Original article:

A study of clinical manifestations of PCOS among obese and non- obese rural women

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ABSTRACT:

Introduction: The present study was planned to determine the prevalence of various clinical manifestations in obese and non-obese PCOS women in rural population.

Materials and methods : 100 consecutive PCOS women were divided in non- obese(BMI≤23) and obese (BMI>23) groups .The prevalence of various clinical parameters like menstrual irregularities, clinical hyperandrogenism, android obesity, hypertension and other cutaneous manifestations like acanthosis nigricans, achrochordons were compared between the two groups.

Results: There were 25% of PCOS women with normal BMI. The prevalence of android obesity was significantly high in obese group. The prevalence of menstrual irregularities, hirsutism, acne, androgenic alopecia, hypertension and pre hypertension were similar in both groups. Acanthosis nigricans, achrochordons and striae distensae were more prevalent in obese group.

Conclusion: There were no major differences in clinical manifestations in obese and non- obese PCOS women probably indicating inherent insulin resistance in PCOS irrespective of BMI .The prevalence of obesity (30%) and over weight (45%) in rural women is of concern.

Key Words: PCOS, Menstrual disturbances, Cutaneous manifestations.

Introduction:

PCOS (Stein Leventhal Syndrome) is a common hyperandrogenic disorder in women of child bearing age group.[1] It is a multisystem metabolic disorder which has a major impact on quality of life and fertility.[2] It is a conglomeration of symptoms with varied presentations such as hirsutism, acne, alopecia, anovulatory cycles and obesity. PCOS was defined at a Joint consensus meeting of the European Society of Human Reproduction and Embryology (ESHRE) and the American Society of Reproductive Medicine (ASRM),held in Rotterdam in May 2003.This included the presence of 2 of the following 3 criteria.

(a)Oligo ovulation and anovulation

(b)Polycystic ovaries on ultrasonography

(c)Hyperandrogenism(clinical &/ or biochemical) with exclusion of other etiologies.[3]

The aim of the study was to determine the prevalence

of various clinical manifestations in obese and non-obese PCOS women in rural population.

Materials and methods:

One hundred consecutive women aged between 12-42 years attending the Gynaecology and Dermatology departments of our institution from Jan 2011 to Dec 2011, who fulfilled the Rotterdam criteria were enrolled in the study after obtaining an informed consent. These women were further divided into two groups according to their body mass index(BMI);

Group A:obese and overweight -BMI>23 and

Group B:non-obese (normal weight and lean) - BMI≤23.[4]

A detailed history including menstrual pattern, personal, past, family, obstetric and treatment history was recorded. A complete physical examination including general, systemic, breast and pelvic examination was also performed and subjects were screened for signs of hyper androgenism such as hirsutism, acne, acanthosis nigricans, alopecia, achrochordons and striae distensae. Hirsutism scoring was done according to Ferriman Gallwey score and women with score>7 were considered hirsute.[5] Height and weight were recorded by standard methods. Waist circumference was measured at the level of umbilicus without clothing and in standing position. Hip circumference was measured at the level of ischial tuberosity. Subjects with known thyroid disorder, hypothalamic, pituitary or adrenal disease were not included for the study.

Depending on blood pressure measurements women were divided into pre hypertensives, in whom systolic pressure was ranging from 120-139 mm Hg or a diastolic pressure ranging from 80-89 mm Hg. Stage 1 hypertension, when pressure was in the range of 140- 159 mmHg or a diastolic pressure was in the range of 90-99 mm hg .Stage 2 hypertension with systolic pressure of 160 mm Hg or higher or a diastolic pressure of 100 mm Hg or higher.[6]Statistical analysis was done by chi square test and p value <0.05 was considered significant.

TABLE 1: DISTRIBUTION ACCORDING TO BMI

BMI	No. of patients n=100(%)
Group A:	
Obese(>27.5)	30(30%)
Overweight(23.1-27.5)	45(45%)
Total	75
Group B:	
Normal weight(18.5-23)	24(24%)
Lean(<18.5)	1(1%)
Total	25

TABLE 2 AGEWISE DISTRIBUTION OF OBESE AND NON OBESE PCOS WOMEN

Age (years)	Group A (Obese) [n=75]	Group B (non obese)[n=25]
11-20	13	06
21-30	47	14
31-40	13	05
>40	02	00

TABLE 3COMPARATIVE DATA OF VARIOUS CLINICAL FEATURES

Waist hip ratio	Group A [n=75(%)]	Group B [n=25(%)]	p value
>0.85	45(60)	8(32)	0.015 (S)
≤0.85	30(40)	17(68)	0.015 (S)

Menstrual disturbances	Group A [n=75(%)]	Group B [n=25(%)]	p value
Amenorrhoea	9(12)	2(8)	0.58(NS)
Oligomenorrhoea	46(61.3)	14(56)	0.637(NS)
Polymenorrhoea	-	2(8)	NA
Regular	20(26.6)	7(28)	0.897(NS)

Cutaneous manifestations	Group A [n=75(%)]	Group B [n=25(%)]	p value
Hirsutism	42(56)	16(64)	0.483(NS)
Acne	24(32)	10(40)	0.465(NS)
Androgenic alopecia	12(16)	3(20)	0.645(NS)
Acanthhosis Nigricans	20(26.6)	1(4)	0.016(S)
Striae distensae	55(73.3)	2(8)	0.0001(S)
Achrochordons	12(16)	0	NA

S - Significant; NS -Not significant; NA-Not applicable

TABLE 4 DISRIBUTION DEPENDING ON STAGES OF HYPERTENSION

Blood pressure	Group A [n=75(%)]	Group B [n=25(%)]	p value
Normo tensives	58(77.3)	22(88)	
Pre hypertensives	12(16)	1(4)	0.122(NS)
Hypertensive	5(6)	2(8)	0.821(NS)
Stage 1	3(4)	2(8)	
Stage 2	2(2.6)	0	
Pre HTN+HTN	17(22.66)	3(12)	0.248(NS)

S - Significant; NS - Not significant

Results:

The study group consisted of 100 PCOS women who were divided into group A and group B depending on BMI. Group A(n=75) consisted of obese (n=30) and overweight (n=45). Group B(n=45) consisted of normal weight (n=24) and only one woman with lean PCOS. The average age was 29±5.1 years in group A and 28.4±4.2 years in group B. The prevalence of android obesity as indicated by waist hip ratio was significantly high in group A as compared to group B (p=0.015).

The menstrual disturbance was seen in 72% of patients in both group A and group B. The commonest one being oligomenorrhoea (61.3% Vs 56% P=0.637) followed by amenorrhoea.

The commonest cutaneous manifestations secondary to hyperandrogenism was hirsutism 68%(n=68) seen in 56%(n=42) of group A and 64%(n=16) of group B women .The prevalence of acne was 34% (32% vs 40% P=0.465).Androgenic alopecia was seen in 17%(16% vs 20% p=0.645). None of these differences in the clinical parameters were statistically significant.

Acanthosis nigricans was seen in 21% (n=21) of total PCOS women with majority of them in group A as compared to group B(p=0.016). Striae distensae was noted in 57%(n=57) of PCOS women and was significantly(p=0.0001) more commoner in group A.

Achrochordons was another cutaneous manifestation noticed in our study which was seen only in groupA .The pre hypertensives and hypertensives were equally seen among both study groups (22.6% vs 12% P=0.248) though the percentage of women who had hypertension was less.

Discussion:

Polycystic ovarian syndrome is a multisystem disorder closely associated with obesity. The prevalence of obesity and overweight women in our study was 30% and 45% respectively. Similar results were reported by Majumdar *et al* wherein the prevalence rate of obesity was 37.5%.[7]A multicentre study involving 7 urban cities in India among age group of 20-40 years indicated that the prevalence of obesity was 31%. [8] Though our study population consisted of rural women, the prevalence of obesity was the same as seen in urban population. The waist to hip ratio indicative of central obesity was significantly high in obese group in our study, similar to that reported by Saxena *et al.* [9] Lim *et al* in a systemic review and meta-analysis concluded that women with PCOS had a greater risk of overweight,obesity and central obesity.[10]

The menstrual disturbances was seen in 72% of the PCOS women. Among them oligomenorrhoea(60%) was the commonest followed by amenorrhoea (11%). Balen *et al* has reported similar results in their study wherein 70% women had menstrual disturbances with oligomenorrhoea seen in 50%,amenorrhoea in 20% and 30% of the women had normal menstrual cycles.[11] In our study there was no significant changes in incidence of menstrual disturbance in obese and non- obese group . The same has been reported by Saxena *et al* in their study of 100 PCOS women wherein they have stated that irrespective of weight, PCOS women are inherently insulin resistant with compensatory hyperinsulinemia and this plays a central role in pathogenesis of PCOS. Hyperinsulinemia probably acts at the level of hypothalmic pituitary axis and stimulates LH secretion leading to anovulation with irregular cycles.

Hirsutism is the commonest clinical manifestation of androgen excess in PCOS women. The hyperinsulinemia stimulates ovarian stromal tissue to

produce excess androgens resulting in hirsutism & acne. In our study the prevalence of hirsutism was 68%, with no significant difference in obese and non-obese study group. Saxena *et al* reported prevalence of 89% and 80% in obese and lean PCOS which was statistically insignificant. 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 they postulated that testosterone sensitivity, 5 alpha reductase activity or environmental/socioeconomic factors may play role in development of clinical hirsutism.[12]

The next common clinical manifestation of hyperandrogenism noted in our study was acne which was seen in 34% of women, with no significant difference in both the groups. Balen *et al* reported incidence of acne as 66.2%. Although there is a high incidence of acne in PCOS women, this clinical feature is not among the criteria for diagnosis of PCOS. Androgenic alopecia was seen in 17% of our patients, equally among the two groups. However Balen *et al* in their study noted an incidence of only 6% & concluded that androgenic alopecia was not significantly associated with PCOS.

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 our study was 21% and most common site was nape of neck. We have 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.[13]

Straie distensae & achrochordons were other cutaneous manifestations seen in our study more commonly in the obese group. Since these two manifestations are seen more commonly in the obese group and the proportion of obese women in our study population was more, a significant number of women had these two features.

Metabolic abnormalities are more frequently encountered when obesity is associated with PCOS .In our study we observed that incidence of HTN was 20%, equally seen in both the study groups probably because of the hyperinsulinemia playing an etiological role in development of HTN. Majumdar *et al* in their study of 450 PCOS women noted similar frequency of pre hypertension in obese and non obese women , but higher prevalence of hypertension in obese women.

Conclusion:

Regardless of BMI, PCOS women are inherently insulin resistant indicating no major differences in clinical manifestations among obese and non obese women. All PCOS women are considered at risk for atherosclerosis and its complications. An alarming raise in obesity among rural population is of concern.

REFERENCES:

1.Frank S, Gharani N and McCathy M. Candidates genes in Polycystic Ovary Syndrome. Hum Reprod 2001; update 405-410.

2.Elsenbruch s, Hahn s, Kowalsky D, *et al* Quality of life ,Psychosocial well being and sexual satisfaction in women with polysystic ovarian syndrome. J clin endocrinol metab 2003; 88:5801-7.

3. Bonnar J, Dunlop W, editors.Recent advances in obstetrics and gynaecology vol 23.London: Royal society of medicine press limited; 2005

4. Choo v.WHO reassesses appropriate BMI for Asian population. The Lancet 2002; 360:235.

5. Falsetti L, Gambera A, Andrico S, Sartori E.Acne and Hirsuitism in PCOS. Clinical, endocrine- metabolic and ultrasonographic differences. Gynecol endocrinol 2002; 16:275-84.

6.Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr *et al.* The seventh report of the Joint national committee on prevention,detection, evaluation and treatment of high blood pressure: JNC 7 report. JAMA 2003 May 21 ;289:2560-72.

7.Majumdar A, Singh TA. Comparison of clinical features and health manifestations in lean vs obese Indian women with polycystic ovarian syndrome. J Hum Reprod Sci 2009;2:12-17.

8.Snehalatha C, Ramachandran A, Kapur A, Vijay V. Age specific prevalence and risk associations for impaired glucose tolerance in urban southern Indian population. J Assoc Physicians India 2003;51:766-9.

9.Saxena P, Prakash A, Nigam A, Mishra A. Polycystic ovarian syndrome: Is obesity a sine qua non ?A clinical, hormonal and metabolic assesment in relation to body mass index. Indian J Endocr Metb 2012;16:996-9.

10.S.S. Lim, M.J Davis, R.J Norman and L.J.Moran. Overweight, obesity and central obesity in women with polycystic ovarian syndrome: A systemic review and meta-analysis. Hum Reprod update 2012;18(6):618-637.

11.Balen AH, Conway GS, Kaltas G, Techatraisak K, Manning PJ, West C *et al* .Polycystic ovarian syndrome: The spectrum of disorder in 1741 patients. Hum Reprod 1995;10:2107-11.

12. Demir B, Pasa S, Demir S, Tumer C, Atay AE, Gul T and Atamer Y. Hirsutism score and the severity of hyperandrogenism associated with polycystic ovarian syndrome in south-eastern region of Turkey. The Journal of International Medical Research 2011;39:1529-1535.

13.Hud Jr JA, Cohen J B, Wagner JM. Prevalance and significance of acanthosis nigricancs in an adult obese population. Arch Dermatol 1992;128:941-4.

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