conclusively, the present study observed that the current level of awareness on PCOS among the South-Indian population is still in low key though relatively better than past decades. With regard to knowledge and attitudes of PCOS, patients are still in the grey zone which could be overcome by extensive awareness programme. The present study emphasized the need to health education and awareness programmes to be incorporated in educational system improve to combat the low knowledge among rural population especially utilizing different sources, targeted approach to provide clear, appropriate and tangible information and preventive measures.

### Keywords:

PCOS, excess androgens, menstrual irregularity, awareness, knowledge, prevalence and risk factors.

### INTRODUCTION:

Polycystic ovarian syndrome (PCOS) is an endocrine disorder which commonly affects the adolescent girls. It affects 5% to 10% of women in their reproductive years<sup>1</sup>. PCOS has a wide range of presentation in adolescents as menstrual irregularity, hirsutism, acne and acanthosis nigricans. It is important to make an early diagnosis in order to prevent early and late sequel of the syndrome<sup>2</sup>. The pathophysiology responsible for the development of polycystic ovaries has puzzled gynaecologists and endocrinologists for many years and has proven very difficult to define<sup>3</sup>. However, the main pathogenesis still could be hormonal imbalance and insulin resistance. PCOS is associated with increased metabolic and cardio-vascular risk factors due to increased insulin resistance<sup>4</sup>. In more than 40% of cases, PCOS is associated with obesity, as well as impaired glucose tolerance, type 2 diabetes, and the metabolic syndrome<sup>5</sup>.

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<sup>6</sup>. While World Health Organisation (WHO) states the condition under Group II disorder of ovulation involving dysfunction of hypothalamus-pituitary-ovarian axis. Many proposals had been postulated in picking up PCOS with own pros and cons. Rotterdam criteria recommended from European countries is being followed worldwide in categorizing PCOS which includes presence of any 2 of the following

conditions namely: excess of androgen, ovulatory dysfunction/anovulation, and polycystic ovaries (detected by diagnostic procedure).

The studies that had been conducted to analyse the problem of PCOS only one-third of affected females has gained some awareness of the condition and its complications and rest of the study population are unaware of either sequelae or morbidities. Being a developing Country, with many endemic pathological conditions rather than a sequelae of endocrine disorder like PCOS it is believed that knowledge on awareness on PCOS and its consequences will have a good impact on reducing the incidences.

Lack of knowledge and lifestyle changes are considered to be the major factor leading to rapid increase in incidence of PCOS in recent years, resulting in complications. Awareness of PCOS symptoms and complications among the health care workers is essential for early treatment and to prevent serious complications. The gap in the level of knowledge and perception when assessed among nurses can be used as a tool to improve the education of the public on PCOS<sup>10</sup>. PCOS still stays as a condition with diagnosis of exclusion<sup>11</sup>. The condition also has many similar mimickers clinically often warranting multisystem approach. Being an endocrine disorder, is associated with many morbidities including increased of myocardial infarction<sup>12</sup>.

The most common purpose of the study was due to the lack of awareness in female of reproductive age group is their inability to relate their symptoms to PCOS. Their unawareness of PCOS may lead to complications. Overall the findings from the study will help to provide information to support the development of learning and managing tools for women about PCOS.

## **MATERIALS AND METHODS:**

### **Study design:**

An observational cross sectional study on evaluation of knowledge, awareness, prevalence, risk factors and management of PCOS among south Indian women with a sample size of 222 participants. The study was conducted for a period of 8 months from October 2021 to May 2022. The purpose and objective of the study were explained to the participants. Informed consent was signed by the participants willing to participate in the study. The data of the participants was recorded on the basis of questionnaire and was analysed.

### **Study units (Inclusion criteria/Exclusion criteria):**

Participants who are above the age of 18 and below the age of 45 will be included in study. Participants who are willing to participate in the study will be included. Participants below the age of 18 years, and antenatal women will be excluded from study. Participants who are not willing to participate in the study will be excluded.

### **Method of data collection:**

The selected participant group as per the above inclusion/exclusion criteria were included in the study. An online survey form was designed for the collection of information about the participant age at menopause, address, contact number, height and weight, dietary habits, level of education, any associated disease, oral contraceptive uses/non uses, pattern of menstrual cycle (regular /irregular), length of each cycle, duration of bleeding (in days).

### **Statistical analysis:**

The collected data was initially entered into the Microsoft excel work sheet (Microsoft corporation, Redmond WA) and the analysis was performed. The data on continuous variables were summarized on descriptive statistics Mean and Standard deviation. Categorical data was expressed as number and percentage. All the entries are double checked for any possible errors. The obtained results were presented in tabular and graphical forms using Microsoft word and excel. The data collected were analysed through descriptive analysis as frequencies and percentages after entry into

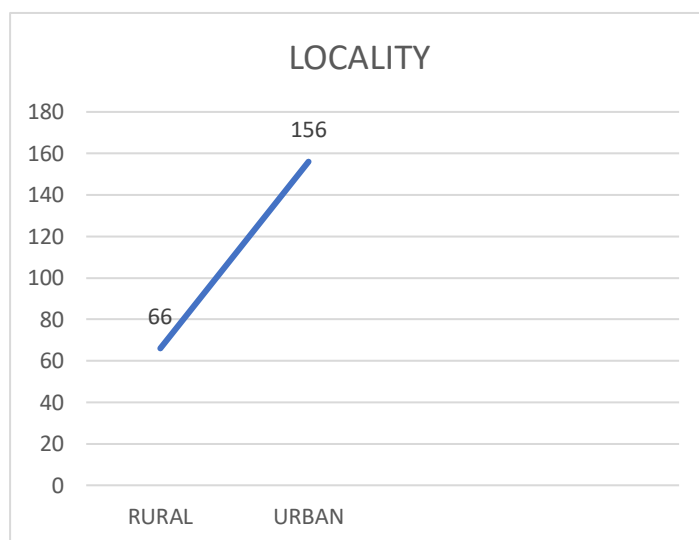
Microsoft excel sheets. Chi square test was used to test the association between different variables. P value <0.05 was considered significant.

**RESULTS:**

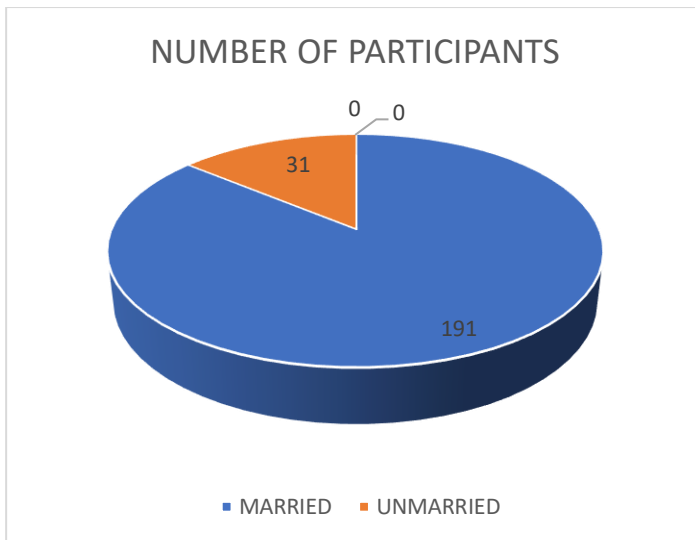
This is a cross sectional online and offline (both) study was conducted for a period of 8 months (October 2021 to May 2022) among South Indian region womens. The participants sample size (n=222) was selected by inclusion criteria and exclusion criteria.

*Table 1: Analysis on social demographic details*

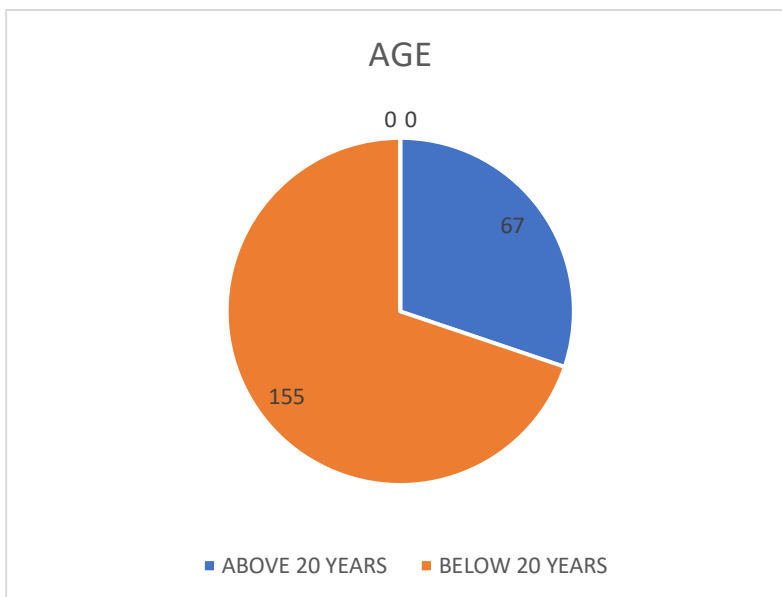
Demographic details		Number of people	Percentage (%)
<b>Age</b>	Below 20 yrs	155	69.81%
	Above 20 yrs	67	30.18%
<b>Education level</b>	10 <sup>th</sup> and below 10 <sup>th</sup>	6	2.7%
	Intermediate	17	7.65%
	Undergraduate	182	81.98%
	Post graduate and doctorates	12	5.4%
	Illeterates	5	2.25%
<b>Marital status</b>	Married	31	14%
	Unmarried	191	86%
<b>Married participants (31)</b>	People with child	22	71%
	People without child	9	29%
<b>Locality</b>	Urban	156	70.27%
	Rural	66	29.72%



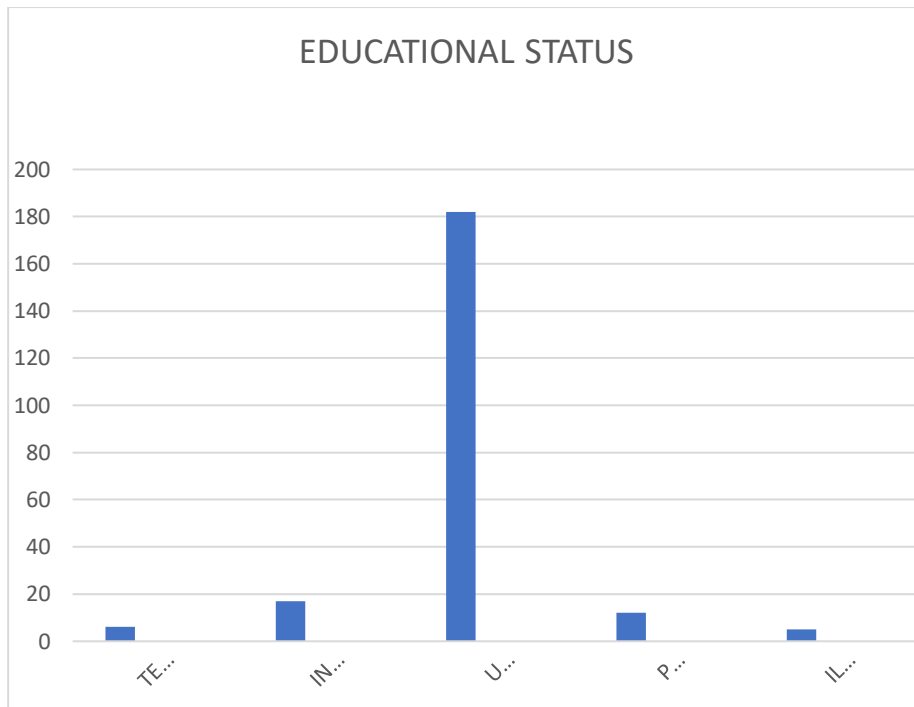
**Figure 1.1: Analysis on social demographic details**



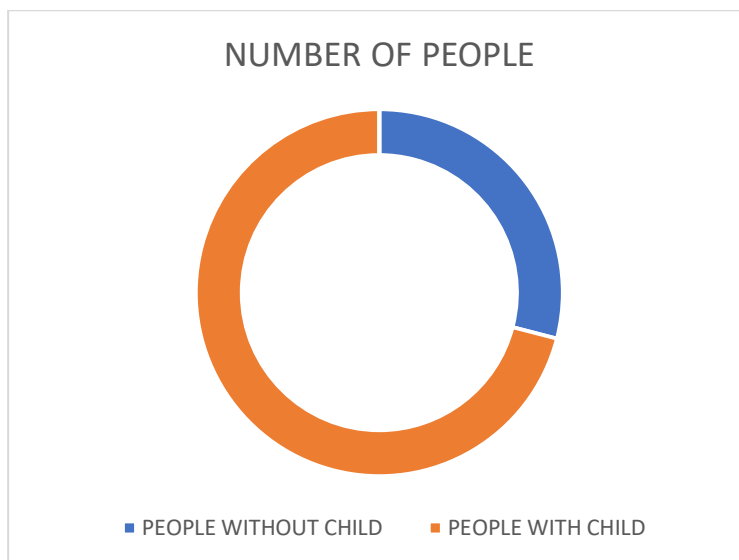
**Figure 1.2: Distribution of marital status among participants:**



**Figure 1.3: Age distribution among participants**



**Figures 1.4: Distribution of educational level among the participants**

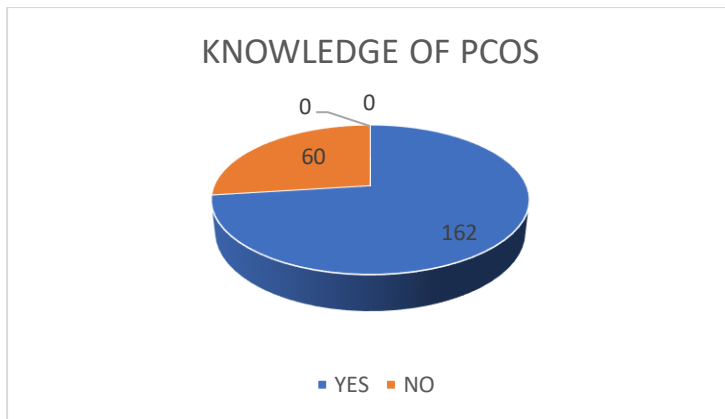


**Figures 1.5: of people having children among married participants**

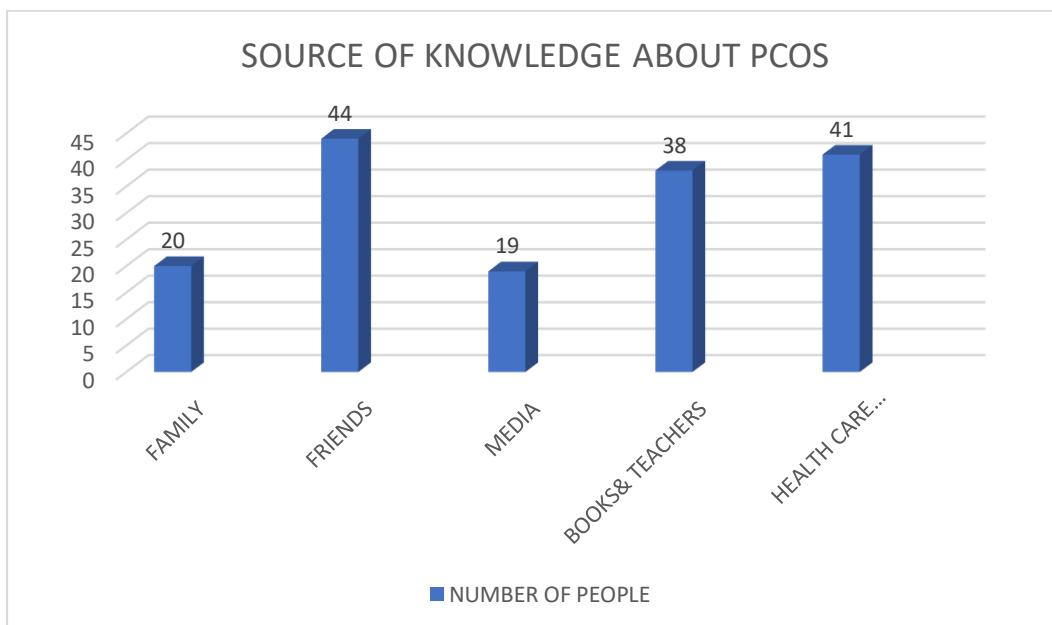
**Table 2: Analysis on knowledge of study participants about PCOS**

Questions	Number of people	Percentage(%)
<b>Knowledge of PCOS</b>	Yes	73%
	No	27%
<b>Source of PCOS</b>	Family	12.34%
	Friends	27.1%
	Books and teachers	23.45%
	Media	11.72%

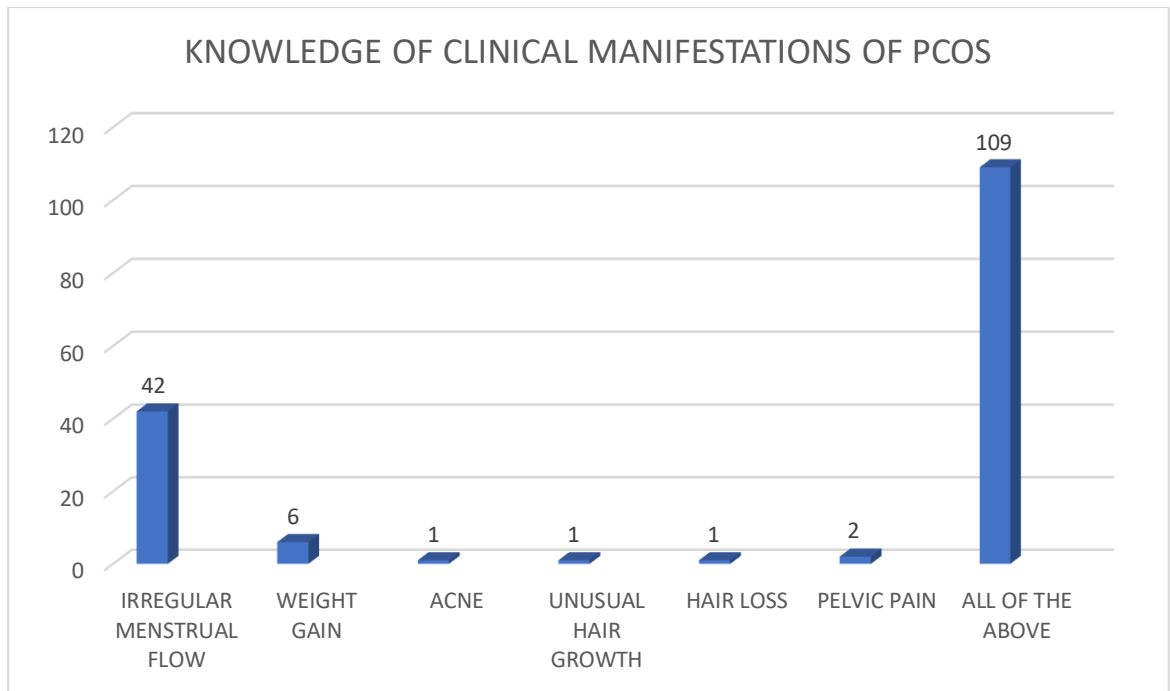
	Health care professionals	41	25.3%
<b>Causes of PCOS</b>	Obesity	13	8.02%
	Smoking	01	0.61%
	Insulin resistance	09	5.55%
	Hypothyroidism	06	3.73%
	Life style	15	9.25%
	Imbalance of reproductive hormones	01	0.61%
	All of the above	105	64.81%
<b>Clinical manifestations</b>	Irregular menstrual flow	42	25.9%
	Weight gain	06	3.7%
	Acne	01	0.61%
	Unusual hair growth	01	0.61%
	Hair loss	01	0.61%
	Pelvic pain	02	1.23%
	All the above	109	67.28%
	Don't know	60	27%
<b>Morbidities of PCOS</b>	Infertility	36	16.2%
	Pregnancy/delivery complications	18	8.1%
	Depression/anxiety	03	1.4%
	Cardiovascular disorder	05	2.3%
	Endometrial cancer	02	0.9%
	Sleep apnoea	04	1.8%
	All the above	132	59.5%
	Don't know	60	27%
<b>Treatments of PCOS</b>	Weight reduction	04	1.8%
	Medications	29	13.1% <sup>3</sup>
	Vitamins and nutrients	7	3.2%
	Diet	06	2.7%
	Harmonal therapy	13	5.9%
	All the above	103	46.39%
	Don't know	60	27%



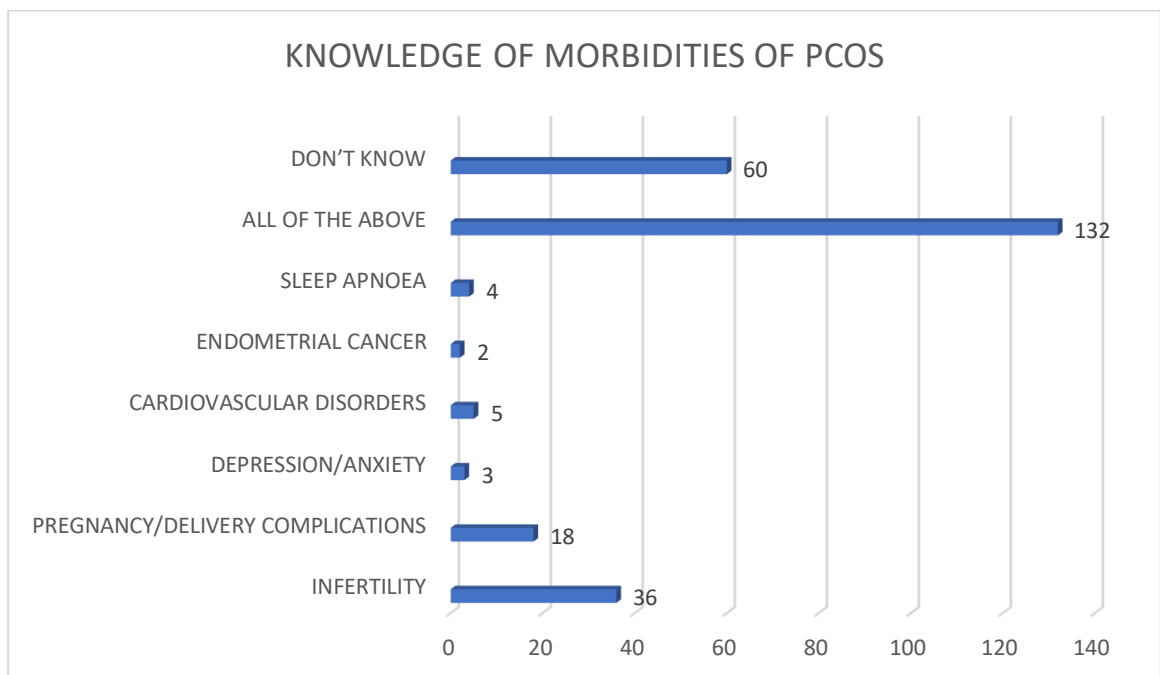
**Figure 2.1: Knowledge of PCOS among participants**



**Figure 2.2: Source of knowledge among participants**

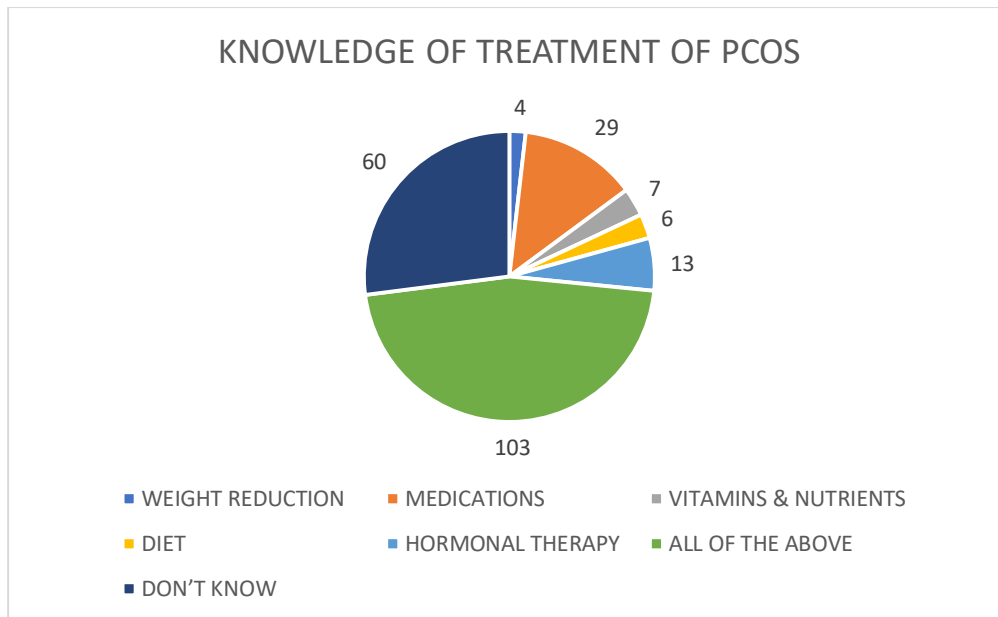


**Figure 2.3: Knowledge of clinical manifestations of PCOS**



**Figure 2.4: Knowledge of morbidities of PCOS**

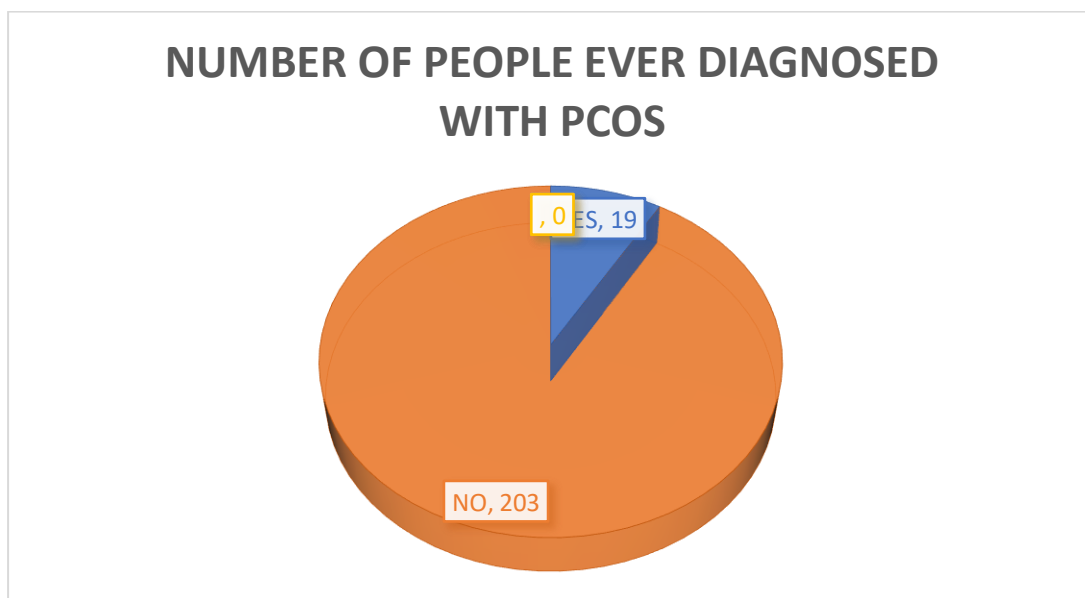




**Figure 2.5: Knowledge of treatment of PCOS**

**Table 3: Analysis on prevalence of PCOS**

Ever diagnosed with PCOS	Number of participants	Percentage
Yes	19	8.6%
No	203	91.4%

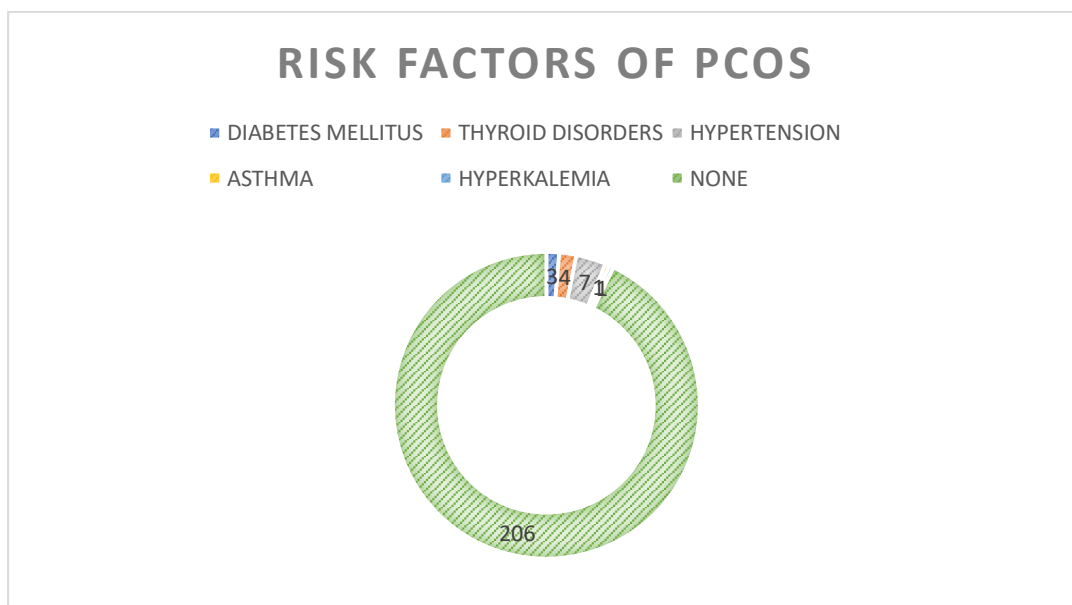


**Figure 3: Number of people ever diagnosed with PCOS among participants**

**Table 4: Analysis on attitude and practices of PCOS**

Questions	Number of participants	Percentage	
Risk factor of PCOS	Diabetes mellitus	03	1.35%

	Thyroid disorders	04	1.8%
	Hypertension	07	3.2%
	Asthma	01	0.5%
	Hyperkalemia	01	0.5%
	None	206	92.7%
<b>Family history</b>	Diabetes mellitus	30	13.6%
	Hypertension	27	12.2%
	PCOS	02	0.9%
	Obesity	04	1.8%
	Other	03	1.4%
	None	156	70.27%
<b>Days of menstrual flow</b>	2 to 4 days	138	62.2%
	5 to 7 days	711	32%
	More than 7 days	13	5.85%
<b>Periods flow</b>	Normal bleeding	169	76.1%
	Heavy bleeding	29	13.1%
	Light bleeding	24	10.8%
<b>Type of pain</b>	Mild	42	18.9%
	Moderate	99	44.6%
	Severe	45	20.3%
	No pain	36	16.2%
<b>Treatment</b>	Allopathy	91	41%
	Ayurvedic	66	29.7%
	Homeopathy	442	19.8%
	No treatment	21	9.45%
<b>Methods to maintain weight</b>	Diet	98	44.1%
	Exercise	95	42.8%
	Drugs and surgery	06	2.7%
	None	23	10.4%



**Figure 4.1: Risk factor of PCOS among participants**

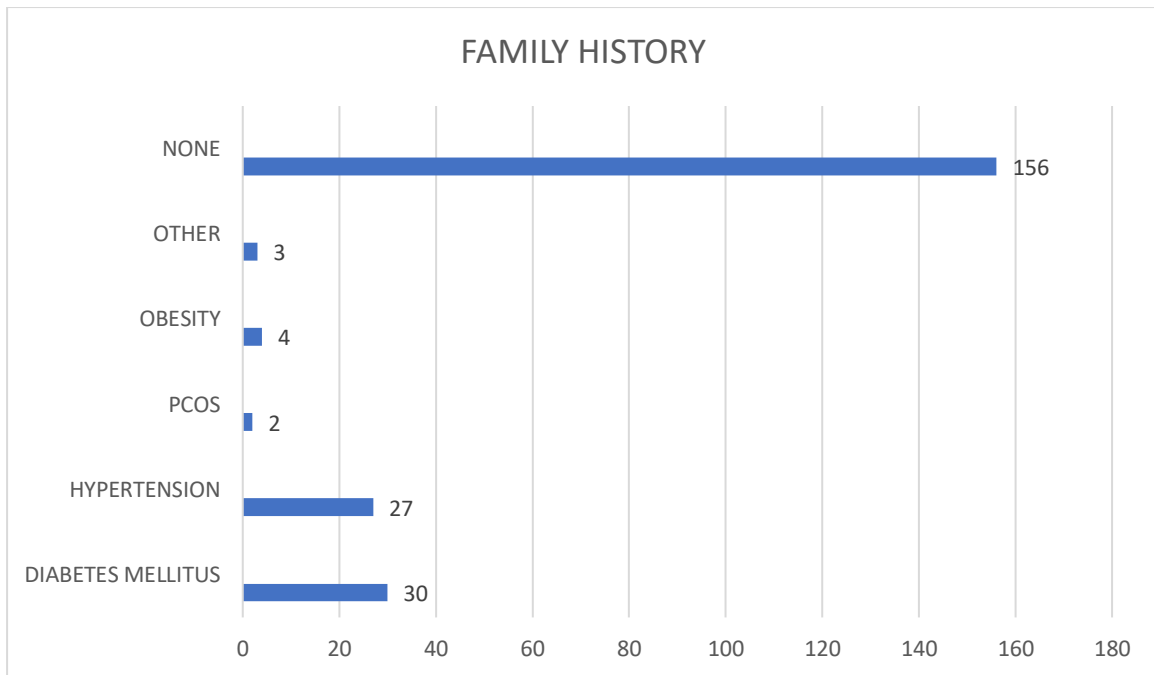


Figure 4.2: Family history of disease among the participants

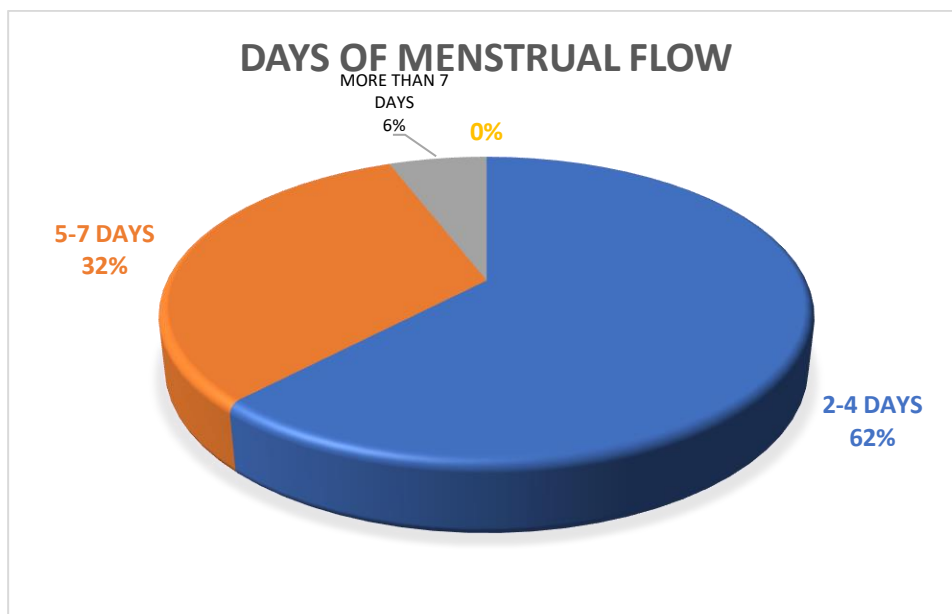
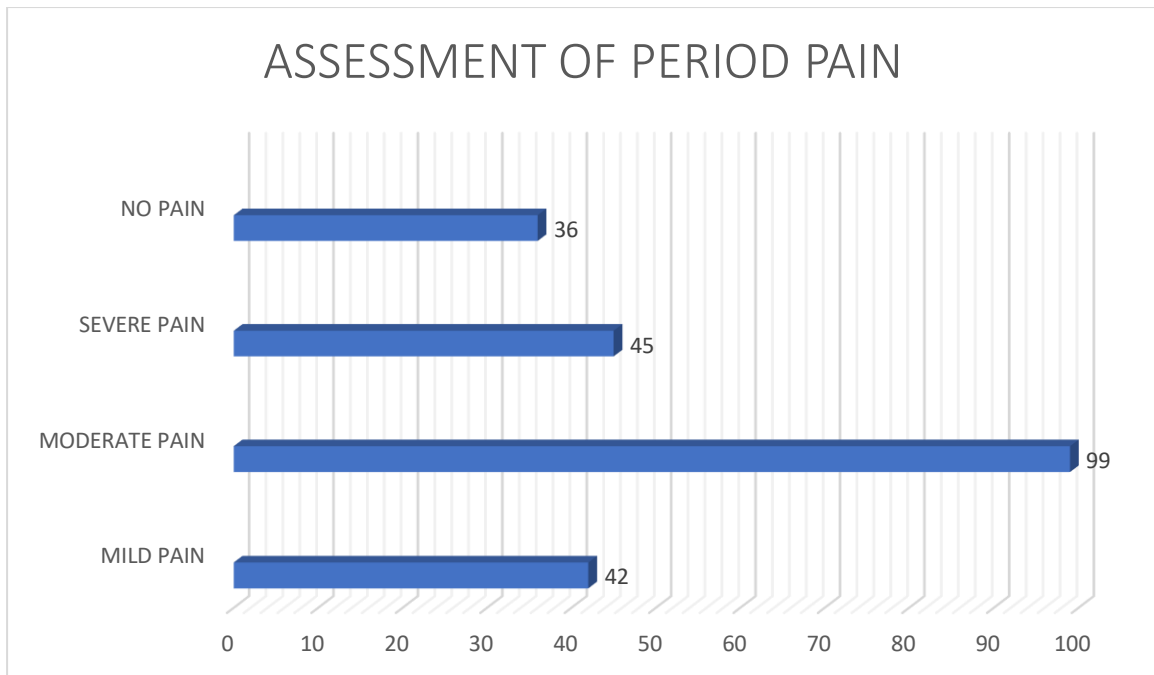
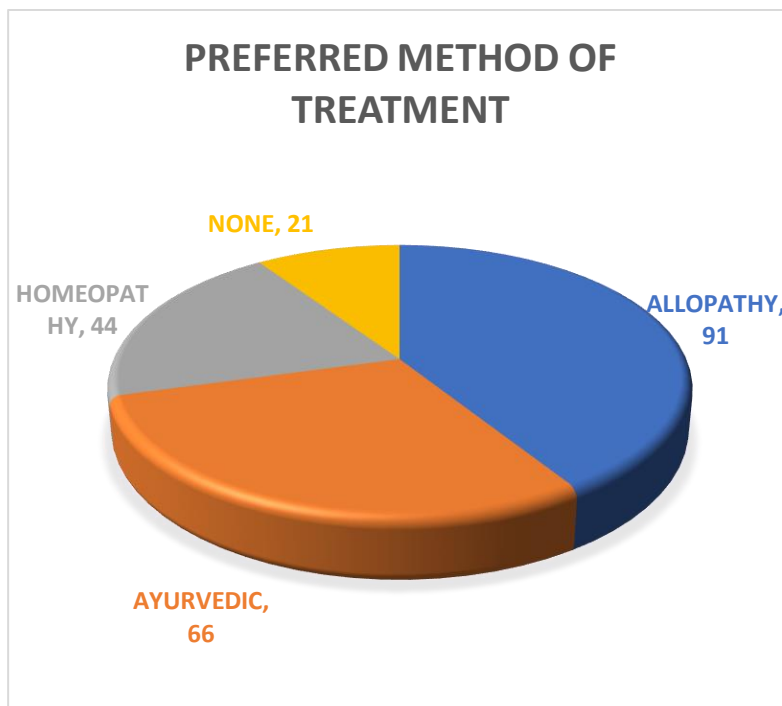


Figure 4.3: Days of menstrual flow among participants



**Figure 4.4: Assessment of period pain among the participants**



**Figure 4.5: Method of treatment among the participants**

**Table 5: Association of socio-demographic characteristics with knowledge, attitude and practice towards PCOS.**

SOCIO-DEMOGRAPHIC CHARACTERISTICS	ODD RATIO	CHI SQUARE STATISTIC	P VALUE	LEVEL OF SIGNIFICANCE
AGE				
Below 20 years	3.49	13.2228	0.000277	<i>p</i> < .05
Above 20 years	2.18			
LOCALITY				
Rural	2.1	11.7366	0.000613	<i>p</i> < .05
Urban	3.4			
LEVEL OF EDUCATION				
Below intermediate	1.0	12.5145	0.000404	<i>p</i> < .05
Above intermediate	1.12			

**DISCUSSION:**

PCOS is a complex condition characterized by elevated androgen levels, menstrual irregularities, and/or small cysts on one or both ovaries<sup>1</sup>. The disorder can be morphological (polycystic ovaries) or predominantly biochemical (hyperandrogenemia). Hyperandrogenism, a clinical hallmark of PCOS, can cause inhibition of follicular development, microcysts in the ovaries, anovulation, and menstrual changes<sup>2</sup>. According to the National Institutes of Health Office of Disease Prevention, PCOS affects approximately 5 million women of childbearing age in the U.S. Costs to the U.S. health care system for the identification and management of PCOS are approximately \$4 billion per year<sup>4</sup>.

Research suggests that 5% to 10% of females 18 to 44 years of age are affected by PCOS, making it the most common endocrine abnormality among women of reproductive age in the U.S.<sup>5</sup>. Women seeking help from health care professionals to resolve issues of obesity, acne, amenorrhea, excessive hair growth, and infertility often receive a diagnosis of PCOS. Women with PCOS have higher rates of endometrial cancer, cardiovascular disease, dyslipidemia, and type-II diabetes mellitus<sup>6</sup>. This article explores the pharmacotherapeutic management of PCOS.

PCOS is one of the non neoplastic lesions of ovary which comprises around 12-14 % of overall incidence of non-neoplastic ovarian pathology. It is a heterogeneous endocrine disorder with a spectrum of reproductive and metabolic pathological features; it ranges between 6-26% globally with higher incidence in tropical countries like India as proposed by panda et al<sup>2, 3</sup>. The reason for this higher incidence of PCOS is due to lack of awareness, knowledge, attitude, towards practices related to the condition. Many studies were conducted on PCOS that focused only on diagnostic criteria of disease and clinical manifestations apart from documenting awareness of the sequence of PCOS. The present study is in concordance with Giltborg et al. that analyzed and documented awareness and knowledge of PCOS among South eastern population socio demographic profile of patients has a prominent role<sup>4</sup>.

In the present study it was observed that 69.81% of participants were below 20 years of age and 30.18% of participants were above 20 years of age. The average age was between 18-36 years. The reason for these is "Third decade" has higher incidence of PCOS because of active reproductive cycle phase and ovarian hyper stimulation. From the present study, it was found that 73% of participants have knowledge about PCOS as compared to the study conducted by Vaithy. K A et al was 90%. The lower incidence was due to lack of education<sup>11</sup>.

Among these 73% of participants who had knowledge of PCOS. The knowledge was mostly acquired from family (12.34%), friends (27.1%), health care professionals (25.3%), media (11.72%), book and teachers (23.45%). Among these 162 (73%) of the participants were aware of the symptoms of PCOS as obesity (8.02%), smoking (0.61%), hypothyroidism (3.73%), life style (0.61%) and all the above symptoms (64.81%). In context to knowledge of morbidities of PCOS, 73% aware of the problems associated with PCOS in terms of infertility, weight gain, menstrual irregularities, and pregnancy disorders concurring with the observations done by Moron et al<sup>18</sup>.

In this survey, participants believed that PCOS will be cured by weight reduction (1.8%), medications (13.1%), vitamins and nutrients (3.2%), diet (2.7%), hormonal therapy (5.9%), all the above (46.39%) and don't know (27%). Among 222 participants, 19 (8.6%) participants had noticed and diagnosed with prevalence of PCOS and 203 (91.4%) participants had not diagnosed with prevalence of PCOS.

From the present study it was found that 1.25% (3) people had felt that diabetes mellitus as risk factor of PCOS, 1.8% (4) people felt thyroid disorder as a risk factor of PCOS, and 3.2% (7) people felt hypertension as a risk factor of PCOS, 0.5% (1) member felt that asthma as a risk factor of PCOS and 92.6% (206) people felt none of them are risk factors of PCOS.

The study found that 13.6% (30) people had diabetes mellitus in their family history, 12.2% (27) people had hypertension, 0.9% (2) people had PCOS and 1.8% (4) people had obesity, 1.4% (3) people had other disorder in their family history and 70.27% people had no disorder in their family history. In this study 62.2% (138) people had 224 days of menstrual flow, 32% (71) people had 5 to 7 days of menstrual flow and 5.85% (13) people had more than 7 days of menstrual flow.

The present study says that 76.1% (169) people had subjected to normal bleeding, 13.1% (29) had subjected to heavy bleeding and 10.8% (24) people had subjected to light bleeding. From the present study 13.9% (42) people had faced mild period pain, 44.6% (99) people had faced moderate period pain and 20.3% (45) faced severe pain and 16.2% (36) have not faced any kind of period pain.

In this study, 80.2% (178) people have been in normal weight during their reproductive year and 19.8% (44) people have been in overweight during their reproductive years.

In this study, 41% (91) if they ever diagnosed with PCOS they would prefer Allopathy treatment, 29.75% (66) if they ever diagnosed with PCOS they would prefer Ayurvedic method and 19.8% (44) if they ever diagnosed with PCOS they would prefer Homeopathy method, and 9.45% (21) does not prefer treatment.

## **CONCLUSION:**

The present study observed that the current level of awareness on PCOS among the South-Indian population is still in low key though relatively better than past decades. With regard to knowledge and attitudes of PCOS, patients are still in the grey zone which could be overcome by extensive awareness programme. The present study emphasized the need to health education and awareness programmes to be incorporated in educational system improve to combat the low knowledge among rural population especially utilizing different sources, targetted approach to provide clear, appropriate and tangible information and preventive measures.

## **ACKNOWLEDGEMENTS:**

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## **CONFLICTS OF INTEREST:**

There are no conflicts of interest in this research work.

## **REFERENCES:**

1. J. C. Avery and A. J. Braunack-Mayer, "The information needs of women diagnosed with polycystic ovarian syndrome - Implications for treatment and health outcomes", *BMC Womens Health*. (2007); 7: 9
2. Franks S. Polycystic ovary syndrome. *N Engl J Med*. (1995); 333(13): 853-61.
3. D. Shanmugham , R. K. Vidhya Lakshmi and H. M. Shivamurthy, "The effect of baseline serum luteinizing hormone levels on follicular development, ovulation, conception and pregnancy outcome in infertile patients with polycystic ovarian syndrome", *Int J Reprod Contracept Obstet Gynecol*. (2018); 7: 318- 22.
4. D. Shanmugham, S. Natarajan and A. Karthik, "Prevalence of thyroid dysfunction in patients with polycystic ovarian syndrome: a cross sectional study", *Int J Reprod Contracept Obstet Gynecol*. (2018); 7: 3055-9.
5. S. Broder-Fingert, B. Shah, M. Kessler, M. Pawelczak M and R. David , "Evaluation of adolescents for polycystic ovary syndrome in an urban population", *J Clin Res Pediatr Endocrinol*. (2009);1(4):188-93.
6. P. K. Panda, R. Rane, R. Ravichandran, S. Singh, and H. Panchal, "Genetics of PCOS: A systemic bio informatics approach to unveil the proteins responsible for PCOS", *Genomics data*. (2016); 8:52-60.
7. D. Kasper, A. Fauci, S. Hauser, D. Longo, J. Jameson and J. Loscalzo, "Harrison's Principles of internal medicine", New York: McGraw-Hill Education; (2015).
8. J. Marshall and A. Dunaif, "Should all women with PCOS be treated for insulin resistance"? . vol. 9; p. 18–22.
9. G. Begum, R. Rathod and H. Panchal, "Genetics of PCOS: A systematic bioinformatics approach to unveil the proteins responsible for PCOS. *Genomics Data*", (2016); (8):52–60.
10. R. Sasikala, D. Shanmugham, J. Varghese and D. K. Saravanan, "A study of knowledge and awareness on polycystic ovarian syndrome among nursing students in a tertiary centre in South India", *The New Indian Journal of OBGYN*. (2021); 8(1): 121-25.
11. K. Vaithy et al. / *IP Journal of Diagnostic Pathology and Oncology* (2020);5(2):215–219.
12. S. Guraya, "Prevalence and ultrasound features of polycystic ovaries in young unmarried Saudi females", *J Microsc Ultrastruct*. (2013); 1 (1):30–4.
13. M. Gupta, D. Singh, M. Toppo, A. Priya, S. Sethia, and P. Gupta P, " A cross sectional study of polycystic ovarian syndrome among young women in Bhopal", *Central India. International Journal of Community Medicine and Public Health*. (2017); 5(1): 95.
14. B. Sunanda and S. Nayak, "A study to assess the knowledge regarding PCOS (polycystic ovarian syndrome) among nursing students at NUINS. *NUJHS*", (2016); 6(3): 2.
15. E. S. Sills, M. Perloe, M. J. Tucker, C. R. Kaplan, M. G. Genton and G. L. Schattman, "Diagnostic and treatment characteristics of polycystic ovary syndrome: descriptive measurements of patient perception and awareness from 657 confidential self-reports", *BMC Women's Health*. (2001); 1(1): 3.
16. A. Alessa, D. Aleid, S. Almutairi, R. Alghamdi, N. Huaidi and E. Almansour, "Awareness of polycystic ovarian syndrome among Saudi females. *International Journal of Medical Science and Public Health*", (2017); 6 (6): 1013 – 9.
17. S. Sam, "Obesity and Polycystic Ovarian Syndrome. *Obesity Management*", (2017), 3(2): 69–73.
18. L. J. Moran, S. K. Hutchison, R. J. Norman and H.J. Teede, "Lifestyle changes in women with polycystic ovary syndrome", *Cochrane Database Syst Rev*. (2011); (7):612–626.