ORIGINAL ARTICLE

COMPARATIVE STUDY OF PREVALENCE OF POLYCYSTIC OVARIAN SYNDROME IN RURAL AND URBAN POPULATION

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ABSTRACT:

Introduction: The occurrence of polycystic ovarian syndrome has been associated with an increased risk for Type 2 diabetes, gestational diabetes, hypertension, and gynaecological cancers. Aim : The present study hypothesize that the burden of PCOS will be considerably lower among rural Indian adolescents compared to their urban counterparts. Materials and methods: This study includes 100 cases , 50 from urban and 50 from rural for a period of 2 yrs in reproductive age group who had attended the outpatient with the clinical symptoms of Oligomennorhea /amenorrhea, clinical signs of hyperandrogenism, hirsutism and acne and at least one ovary with 12 or more 2-9mm follicles and/or increased volume. Results: Most of the urban participants are from Nuclear Family structure when compared to rural. (88% vs 64%). The proportion of individuals with oligomenorrhoea were higher among urban participants compared to rural counterparts. Participants had higher proportion of individuals with recent weight gain in comparison with rural participants. The proportion of participants from urban areas are more obese than their rural The urban participants had a higher frequency of excess androgen activity which was counterparts. evidenced by Hirsutism. Involvement in vigorous work activity was significantly higher among rural. There was no statistically significant difference for serum testosterone level of the rural and urban participants. The proportion of participants diagnosed with polycystic ovarian syndrome serum Insulin levels in rural verses urban (40% verses 44%). The proportion of participants diagnosed with polycystic ovarian syndrome having polycystic ovaries on ultrasonography finding in rural and urban (74% Vs 76%). Conclusion: The reported younger onset of this syndrome and the prevalence of associated risk factors such as glucose intolerance in the Indian population signified a need for intensified efforts in early detection.

Key words: Oligomennorhea, Hirsutism, Glucose intolerance.

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NTRODUCTION

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.¹ The occurrence of polycystic ovarian syndrome has been associated with an increased risk for Type 2 diabetes, gestational diabetes, hypertension, and gynaecological cancers.^{1,2} Studies have reported 10 times greater risk of developing Type 2 diabetes in women affected by PCOS of polycystic ovarian syndrome ranges from 2.2 to 26%.³ The rates of polycystic ovarian syndrome have been reportedly high among Indian women compared to their Caucasian counterparts, with an estimated prevalence of 9.13% in Indian adolescents.^{3,4} Clinical presentations of polycystic ovarian syndrome include abnormal facial and skin hair growth (hirsutism), acne, and irregular or absence of menstrual periods.⁵ However acne is most common during adolescent phase of life and there is limited literature on adolescent androgenic alopecia⁶. Differential diagnosis of PCOS includes congenital adrenal hyperplasia (late onset),

syndrome,

hyperprolactinemia,

hypothyroidism, and ovarian and adrenal androgen secreting tumours⁶. Different categories in the clinical presentations of PCOS have been distinguished according to the Rotterdam criteria ⁵. They include (I) "Classic PCOS" characterized by the presence or absence of ovarian cysts with excessive androgen secretion and irregular menstrual periods, (ii) "Ovulatory PCOS" characterized by the presence of increased androgen secretion and multiple cysts and (iii) "Non-androgenic PCOS" associated with irregular menstruation and multiple cysts.⁵

The determinants of polycystic ovarian syndrome have been linked to both hereditary and environmental factors.¹ The attributed hereditary factors include early age of sexual maturation, premature foetal development, and family history of PCOS among first-degree relatives.^{1,7} Studies have reported an earlier age at diagnosis of PCOS (9-12 years) among adolescent females with earlier maturation of sexual characteristics compared to their later counterparts (13-18 years). This has been attributed to an increased androgen secretion associated with early onset of puberty.¹ It has been reported that premature fetal development leads to an earlier and more rapid onset of puberty with an increased risk of developing PCOS Clinical manifestations of associated symptoms such as hyper-insulinemia have also been observed S in offspring of PCOS affected women long before the onset of puberty affirming the role of family history.⁸ The associated environmental factors reported include physical inactivity, obesity, and its associated insulin resistance. Insulin resistance which is of high prevalence in the Indian population ⁵has been consistently reported as a strong determining factor for the occurrence of PCOS in Indian adults and adolescents.¹ While several studies have reported an association between excessive androgen secretion and the occurrence of insulin resistance in affected women, temporality has not been established.¹ There are marked variations in the prevalence of insulin resistance across different geographical regions of India and among urban and rural settings.9 A higher prevalence of insulin resistance has been observed in urban Indian populations compared to their rural counterparts.⁹ This is suggestive that a marked difference could exist in the prevalence of PCOS among different settings. Since the clinical manifestations of PCOS have been consistently observed in early adolescence, the increased risk of developing Type 2 diabetes and its associated comorbidities during later years can be controlled by identifying high risk populations and implementing preventive measures. However, 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. Such results could foster the implementation of lifestyle preventive measures for PCOS and its associated co morbidities in different settings at an earlier stage. Although studies have reported the prevalence of PCOS in Indian adolescents, no studies have examined the differences in prevalence rates in urban and rural settings. The present studies hypothesize that the burden of PCOS will be considerably lower among rural Indian adolescents compared to their urban counterparts.

MATERIALS AND METHODS

It is a Prospective study was done in the department of Obstetrics and Gynaecology of Government Maternity Hospital, Hanamkonda from November 2013 to November 2015. The study was conducted after taking approval of ethical committee. This study includes 100 cases of which 50 from urban and 50 rural of reproductive age group who had attended outpatient department of obstetrics and gynaecology.

Inclusion Criteria: Oligomennorhea (intermenstrual interval>35 days with less than 8 menstrual bleedings in the past year) or amenorrhea (absent menstrual bleeding or no menstrual bleeding in the past 90 days). Clinical signs of hyperandrogenism, hirsutism and acne. Polycystic ovarian morphology – at least one ovary with 12 or size of more than 2-9 mm follicles and/or increased volume.

Exclusion Criteria: Less than 15yrs and more than 39yrs and Individuals not fulfilling the inclusion criteria or participating in other clinical trials

Information about the variables was gathered by using set of semi structured questionnaires and anthropometric assessment was done by using measuring tape, weighing scale, and standard height rod. Non-invasive sonographic scanning was done to identify polycystic ovaries. Further biochemical examination was done for obtaining the values of prolactin, testosterone, T3, T4,TSH and serum Insulin. Data were analyzed using IBM SPSS statistical software version 22.

RESULTS

The present study was done for a period of 2 yrs on 100 patients. Out of them 50 from urban and 50 from rural patients of PCOS. The results were as follows.

Table 1:	Comparison	of Details	in Rural	and Urban
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	RURAL		URBAN			
	No. of Patients	%	No. of Patients	%	P-value	
Types of families						
Nuclear	32	64%	44	88%	<0.0001*	
Joint	18	36%	6	12%		
Oligomenorrhorhoea	8	16%	32	64%	<0.05. *	
Recent weight Gain	6	12%	26	52%	<0.05. *	
Proportion of Individuals with Obesity						
Obese	25	50%	44	88%	< 0.0001*	
Non obese	25	50%	6	12%		
Work Activity	20	40%	6		< 0.0001	

*Values <0.05 are significant

Table 2: Comparison in Rural and Urban areas

	Rural		Urban		P-Value			
	No. Of	%	No. Of	%				
	Patients		Patients					
Hirsutism	12	24 %	31	62%	< 0.05.*			
Serum	20	40%	22	44%	0.862			
testosterone								
Serum Insulin								
Raised	20	40%	22	44%	0.783			
Within normal	30	60%	28	56%				
limits								
Ultra Sono	37	74%	38	76%	0.871			
Graphy								

*Values <0.05 are significant.





Most of the urban participants are from Nuclear Family structure when compared to rural. (88% and 64%). The Propotion of Individuals with oligomenorrhoea were higher among urban participants compared to rural counterparts.

Participants had higher proportion of individuals with recent wt. Gain in comparison with rural participants. The proportions of Participants from Urban areas are more Obese than their rural counterparts. The Urban Study Participants had a higher frequency of excess androgen activity which was evidenced by Hirsutism involvement in vigorous work activity was significantly higher among rural. There was no statistically significant difference for serum testosterone level of the rural and urban participants. The proportion of participants diagnosed with polycystic ovarian syndrome serum Insulin levels in rural verses urban (40% verses 44%). The proportion of participants diagnosed with polycystic ovarian Syndrome having polycystic ovaries on ultrasonography finding in rural verses urban (74% verses 76%).

DISCUSSION

Reproductive phase of life brings multiple physiological, anatomical and psychological changes in the life of 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. PCOS is of this condition which is of serious concern. The present study was conducted with the objective to determine the difference in burden of PCOS in rural and urban settings.

The results of the study have shown that 20% of A India among age group of 20-40 years indicated participants were diagnosed with PCOS. The M that the prevalence of obesity was 30%¹². Lim et al proportion of PCOS was higher in urban D in a systemic review and meta-analysis concluded population in comparison to rural counter parts. S 40that women with PCOS had a greater risk of Most of the studies so far conducted the prevalence R overweight, obesity, and central obesity.¹³ The 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.

The prevalence of PCOS depends on the recruitment process of the study population, criteria used for its definition, and the screening methods used. Comparison of prevalence of PCOS in different studies: In a study conducted in Sri Lanka on 3.030 women aged 15-39 years, the prevalence was found to be 6.3 %(95%; L:5.9for the period 2005-2006. A higher 6.8%) prevalence of PCOS (46.8%) was reported among girls aged 13-18 years with euthyroid chronic lymphocyte thyroiditis in a case –control study conducted in New Delhi. In a study conducted among girls aged 15-18 years in Andhra Pradesh. the prevalence was noted to be 9.13%. In another study on adolescent in Kerala, prevalence was found to be 26.4%.

Rural and urban family structure in Swetha Balaji et al¹⁰ study is 63%, 87% in present study it is 64% , 88% which correlates well .Number of urban participants living in nuclear family structure was more when compared to their rural counterpart in both studies.

The present study participants presenting with menstrual irregularities like oligomenorrhoea were comparable with other study groups. Proportion of participants presenting with oligomenorrhoea were higher in urban women when compared to their rural counterparts.

The present study participants presenting with recent weight gain were comparable with other study groups. Proportion of participants presenting with recent weight gain were higher in urban women when compared to their rural counterparts According to Swetha balaji et al ¹⁰study, complaints of leucorrhoea and weight gain with irregular menses were also reported to be higher in frequency among urban participants. Study of Proportion of individuals with obesity in Rural-Urban areas. In prior study prevalence of obesity as per BMI among rural and urban participants . Study of prevalence of Obesity as per BMI among rural and urban areas. Similar results were reported by Majumdar et al wherein the prevalence rate of obesity was 37.5.¹¹

A multicentre study involving 7 urban cities in India among age group of 20-40 years indicated that the prevalence of obesity was 30%¹². Lim et al in a systemic review and meta-analysis concluded 40that women with PCOS had a greater risk of overweight, obesity, and central obesity.¹³ The present study participants presenting with obesity have been categorised as per BMI, were comparable with other study groups. Proportion of participants presenting with obesity were higher in urban women when compared to their rural counter parts. Swetha Balaji et al¹⁰ study is 40%, 57% in present study it is 50%, 88% which correlates well with our study.

Involvement in vigorous work activity was significantly higher among rural participants compared to urban vanes. Obesity aggravates this alone or in combination with other factors. In 2006 Sarkar et al¹⁴ reported that life style changes in the both rural and urban areas have influenced in the prevalence of PCOS. Misra et al ¹⁵reported that lack of exercise and low physical activity play a role in prevalence of PCOS.

In the present study the serum testosterone levels were raised in about 21% of total participants. Average testosterone levels of participants were 2.47pg/ml. There was no statistical significance difference for serum testosterone levels of the rural and urban participant's .The present study group results were comparable Swetha Balaji et al study. According to Swetha Balaji et al study, 30% of participants had above normal testosterone levels.¹⁰ Demir et al observed in their study that there was no correlation between serum testosterone levels and the rate of hirsutism in PCOS women and the incidence of hirsutism in PCOS women varies widely between different studies (17% to 100%) & hence above mentioned study groups postulated that testosterone sensitivity, 5 alpha reductase activity or environmental/ socioeconomic factors may play role in development of clinical hirsutism.¹⁶

In the present study rural participants diagnosed with PCOS had raised serum insulin levels in 40% when compared to urban participants which were 44%. Insulin resistance and hyperinsulinemia are considered risk factors for development of atherosclerosis and impaired glucose tolerance. Acanthosis nigricans is considered as an important cutaneous marker of hyperinsulinemia. The incidence of acanthosis nigricans in Kala k, Sujata N Datti et al ¹⁷ study was 21% and most common site was nape of neck. Study has observed very strong association between acanthosis nigricans and obesity. The prevalence of acanthosis nigricans in adult obese patients has been estimated to be 74% by Hud et al.¹⁸

PCOS is often associated with profound insulin A 3. resistance as well as with defects in insulin M secretion. These abnormalities, together with D obesity, explain the substantially increased S prevalence of glucose intolerance in PCOS.PCOS R 4. P. Kalra, B. Bansal, P. Nag et al., "Abdominal fat compensatory hyperinsulinemia and this plays a role in pathogenesis PCOS. central of Hyperinsulinemia probably adds at the level of hypothalamic pituitary access and stimulates LH secretion leading to an ovulation with irregular cycle. The fasting insulin levels were significantly higher in the insulin resistance groups (26.26 \pm 7.98 vs. 12.72 ± 4.08).

In the present study seventy -five percent of the study participants had a positive radiology test reflecting presence of poly cystic ovaries .The present study was comparable to other studies-Swetha Balaji et al¹⁰ study and Vijayan CP and Sonia A et al study with similar findings.¹⁹

In the present study the proportion of urban participants diagnosed with PCOS presented with hirsutism were 62% when compared to rural counterparts which were 25% .In Kala k., Sujata N Datti et al ¹⁷study the prevalence of hirsutism was 68%, with no significant difference in obese and non- obese study group. Saxena et al²⁰ reported prevalence of 89% and 80% in obese and lean PCOS which was statistically insignificant. Demir et al ¹⁶observed in their study that there was no correlation between serum testosterone levels and the rate of hirsutism in PCOS women and the incidence of hirsutism in PCOS women varies widely between different studies $(17\% \text{ to } 100\%)^{16}$ the present study results were also comparable with Balaji et al ¹⁰ study.

CONCLUSIONS

The crude prevalence rate determined from the present study was 20%. The increased risk of developing Type 2 diabetes in polycystic ovarian syndrome is of immense public health concern especially in India, which has been tagged as a diabetic capital of the world. The reported younger onset of this syndrome and the prevalence of associated risk factors such as glucose intolerance in the Indian population signified a need for intensified efforts in early detection.

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