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Original Research Article

To identify the risk factors of poly cystic ovarian disease [PCOD] among women in reproductive age group at selected areas of puducherry –A case control study

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ABSTRACT

Introduction: Poly Cystic Ovarian Disease is a common endocrine disorder which is difficult to define because there is no single abnormality or diagnostic test that defines the syndrome. But different studies on PCOD shows the life style changes, food pattern and several other factors were involved in the development of PCOD. It is very important for women to take care of their health during their reproductive years because much reproductive health related problems can arise during this period. So it is important to know the risk factors of PCOD, to reduce the morbidity level.

Materials and Methods: A case control study was carried out in hospital and in community. Three groups were selected: hospital cases, hospital controls and community controls with 50 samples in each group selected by purposive sampling technique. The data was collected using semi structured questionnaire using interview method. Approximately 10- 15 mins was taken by the study participants to answer the questions. By using Odds ratio the risk factors for PCOD were found out.

Results : The risk factors identified were medical history of other than PCOD (OR= 25.242), regular periods (OR=0.027), number of child (OR=7.667), taking milk (OR= 0.288) among hospital cases and hospital controls. Among hospital cases and community controls education (OR=5.167), BMI (OR= 4.25), Marital status (OR= 6), number of children (OR=40.773), taking tea (OR= 0.278), not doing exercise (OR= 0.255) were the risk factors identified. From the findings, it is evident that women with no children are 41 times at higher risk of getting PCOD when compared with women having children.

Conclusion : The study concludes that risk factors can be identified for PCOD. This will assist the community health nurse to take up preventive measures to bring down the morbidity rate.

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1. Introduction

Poly Cystic Ovarian Disease [PCOD] or Poly Cystic Ovarian Syndrome [PCOS] is a disease characterized by multiple “Poly” cysts [small sacs filled with fluid] in the ovaries. It is an endocrine disorder affecting women of reproductive age worldwide and affects 5% to10% of women in the reproductive age.¹ In India 1 in 5 women suffer from Poly Cystic Ovarian Disease [PCOD] and East India leads the chart, 1 in 4 women suffering from PCOD.

It is the leading cause for infertility among women today.¹

The exact cause of PCOD is unknown, but doctors believe that hormonal imbalances and genetics play a role. PCOD is not only diagnosed by history collection but along with additional tests like thyroid assessment and USG. The main symptom of PCOD varies from patient to patient.¹

The menstrual periods may be missing or it may be irregular.

1. The women with PCOD may experience infertility.
2. The unwanted or excess growth of hair in the body or face, thinning of hair on the scalp.

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3. Increase in weight around the waist.
4. The skin and acne may be darkened which may include skin tags.
5. The women with PCOD may lead to the severe disease such as problems in the blood vessels, heart, diabetes, cancer in uterus and sleep apnea.²

Present day lifestyle, food habits, environmental exposure to toxins along with hereditary predisposition for metabolic syndrome (obesity, diabetes) and stress has contributed to the common problem faced by today's female population which is PCOD.²

Poly Cystic Ovarian Disease is a common problem among teenage girls. In fact almost 1 out of 10 girls have Poly Cystic Ovarian Disease. A study finding shows that Adolescent Girls with Poly Cystic Ovarian Disease have an increased risk of the Metabolic Syndrome Associated with increased androgen levels.³

Polycystic ovary syndrome, or PCOS, is the most common cause of female infertility related to the absence of ovulation (called anovulatory infertility). In fact, most women don't find out that they have PCOS until they try to get pregnant, but are not successful. However, research shows that many of the features and some of the symptoms of PCOS are present before a girl has her first menstrual period and that the impact of PCOS goes beyond infertility.⁴

The researcher found that there are number of cases of PCOD in the community which could have been prevented if the risk factors were identified. Hence to bridge these lacunae it was found important to list the risk factors of PCOD. Thus the present study was undertaken.

2. Materials and Methods

2.1. Research approach

The approach used for this study is Quantitative approach.

2.2. Research design

The research design used in this study is Case control research design.

2.3. Setting

The study was conducted in OPD of Pondicherry Institute of Medical Science (PIMS), private clinic (SHRISTI Hospital) and community (Muthialpet).

2.4. Population

Women in reproductive age group of 18-45years.

2.5. Sample

The sample of the study is Women in the age group of 18-45 years, who are attending OPD of P.I.M.S, private clinic and community.

2.6. Sample size

According to literature⁵ assuming 30% exposure in control group OR(Odds Ratio) of 5.8 the sample size needed for the study is 17 cases and 17 controls from hospital and 17 controls from community to achieve 80% power of the study and 5% significance level. Pilot study was done in PIMS, Shruti and Muthialpet with 10 cases and 10 hospital control and 10 community control, samples showed no variation. Hence sample size was increased to 50 Cases and 50 Controls in hospital and 50 controls in community.

2.7. Inclusion criteria

2.7.1. Cases

1. Age group of 18-45 years
2. Women with PCOD diagnosed by Ultra Sono Graphy

2.7.2. Hospital controls

1. Age group of 18-45 years
2. Amenorrhea
3. Women without PCOD diagnosed with Ultra Sono Graphy

2.7.3. Community controls

1. Age group of 18-45 years
2. Women with normal menstruation
3. Women residing in urban area of Muthialpet

2.8. Exclusion criteria

1. Cardiovascular disease (coronary artery disease, atherosclerosis, high blood pressure, cardio myopathy)
2. Mood disorders (Depression, Dysthymia)
3. Sleep apnea
4. Not willing to participate in the study

2.9. Sampling techniques

In this study, the subjects were selected by purposive sampling technique.

2.10. Instruments and tools

Demographic variables consisted of age, education, occupation, income, religion, food pattern, BMI, type of family, age of menarche, marital status and number of children.

Semi structured interview guide consisted of family history, medical history, menstrual history and life style practices.

The tool along with the objectives was given to 6 experts (5 nurse educator, 1 doctor) to establish content validity, suggestions were taken and final tools were prepared. The reliability of the study was done using Cronbach's alpha. The tool was found to be reliable ($\alpha = 0.73$).

The study objectives and the data collection process were approved by concerned authorities of Institution Review Board. Informed consent was obtained from the women and confidentiality of data was maintained. The women had the freedom to leave the study at her will without any reason. Thus the ethical issue was ensured in the study.

3. Results

3.1. Demographic variables

Results shows that (39) 78% and (28)56% belong to <30 years of age among hospital control and community control. (31) 52%, (12) 24% of them have completed above schooling among hospital cases and community control. With regard to occupation (45) 90%, (38) 76% of them were house wives among hospital control and community control and (10) 20%, (5) 10% of them had no income among community control and hospital controls. 92% (46), 86% (43), and 98% (49) from hospital case, hospital control and community control belong to Hindu religion.

The results regarding physical and family history reveals that 94% (47), 98% (49), and 96% (48) of hospital case, hospital control and community control were Non-Vegetarian. Around 68% (34), 66% (33), and 26% (13) of participants from hospital case, hospital control and community control were overweight.

Table 1 findings show that 64% (32), 66% (33), and 60% (30) of participants from hospital case, hospital control and community control attained menarche at the age of 14-17 years. Majority of the participants 96% (48), 100% and 80% (20) from hospital case, hospital control and community control were married. 92% (46), 60% (30), and 22% (11) from hospital case, hospital control and community control had no child and 26% (13), 20% (10), and 20% (10) from hospital case, hospital control and community control had Abortion.

3.2. Risk factors

The study also analyzed the risk factors and found that 86% (43), 84% (42), and 90% (45) from hospital case, hospital control and community control had no family history of PCOD. 34% (17) in hospital cases had past history other than PCOD. Around 80% (40), 82% (41) and 80% (40) from hospital case, hospital control and community control had not undergone any treatment in the past.

Regarding the menstrual irregularities it found that 70% (35) and 6% (3) of participants from hospital case and hospital control had irregular periods. 56% (28), 54% (27), and 62% (31) from hospital case, hospital control and community control had pain during menstruation. 12% (6), 10% (5), and 6% (3) from hospital case, hospital control and community control were taking medication for pain relief. 34% (17), 22% (11), and 36% (18) from hospital case, hospital control and community control were taking home

remedies for menstrual pain.

Among dairy products 32% (16), 62% (31), and 22% (11) of participants from hospital case, hospital control and community control were taking milk.

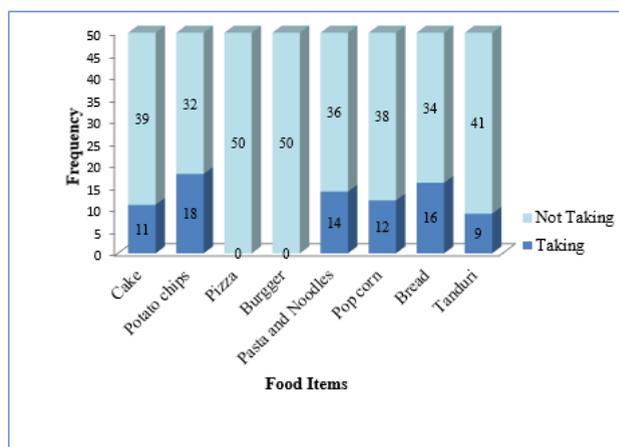


Figure 1: Distribution of women taking fast food items among hospital cases

Less than half of the people among cases were taking fast food items, 11 were taking cake, 18 were taking potato chips, no one was taking pizza and burger, 14 of them were taking pasta or noodles, 12 of them were taking pop corn, 16 of them were taking bread and 9 of them were taking tanduri items.

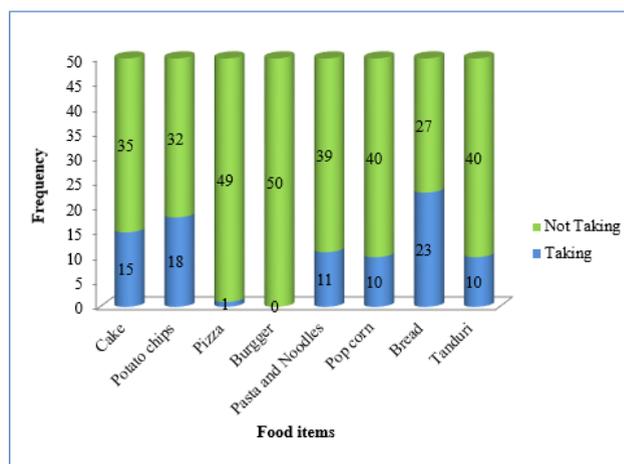


Figure 2: Distribution of women taking fast food items among hospital controls

Among hospital controls 15 were taking cake, 18 were taking potato chips, 11 of them were taking pasta or noodles, 10 of them were taking pop corn, 23 of them were taking bread and 10 of them were taking tanduri items.

Most of the people among community controls were taking fast food items 10 were taking cake, 25 were taking

Table 1: Distribution of demographic variables of the study population. (reproductive health related) n= 150

S. No	Demographic Variables	Hospital case		Hospital control		Community control	
		f	%	f	%	f	%
1	Age of Menarche						
	a) 11-13	18	36	17	34	20	40
	b) 14-17	32	64	33	66	30	60
2	Marital Status						
	a) Yes	48	96	50	100	40	80
	b) No	2	4	0	0	10	20
3	No. of children	46	92	30	60	11	22
	a) No child						
	b) Having child	4	8	20	40	39	78
No. of Previous pregnancy							
4	Gravida						
	a) 0	35	70	7	14	10	20
	b) 1	10	20	21	42	7	14
	c) >2	5	10	22	44	33	66
	Parity						
	a) 0	44	88	19	38	11	22
	b) 1	2	4	22	44	7	14
	c) >2	4	8	9	18	32	64
	Live						
	a) 0	46	92	32	64	11	22
	b) 1 c) >2	0 4	0 8	16 2	32 4	7 32	14 64
	Abortion						
	a) No abortion	37	74	40	80	40	80
	b) Abortion	13	26	10	20	10	20

potato chips, no one was taking pizza and burger, 18 of them were taking pasta or noodles, 9 of them were taking pop corn, 20 of them were taking bread and 14 of them were taking tanduri items. Among cases 24 of them were taking biscuits 1-4 times per week, 18 were not taking biscuits among hospital controls and 18 of them were taking biscuits more than 4 times per week among community controls

Table 2 reveals that 80% (40), 76% (38), and 94% (47) of participants from hospital cases, hospital controls and community controls were not doing any exercise.

3.3. Association

There was no significant association between hospital cases and hospital controls with regard to age, education, occupation, income and religion. There was no significant association between hospital cases and hospital controls with regard to religion, food pattern, BMI and type of family. There was no significant association between hospital cases and hospital controls with regard to religion, food pattern, BMI and type of family.

There was significant association between hospital cases and hospital control with regard to number of children. (Fisher's Exact Test=14.03, $p < 0.001$)

Table 3 shows there was significant association between hospital cases and hospital control with regard to gravida, parity and live birth

There was significant association between hospital cases and hospital controls with regard to medical history of other than PCOD. (Fisher's Exact Test=17.34, $p < 0.001$)

There was significant association between hospital cases and hospital controls with regard to regular periods every month. (Fisher's Exact Test=43.46, $p < 0.001$)

There was significant association between hospital cases and hospital controls with regard to taking of milk. (Fisher's Exact Test=9.03, $p = 0.005$)

There was no significant association between hospital cases and hospital controls with regard to intake of cake, biscuits and potato chips and also no significant association between hospital cases and hospital controls with regard to intake of pasta/ noodles, pop corn, bread and tanduri. and also no significant association between hospital cases and hospital controls with regard to exercise, watching TV, sleeping during day time and chatting.

There was significant association between hospital cases and community controls with regard to education. (Fisher's Exact Test=14.72, $p < 0.001$). There was significant association between hospital cases and community controls with regard to BMI. (Fisher's Exact Test=24.26, $p < 0.001$).

Table 4 shows that there is significant association between hospital cases and community controls with regard to marital status and number of children.

Table 5 shows that there is significant association between hospital cases and community controls with regard

Table 2: Distribution of risk factors of the study population.(activities) n= 150

S.No	Risk factor	Hospital case		Hospital control		Community control	
		f	%	f	%	f	%
1	Activities						
	Exercise						
	Doing	10	20	12	24	3	6
	Not doing	40	80	38	76	47	94
	Watching TV						
	1-4 times	4	8	7	14	7	14
	>4 times	40	80	40	80	40	80
	Not seeing	6	12	3	6	3	6
	Sleep during day time						
	1-4 days	14	28	14	28	16	32
	>4 days	13	26	19	38	9	18
	Not sleeping	23	46	17	34	25	50
	Chatting						
	1-4 times	9	18	5	10	3	6
	>4 times	31	62	31	62	31	62
	Not chatting	10	20	14	28	16	32

Table 3: Association of demographic variables among hospital cases and hospital controls n = 100

S.No	Demographic Variable	Hospital Case		Hospital Control		Fisher's Exact Test	P-Value
		f	%	f	%		
		No. of Previous pregnancy					
	1) Gravida						
	a) 0	35	70	7	14	34.76	< 0.001**
	b) 1	10	20	21	42		
	c) >2	5	10	22	44		
	2) Parity						
1	a) 0	44	88	19	38	30.29	< 0.001**
	b) 1	2	4	22	44		
	c) >2	4	8	9	18		
	3) Live						
	a) 0	46	92	32	64	22.11	< 0.001**
	b) 1	0	0	16	32		
	c) >2	4	8	2	4		
	4) Abortion						
	a) No abortion	37	74	40	80	0.50	0.635
	b) Abortion	13	26	10	20		

*Significant (p<0.05);**Highly Significant (p<0.001).

Table 4: Association of demographic variables among hospital cases and community controls(reproductive history) n = 100

S. No	Demographic Variable	Hospital Case		Community Control		Fisher's Exact Test	p-Value
		f	%	f	%		
1	Age of Menarche					0.17	0.837
	a) 11-13	18	36	20	40		
	b) 14-17	32	64	30	60		
2	Marital Status					6.06	0.028*
	a) Yes	48	96	40	80		
	b) No	2	4	10	20		
3	Number of children					49.80	< 0.001**
	a) No child	46	92	11	22		
	b) Having child	4	8	39	78		

*Significant (p<0.05);**Highly Significant (p<0.001).

Table 5: Association of demographic variables among hospital cases and community controls (reproductive history) n = 100

S.No	Demographic Variable	Hospital Case		Community Control		Fisher's Exact Test	P-Value
		f	%	f	%		
1	No. of Previous pregnancy						
	Gravida						
	a) 0	35	70	10	20	37.22	< 0.001**
	b) 1	10	20	7	14		
	c) >2	5	10	33	66		
	Parity						
	a) 0	44	88	11	22	47.33	<0.001**
	b) 1	2	4	7	14		
	c) >2	4	8	32	64		
	Live						
	a) 0	46	92	11	22	53.84	37
	b) 1	0	0	7	14		
	c) >2	4	8	32	64		
	Abortion						
	a) No abortion	37	74	40	80	0.50	0.635
	b) Abortion	13	26	10	20		

to gravida and parity.

There was significant association between hospital cases and community controls with regard to medical history of other than PCOD. (Diabetes mellitus, hypertension and asthma). (Fisher's Exact Test=20.48, $p < 0.001$). There was significant association between hospital cases and community controls with regard to regular periods every month. (Fisher's Exact Test=53.84, $p < 0.001$). There was significant association between hospital cases and community controls with regard to taking tea. (Fisher's Exact Test=6.522, $p=0.042$). There was no significant association between hospital cases and community controls with regard to intake cake, biscuits and potato chips and also no significant association between hospital cases and community controls with regard to pasta/noodles, pop corn, bread and tanduri. There was significant association between hospital cases and community controls with regard to exercise, watching TV, sleep during day time and chatting.

Assessment of Risk Factors

Table 6 reveals that medical history of other than PCOD has 25 times risk in the development of PCOD among hospital cases and hospital controls.

Table 7 reveals that women with no children had 41 times risk of developing PCOD among hospital cases and community controls

4. Discussion

The present study findings are supported by the following studies.

A case control study was conducted with 69 cases and 181 controls were the risk studied were, family history, fast food habits, physical exercise, BMI and waist

circumference. The study used relative risk (RR) to identify risk factors which were positive family history of PCOS (RR=1.07) (CI-0.709-1.619), fast food habits (RR= 1.7225) (CI-1.014-2.933), obesity (RR=1.741) (CI-1.054-2.877). The study concludes monitoring of participants were used for prevention and management of PCOS.

In 2015, a case-control study was carried out to find out the risk factors of PCOD among Li people (China). The sample size was 865 (285 cases and 580 controls). The data was collected using Questionnaire regarding risk factors of PCOS. The study revealed that menstrual cycle disorder (OR = 5.824), family history of diabetes (OR = 7.008), family history of infertility (OR = 11.953), menstrual irregularity of mother (OR = 2.557) and lack of physical exercise (OR = 1.866) are the prognostic factors of PCOD.⁵

The physical activity and mental health in women with PCOS was assessed in 2014 by Banting LK. 153 cases with PCOS and 64 without PCOS were selected. Using questionnaire the data was collected. MANCOVA test was used to find the association. The result showed that depression ($p= 0.004$) and anxiety ($p < 0.001$) was significantly higher in women's with PCOS.⁶

A Cross sectional study was conducted in 2016 by Ramand SJ on clinical characteristics, metabolic and hormonal parameters in euthyroid and hypothyroid PCOS women, with 120 samples. They assessed various signs like obesity and hormonal changes, BMI and HOMA signs. The result showed that HOMA value was The physical activity and mental health in women with PCOS was assessed in 2014 by Banting LK. 153 cases with PCOS and 64 without PCOS were selected. Using questionnaire the data was collected. MANCOVA test was used to find the association. The result showed that depression ($p= 0.004$) and anxiety ($p < 0.001$) was significantly higher in women's

Table 6: Multivariate logistic analysis on risk factors of PCOD among hospital cases and hospital controls. n = 100

S.NO	Variables	OR	95% C.I.for EXP(B)		p- value
			Lower	Upper	
1	Medical history of other than PCOD	25.242	3.203	198.94	0.002
2	Regular periods	0.027	0.007	0.102	-
3	No of Child	7.667	2.384	24.65	0.001
4	Milk	0.288	0.127	0.658	0.003

Odds Ratio: >1 Risk factors; <1 Prognostic factors Significant p>0.05

Table 7: Multivariate logistic analysis on risk factors of PCOD among hospital cases and community controls. n = 100

S.NO	Variables	OR	95% C.I. for EXP(B)		p-value
			Lower	Upper	
1	Education	5.167	2.177	12.264	-
2	BMI	4.25	1.741	10.374	0.001
3	Marital Status	6	1.242	28.987	0.026
4	No of Child	40.773	12.022	138.286	-
5	Tea	0.278	0.102	0.756	0.012
6	Exercise	0.255	0.066	0.992	0.049

Odds Ratio: >1 Risk factors; <1 Prognostic factors Significant p>0.05

with PCOS.⁶

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A non comparative cross sectional study was done in India among women on physical activity and mental health in women with PCOS in 2013. The study was carried out for 18 months. They identified the prevalence of insulin resistance, obesity, hirstism and hypothyroidism in PCOS women. They concluded that PCOS can occur in obese and non –obese client. According to the clinical manifestation the PCOS client should be investigated properly and treatment to be provided.⁸

In 2008 the comparative study regarding eating and exercise (QOL ED) in women with and without PCOD for fertility treatment was conducted. A questionnaire on eating disorder and exercise was given to 128 women attending IVF clinics. The result shows that the first-line treatments of women with PCOS were assessment of disordered eating and lifestyle changes, irrespective of their BMI.⁹

In 2005 a cross-sectional, correlational study was done to evaluate the influence of obesity, fertility status and androgenism scores on health related quality of life in women with PCOS. 128 women were selected 78% were married and the mean age of women were 30.4 years. PCOSQ, Physical assessment, lab investigation, BMI, waist to hip ratio and degree of hirsutism were assessed. The result shows that weight, menstrual problems, infertility, emotions

and body hair were the most common health-related quality of life among PCOS women. Nursing has a pivotal role in recognizing these concerns and implementing therapy to improve quality of life in women with PCOS.¹⁰

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improve quality of life in women with PCOS.¹⁰

5. Conclusion

According to Odd's Ratio the risk factors of PCOD were medical history of other than PCOD (OR= 25.242), regular periods (OR=0.027), number of child (OR=7.667), taking milk (OR= 0.288) among hospital cases and hospital controls. Among hospital cases and community controls education (OR=5.167), BMI (OR= 4.25), Marital status (OR= 6), number of children (OR=40.773), taking tea (OR= 0.278) and not doing exercise (OR= 0.255) was found to be the risk factors.

From the findings, it is evident that women with no children are 41 times at higher risk of getting PCOD when compared with women having children.

6. Source of Funding

None.

7. Conflict of Interest

None.

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