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## 1. Cross-Sectional Study Of Polycystic Ovarian Syndrome Among Bodo Community In Rural Areas Of North Guwahati, Kamrup Ditric, Assam

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### **Abstract**

Polycystic ovarian syndrome (PCOS) is a multifaceted lifestyle disorder among women in their reproductive cycle. Prevalence rate is estimated at 4 – 25% depending on the diagnostic criteria used (Jones et.al 2010). The determinants of PCOS have linked with the environmental surrounding and the lifestyle of the women. The nature of the environmental and lifestyle determinants of PCOS including physical activity and obesity is suggestive of the fact that variations could exist in the prevalence of PCOS in urban and rural settings due to dissimilar dietary practices and the level of physical activity. The prevalence of polycystic ovarian syndrome is although thought to be 3% and 10% but it is widely unknown for specific population based on race and ethnicity (Wolf et.al 2018).

**Keywords:** Polycystic ovarian syndrome, cross sectional study, bodo

### **Introduction**

Polycystic ovarian syndrome is the most endocrinal disorder in women of reproductive age. It affects the women in their hormonal levels. The hormonal imbalance creates problem in the ovaries. Polycystic ovarian syndrome (PCOS) has been defined by the National Institute of Health and Rotterdam criteria as a hormonal disorder characterized by the presence of at least one polycystic ovary (presence of multiple cysts) accompanied by ovulatory dysfunction and excessive secretion of androgens (Yii et.al 2009). Polycystic ovarian syndrome (PCOS) can cause missed or irregular menstrual periods. Irregular periods can lead to:

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- Infertility (Inability to get pregnant), in fact, polycystic ovarian syndrome (PCOS) is one of the most common causes of infertility in women.
- Development of cysts (small fluid-filled sacs) in the ovaries.

Prevalence rate is estimated at 4 – 25% depending on the diagnostic criteria used (Jones *et.al* 2010). Women with PCOS show a combination of characteristics such as, menstrual irregularities (Oligomennorrhoea/Amenorrhoea), hirsutism, acne, evidence of increased serum androgen levels and morphological changes in the ovary evident on ultrasonography. Diagnostically, current practice uses criteria agreed in Rotterdam 2003<sup>5</sup>.

Polycystic ovary syndrome (PCOS) has significant public health importance with a higher prevalence of metabolic syndrome and diabetes and potential long term health consequence of cardiovascular disease (CVD) (Engmann *et.al* 2017). Consensus on women health aspect of PCOS has suggested different criteria for diagnosis of PCOS (Balaji *et.al* 2015). The rates of polycystic ovarian syndrome have been reportedly high among Indian women compared to their Caucasian counterparts (Wijeyaratna *et.al* 2002) with an estimated prevalence of 9.13% in Indian adolescents (Nidhi *et.al* 2011; Kalra *et.al* 2009). There are significant ethnic and racial variations in the clinical presentation of PCOS (Norman *et.al* 1995; Duniaf *et.al* 1993). The determinants of PCOS have also linked with the environmental surrounding and the lifestyle of the women. Many studies have also reported on the hereditary factors associated with PCOS such as early age of sexual maturation, premature fetal development, and family history of PCOS among first-degree relatives (Yii *et.al* 2009; Bronstein *et.al* 2011). The associated environmental factors reported include physical inactivity, obesity, and its associated insulin resistance (Wijeyaratne *et.al* 2011). Insulin resistance which is of high prevalence in the Indian population (Wijeyaratne *et.al* 2011) has been consistently reported as a strong determining factor for the occurrence of PCOS in Indian adults and adolescents (Yii *et.al* 2009). Prevalence of insulin resistance is found be widely varied across different geographical regions of India and among urban and rural settings (Singh *et.al* 1998). The nature of the environmental and lifestyle determinants of PCOS including physical activity and obesity is suggestive of the fact that variations could exist in the prevalence of PCOS in urban and rural settings due to dissimilar dietary practices and the level of physical activity (Balaji *et.al* 2015). The prevalence of polycystic ovarian

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syndrome is although thought to be 3% and 10% but it is widely unknown for specific population based on race and ethnicity (Wolf *et.al* 2018). PCOS has a very high percentage of individuals who remain undiagnosed which is likely due to variation of patient presentation and lack of provider knowledge.

Tribes of India are considered as depressed class in general and indigenous to places within in India in particular wherein they live, either as foragers or as tribalistic communities. The Northeast Indian tribes differ substantially in their way of living from the other populations. Therefore, an attempt is made to study on one of the largest tribal community of Northeast Indian tribe Bodo. Bodo community is observed to live a traditional lifestyle in their natural surroundings. A study is undertaken to see the prevalence of polycystic ovarian syndrome of the Bodo community in their rural settings.

### Objectives

To examine the occurrence of polycystic ovarian syndrome (PCOS) of the Bodo tribal women living in their rural environment.

### Methodology

The present study is mainly focused on the women of Bodo community living in the rural areas North Guwhati, Kamrup District, Assam. The samples were randomly selected from two villages of North Guwhati, Mainasundari village and Bhitorkhola village. Guwhati, Assam. The Bodo women in the rural settings are under similar climatic influence. Total of 200 samples were undertaken for the study from the rural settings in the age group of 18 – 35 years of age who were willing to respond to the study. Informed consent was obtained from all the participants and they were given a detailed explanation on the study. The survey was conducted during the period of 2020 March to 2020 December. A self-administered survey questionnaire was prepared based on the available literature on pre-disposing factors for PCOS. The population studied was classified as PCOS group, if there were any visible symptoms associated with PCOS and others as Non-PCOS group without any visible symptoms. The questionnaire included anthropometric details with emphasis on their regular physical activities. The data was entered into Microsoft excel for analysis.

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## Results

A total of 200 Bodo rural women are selected randomly from two villages in North Guwahati, Assam. Out of which the women with two or more visible symptoms of PCOS were categorized as PCOS group and the healthy women with no symptoms are categorized as Non-PCOS group as per Rotterdam criteria. In our study, we have established prevalence rate of 3% PCOS cases based self-administered schedules. Based on our study, higher prevalence of PCOS cases is found in the age group of 24 – 29 years (50%) shown in *Table.1*. Higher percentage is found in this age group may be because, during this phase, and adult becomes fully matured and all the visible symptoms associated with PCOS can be seen.

**Table 1: Age Structure of the PCOS and Non-PCOS group**

Age Group (in years)	RURAL AREA (n = 200)			
	PCOS group (n = 06)		Non-PCOS group (n = 194)	
	No	%	No	%
(18 – 23)	2	33.33	75	38.66
(24 – 29)	3	50.00	81	41.75
(30 – 35)	1	16.67	38	19.59
Total	6	100%	194	100%

Through the study, it is found that maximum menstrual irregularities are seen among the PCOS cases (66.67%) as compared to Non-PCOS cases (18.04%). Irregular menstruation can be indicated as major sign towards the occurrence of PCOS. Hirsutism (unnecessary hair growth in the face and body) is also found to be higher in the PCOS women (50.00%) as compared with Non-PCOS. Other major symptoms like acne (33.33%), baldness (33.33%) and skin discoloration (16.67%) is found to be higher among the PCOS case which is shown in *Table 2*. Infertility as a symptom poses a threat to all the PCOS women (33.33%) shown in the *Table 2*. Menstrual irregularities are the most common complaint associated with PCOS which is calculated at 66.67% and found to play a significant role in PCOS.

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**Table 2: Symptoms of the studied community**

Symptoms of PCOS	PCOS group (n = 06)		Non-PCOS group (n = 194)		Chi-square value
	No	%	No	%	
Hirsutism	3	50.00	11	5.67	4.57 (Significant)
Infertility	2	33.33	4	2.06	0.67 (Not significant)
Acne	2	33.33	5	2.58	1.29 (Not significant)
Baldness	2	33.33	9	4.64	4.46 (Significant)
Skin discoloration	1	16.67	2	1.03	0.33 (Not significant)
Menstrual Irregularities	4	66.67	35	18.04	24.64 (Significant)

**Table 3: Anthropometric characteristics of the PCOS and Non-PCOS group**

Anthropometric characteristics	PCOS group (n = 06)		Non-PCOS group (n = 194)		t - value
	Mean ± SE	S.D.	Mean ± SE	S.D.	
Height (cm)	150.33 ± 1.30	3.204	151.29 ± 0.81	11.21	0.21 (Not significant)
Weight (kg)	55.04 ± 1.33	3.246	53.32 ± 0.36	5.05	1.72 (Significant)
BMI (kg/m <sup>2</sup> )	25.50 ± 0.23	0.569	20.98 ± 0.16	2.23	4.93 (Significant)
Waist circumference(cm)	87.72 ± 1.26	3.095	87.64 ± 0.30	4.16	0.04 (Not significant)
Hip circumference (cm)	93.02 ± 1.92	4.710	89.97 ± 0.26	3.63	2.00 (Significant)
Waist-hip ratio (WHR)	0.88 ± 0.02	0.055	0.83 ± 0.01	0.06	1.92 (Significant)

As regards the anthropometric measurements the findings show that except height and waist circumference, all other variables show a definite and distinguish trend between PCOS and Non-PCOS group. The variables are found to be more among the PCOS group as compared to Non-PCOS group shown in *Table 3*.

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**Table 4: Body mass index of the studied population**

Population	Normal weight		Overweight		Obese		Chi-square value
	No.	%	No.	%	No.	%	
PCOS Group (n = 06)	2	33.33	3	50.00	1	16.67	33.69 (Significant)
Non-PCOS Group (n = 194)	182	93.81	7	3.61	3	1.55	

Body mass index (BMI) is one most important anthropometric parameter which has a great influence on the women suffering from PCOS. The findings shows more PCOS women are found to be overweight (50.00%) and obese (16.67%). PCOS women without a controlled lifestyle have a tendency towards being overweight and obese shown in *Table 4*. Majority of women without PCOS are found to be of normal weight (93.81%).

**Table 5: Blood pressure of the studied population**

Blood Pressure	RURAL AREA (n = 200)				t – value
	PCOS group (n = 06)		Non-PCOS group (n = 194)		
	Mean ± SE	S.D.	Mean ± SE	S.D.	
Systolic	127.83 ± 1.721	4.215	113.49 ± 0.592	8.246	4.23472 (Significant)
Diastolic	83.17 ± 2.088	5.115	74.15 ± 0.381	5.310	4.10016 (Significant)

PCOS and increase level of blood pressure is also found to be one of the symptoms. The variables of systolic and diastolic blood pressure among the PCOS cases are found to be little higher as compared to Non-PCOS. Though, high blood pressure has their many underlying factors but many studies have suggested that PCOS may contribute to earlier development of

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hypertension as well as pre-hypertension. And therefore, it is advisable to monitor blood pressure systematically to control the known risk factors and to treat it accordingly.

Table 6 reveals the level of physical activity of the PCOS and non-PCOS group. Physical activity influences a variety of health benefits. Physical activity is found to be much lower among PCOS group i.e. 50.00% of PCOS women fall in the category of light physical activity as compared to Non-PCOS cases (31.96%). However, maximum Non-PCOS women are found be engaged in moderate to heavy physical activity.

**Table 6: Physical activity of the studied population**

Physical activity	RURAL AREA (n = 200)			
	PCOS group (n = 06)		Non-PCOS group (n = 194)	
	No.	%	No.	%
Light	3	50.00	62	31.96
Moderate	2	33.33	89	45.88
Heavy	1	16.67	43	22.16
TOTAL	6	100%	194	100%

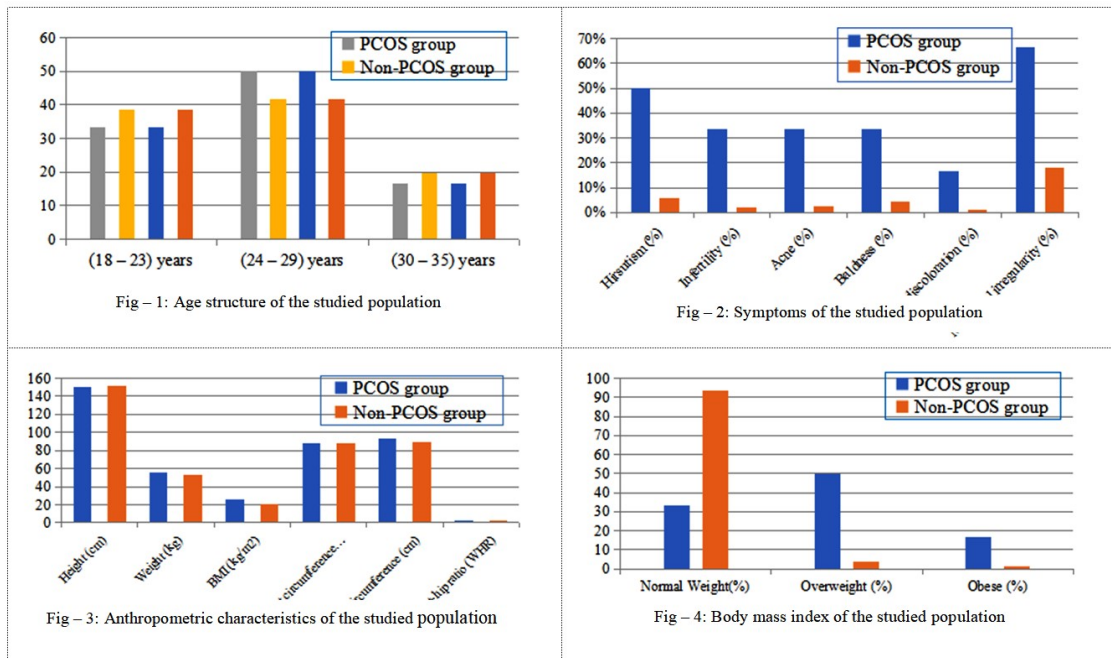
**Table 7: Diet pattern of the studied population**

Diet pattern	PCOS group (n = 11)		Non-PCOS group (n = 194)	
	No.	%	No.	%
Vegetarian	1	16.67	9	4.64
Non- Vegetarian	5	83.33	185	95.36
Junk Food	0	-	0	-
Total	6	100%	194	100%

Table 7 reveals the dietary patterns of the PCOS and Non-PCOS group. Maximum PCOS cases consume non-vegetarian diet (83.33%) as compared to vegetarian diet (16.67%). No junk food consumer can be found in the study as the Bodo community lives a traditional life in the village areas with very low socio-economic conditions. They were mainly fond of non-vegetarian diet that includes pork, fish etc.

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Below are provided the histograms showing the age structure, symptoms associated with PCOS, anthropometric parameters, BMI of the studied population, blood pressure level, physical activity and the dietary patterns for both PCOS and Non-PCOS group.





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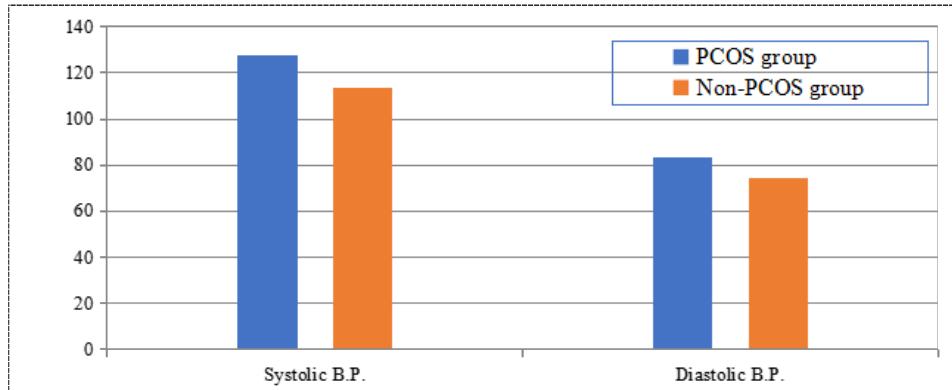


Fig – 5: Blood pressure of the studied population

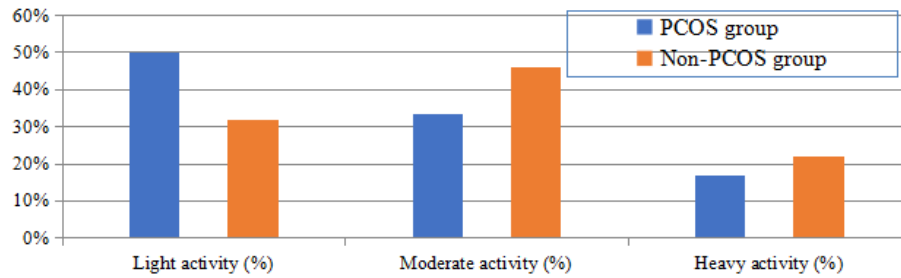


Fig – 6: Physical activity of the studied population

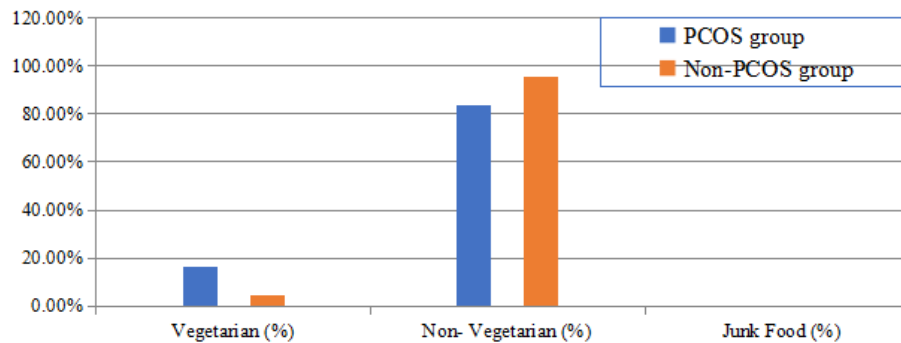


Fig – 7: Diet pattern of the studied population

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### Discussion and Conclusion

Reproductive phase of women brings many physiological, anatomical and psychological changes women due to familial, cultural and social restrictions most of the women are not able to share and get right advice for menstrual related problems (Radha *et.al* 2016). PCOS is found to be a serious condition in the world today and there are many variations in the occurrence of PCOS based on the lifestyle and ethnicity.

In the present study the biological profile of the women have been examined in terms of anthropometric parameters and data on the associated symptoms of PCOS are gathered with the help of gained knowledge regarding PCOS, physically examining the women and through interview method. Total of 200 samples were collected which is divided into PCOS group if any of the associated symptoms were found to be visible and Non-PCOS group with no symptoms with normal anthropometric and physical parameters.

The results of the present study showed that only 3% of the Bodo women were predicted to be suffering from PCOS and rest is normal as per Rotterdam criteria. The less PCOS cases among the Bodo community in the rural areas may be due to their lack of awareness, minimize or nil exposure to junk foods, pollution, healthy traditional lifestyle and other endocrine disruptors. Bodo women in rural areas do not depend on labor saving devices for household work or vehicles for transport thus helping them maintain a good BMI. Most of the studies so far conducted the prevalence of PCOS in various geographic regions. The reported prevalence of PCOS in various geographical areas ranges between 2.2% and 26%. In Southern China the prevalence was 2.4% among 915 women recruited through offer of a free medical camp (Radha *et.al* 2019). In Northeast India, no such study is available on any ethnic community regarding the prevalence of PCOS. Therefore, the present study is conducted to see the occurrence of PCOS in a Bodo community living in rural areas.

The findings of the anthropometric parameters except height and waist circumference, all other variables show a definite and distinguished trend separately for PCOS and non-PCOS group. The variables are found to be more in PCOS group than those of Non-PCOS group. Although there is no direct link of Body mass index (BMI) with PCOS, yet the findings shows a significant difference

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between PCOS and Non-PCOS group. Through which it can be ascertained that PCOS women have a tendency of being overweight if not controlled. The findings shows higher percentage of PCOS women in the category of overweight and obese while in Non-PCOS group, maximum percentage fall in the category of normal weight.

While examining the common symptoms of PCOS, menstrual irregularities are found to be much higher in PCOS group as compared with Non-PCOS group. The dermatological symptoms that are associated with PCOS are hirsutism, acne, baldness, skin discoloration which is found to be in higher range as compared to Non-PCOS group. The chi-square test shows significant role is played by hirsutism and baldness in case of PCOS except infertility, skin discoloration and acne. As there might be many underlying causes of infertility other than PCOS, acne and skin discoloration.

The present study showed menstrual irregularities found to be higher in PCOS group as compared to Non-PCOS group. The chi-square results show that menstrual irregularities play the most significant role in association with PCOS. The study show little increase in blood pressure level in PCOS group as compared to Non-PCOS group. Females with PCOS are at higher risk of hypertension. Physical activity influences a variety of health benefits. The present study also attempted to see the physical activity of the Bodo women which has a strong influence on PCOS. Therefore, physical activity was self-reported based on the types of activity (light, moderate and heavy). Lack of physical labor is found to be much lower among PCOS group. Those without PCOS are found to be engaged in moderate to heavy physical activity. The women with less physical activity are contributing to greater BMI in PCOS women. Previous researchers have speculated that women with PCOS are obese due to their tendency towards overeating. Coming to the dietary patterns of the Bodo community, their diet is found to be healthy with no intake of junk foods both in PCOS and Non-PCO group. Majority women prefer boiled food and avoid spices. They were fond of non-vegetarian the most which includes mostly pork, fish dairy products including home grown leafy vegetables. The Bodo community claims 100% non vegetarian diet practice but the obesity among them is low; this may be due to the increase in activity level among them. Observing their dietary habits and leading a traditional lifestyle, it can be clearly specified that Bodo women are physically and reproductively more fit than others. PCOS is indeed not a recent disease that is diagnosed; it is present worldwide since centuries. But it gained

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importance as in the world today especially in India, more and more patients have been diagnosed. Many doctors believe heritability and lifestyle adaptation as the major cause of PCOS and 40% can be improved through proper treatment and following a good healthy lifestyle. It is seen in the present study that menstrual irregularity and higher BMI as one of the major symptoms of PCOS. But the disorder can be improved by maintaining a good health, by engaging in regular physical activity which is also found to be good sign among the Bodo community. And this may be the reason that very low cases of PCOS can be found among them as compared to other studies. A survey with a large sample size is needed with controlled prospective analysis which would give a good clarity on the occurrence of the disease and the association of lifestyle contributing in the manifestation of PCOS among the women population in India especially Northeast India.

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