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Prevalence of obesity in PCOS female

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Abstract
Background: Polycystic ovary studies involving women with PCOS are often confounded by coexisting obesity, insulin resistance and other features of the metabolic syndrome. In a woman genetically predisposed to developing PCOS, weight gain may be enough to unmask the condition (which may otherwise have remained asymptomatic). Thus, weight gain is an important (both genetic and environmental) contributor to phenotype in many women with PCOS. Condition is closely associated with the obesity but the prevalence of obesity is varied between the other published studies. The objective of this study was to find the prevalence of obesity in women having PCOS.
Methods: Skin fold measurement, BMI and waist hip ratio were taken to measure the obesity of the women with PCOS skin fold measurement was taken by caliper (biceps, triceps, subscapular, supraspinale, abdominal, thigh, calf).
Result: Total 80 participants were studied, and we found the following result that shows, Women with PCOS had increased obesity (44% normal, overweight 20%, pre-obese 16%, type1 obese 8%, type2 obese 6%) according to BMI. Skin fold value were measured by calliper (lean 12%, acceptable 72%, moderately overweight 14%)it shows that abdominal obesity was found to be high in all. Waist hip ratio was (moderate 44%, high 38%, very high 18%), that shows percentage of obesity among the PCOS female.
Conclusion: Women with PCOS had a greater risk of obesity. Although our finding supports a positive association between obesity and PCOS, our conclusions are limited by the significant heterogeneity. Clinical management of PCOS should include the prevention and management of obesity.

Keywords: polycystic ovary syndrome, obesity, prevalence

Introduction

'Sometimes it's hard to see the rainbow when there's been endless days of rain.' said by one of the author about Polycystic Ovary Syndrome (PCOS). It is said to be the commonest endocrine disorder of women of reproductive age with a heterogeneous presentation, which includes hyperandrogenism and ovulatory dysfunction [1, 2].

Polycystic ovary syndrome is the commonest female endocrinological and affects between 6% and 10% of premenopausal women [3].

PCOS is not a disease exclusive to fertility and adolescence period; rather it can be associated with varying effects on a person's life [2] Currently PCOS is described as the most frequent cause of anovulation resulting in infertility in adult women. The cause of PCOS is unknown. But most experts think that several factors including genetics could play a role. Women with PCOS are more likely to have a mother or sister with PCOS**.** Women with PCOS exhibits a wide range of symptoms presenting in varying combination that includes amenorrhea, anovulation, weight gain or obesity, acne vulgaris, excessive androgen production and insulin resistance. Metabolic features includes risk factors for type 2 DM, hypertension and cardiovascular disorders [3]. With PCOS, women typically have High levels of androgens [4] as with T2DM, the development of PCOS is strongly associated with weight gain.

A main underlying problem with PCOS is hormonal imbalance [4] Insulin resistance is central to the pathogenesis of PCOS, and Indians are known to have high prevalence of insulin resistance, so the prevalence of PCOS may be high in our population [1]. In women with PCOS, the ovaries make more androgens than normal. Androgens are male hormones that females also make. High levels of these hormones affect the development and release of eggs during ovulation [3]. Hyperandrogenaemia (originating from a predominantly ovarian source) is the most consistent endocrine feature in women with PCOS, and is likely to play a key role in the etiology of the condition. It is also clear that adiposity plays a crucial role in maintaining and presumably in generating PCOS. Consequently, studies involving women with PCOS are often confounded by coexisting obesity, insulin resistance and other features of the metabolic syndrome [3] In a woman genetically predisposed to developing PCOS, weight gain may be enough to unmask the condition (which may otherwise have remained asymptomatic). Thus, weight gain is an important (both genetic and environmental) contributor to phenotype in many women with PCOS. Furthermore, it may be the distribution of adiposity (namely android adiposity resulting in insulin resistance and consequent worsening of hyperandrogenaemia) that is important for PCOS development [4].

Here are very few articles that show direct effects of obesity

on PCOS And vice versa. Therefore the aim of our study is to find out is there any relationship of obesity and PCOS and prevalence of the obesity among PCOS female and to negate the confounding effect of obesity associated with PCOS.

Methodology

The study was approved by institutional ethics committee. Written informed consent was obtained from participant's. Total 80 females of age group 18 to 30, were included in this study. A female was labeled as PCOS, if she had menstrual irregularity or hirsutism (self-reported) or both [1] for our study we had taken BMI, waist hip ratio and skin fold measurement. BMI was calculated as height in meters and weight in Kg. I, e BMI = mass (kg) / Height in (m^2). Grading of BMI was taken according to Indian criteria [1] The Body Mass Index is a measure of the body weight relative to height that is associated with body fat and health risk. It was developed in the mid 1800's by a Belgian mathematician named Adolphe Quetelet. It is equal to the weight, divided by the square of the height in m^2.The equation is: BMI = body weight in kilograms/height in meters squared. The grading of BMI is calculated according to Indian classification [7, 8]. Waist hip ratio was calculated according to WHO STEPS protocol for measuring waist circumference instruct that measurement be made at approximate midpoint between lower margin of last palpable rib and the top of iliac crest. Hip circumference measurement should be taken around the widest portion of buttock. Measurement is the waist to hip ratio or WHR. This is calculated by dividing the measurement around subject waist by measurement around subject hips [9, 10] Skinfold measurement, is used to asses subcutaneous fat, skinfold thickness of the following sites were measured, suprailiac, subscapular, triceps, biceps, medial calf, thigh and abdominal. Abdominal is established parallel to the longitudinal body axis, approximately 2cm from the lateral edge of navel." Firmly but gently, pinch the skin and subcutaneous fat between the thumb, forefinger, and middle finger. Open the skinfold caliper and measure the skinfold approximately 1 cm below your fingers and approximately 1 cm deep into the skinfold. Do not release the skinfold while taking the measurement. Once you have obtained the skinfold measurement, release the caliper from the skinfold. Take a minimum of 2 measurements at each site. If the measures do not agree within 1 millimeter, subsequent assessments should be taken until all values are within 1 millimeter [11, 12].

Procedure

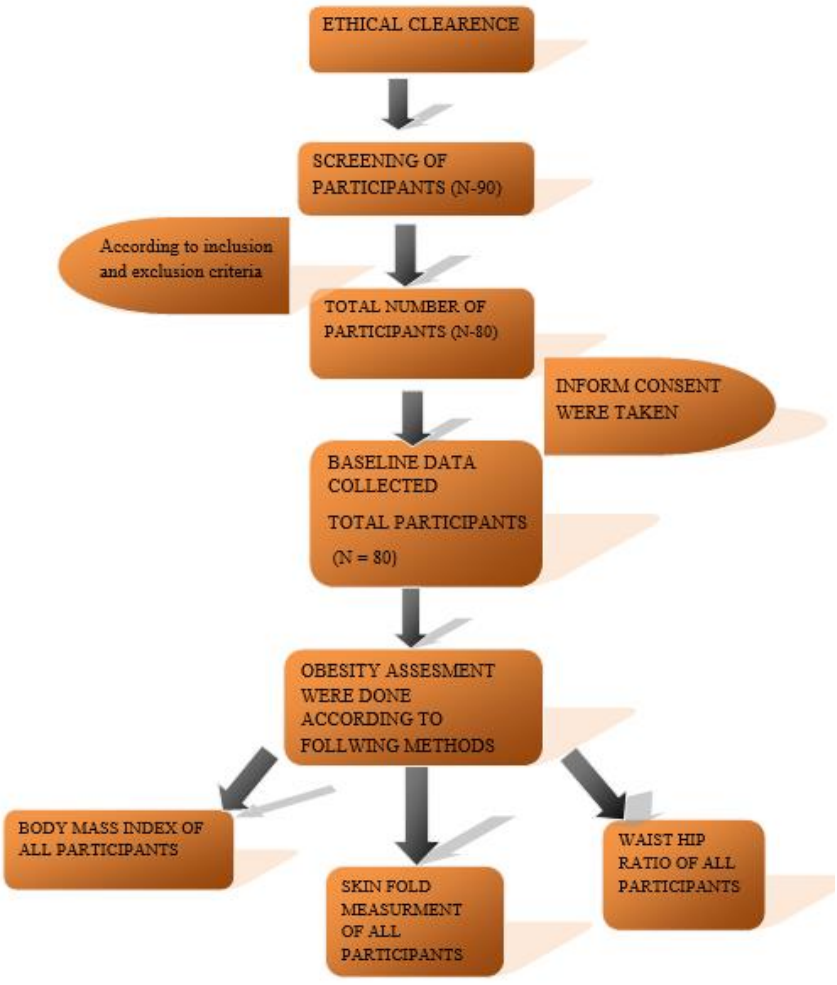

Fig 1

Data analysis and result

About 80 girls were eligible for study. Those all are volunteered to participate in study. Majority of population belong age group of 18 to 25 years. BMI are calculated according to that 44% are having normal BMI, 20% are of overweight, 16% are of pre-obese, 8% are of type I and 6% re of type II obese. Waist hip ratio was calculated as, 44% are moderate obese, 38% have high level of obesity and 18% having very high level of obesity. Skin fold measurement values shows 12% of lean body fat, 72% are acceptable and 18% are moderate overweight.

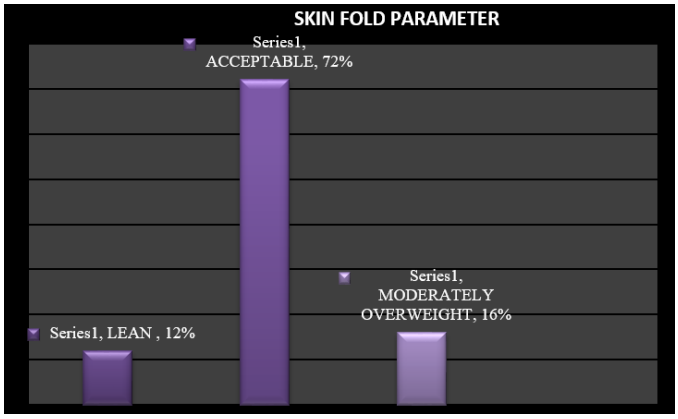

Fig 2: Shows Values of Skin Fold Calliper

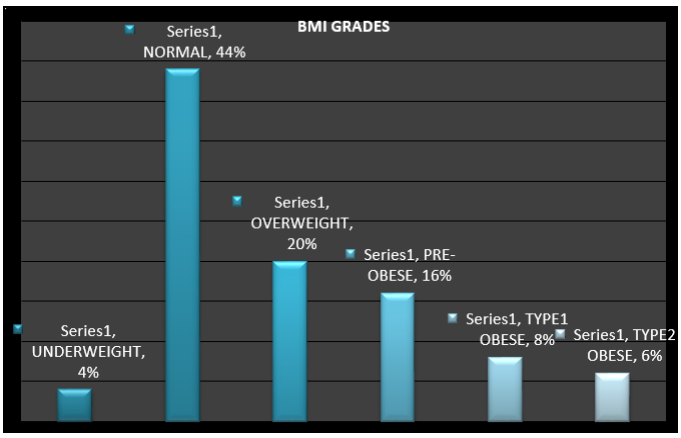

Fig 3: Shows Values of Body Mass Index

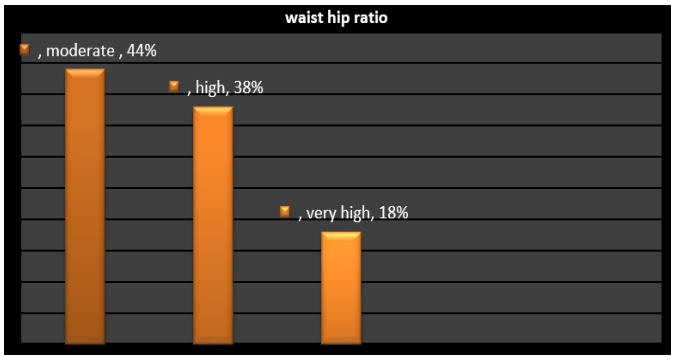

Fig 4: Shows Values of Waist Hip Ratio

Discussion

In our study we find the prevalence of obesity in female having PCOS. For obesity body mass index assessment were done and graded according to Indian classification. Research over last several years shows that Indian bodies and genetics are different from their western counterpart as Indian suffer from abdominal obesity compared to people in west whose bodies are uniform obese [7].

Waist hip ratio was measured according to The WHO STEPS protocol. The 1997 WHO Expert Consultation on Obesity recognized the importance of abdominal fat mass (referred to as abdominal, central or visceral obesity), which can vary considerably within a narrow range of total body fat and body mass index (BMI). It also highlighted the need for other indicators to complement the measurement of BMI, to identify individuals at increased risk of obesity-related morbidity due to accumulation of abdominal fat (WHO, 2000a). Waist hip ratio measure of abdominal obesity better than BMI. And its co-relate more closely than abdominal adipose tissue. Waist–hip ratio (i.e. the waist circumference divided by the hip circumference) was suggested as an additional measure of body fat distribution. The ratio can be measured more precisely than skin folds, and it provides an index of both subcutaneous and intra-abdominal adipose tissue [10].

For measurement of body fat distribution, skin fold measurements were taken.

Scientists suggest the use of the skinfold method, the measurement of subcutaneous fat, in field setting as an alternative to laboratory methods. Currently it is the most widely adopted field method for measurement of body fat. Since the instruments used are portable, in-expensive and non-invasive, skinfold method can be readily applied in clinics, laboratories and schools. It also has high correlation with percent body fat. The validity and reliability of it is already proven [12].

Approximately 50% of women with PCOS are overweight or obese with pattern of body fat primarily centrally located. Previously researchers found that obese women with PCOS have more rapid progression from normal glucose tolerance and diabetes compared with age and weight matched control without PCOS [14].

It has been established that 35%−65% of PCOS patients are obese. Current evidence suggests that, regardless of PCOS, pregnancy achievement and maintenance is adversely affected by obesity, overweight or elevated body mass index (BMI). In particular, obese women may have a lower chance of becoming pregnant and a higher chance of miscarriage after fertility treatment [8].

It is now known that weight gain in both normal women and those with PCOS is associated with increasing insulin resistance. However, most women with PCOS (between 50% and 90%, depending on the diagnostic criteria used) have insulin resistance to a significantly greater extent than in age and BMI-matched control women, this disparity being more marked for higher BMIs [3].

A further adverse effect of hyperinsulinaemia on the ovary in women with PCOS includes the arrest of ovarian follicle development at 5–10 mm (thereby contributing towards anovulation) [1] In support of the mechanism of insulin-enhancing ovarian steroidogenesis in PCOS is the observation of an increased prevalence of PCOS in women with Type 1 Diabetes Mellitus. (The ovaries of these women are often

exposed to hyperinsulinaemia as a result of exogenously administered insulin into the systemic circulation.) [3].

In our study abdominal deposition of fat was more in women having PCOS. Abdominal/truncal (increased waist-to-hip ratio) obesity is another important feature of PCOS, which worsens the clinical, endocrine and metabolic features of the syndrome. This type of obesity is associated with more pronounced hyperandrogenism and insulin resistance [6] both abdominal obesity and weight gain after adolescence were predictive for the development of PCOS. obesity, particularly the abdomino-visceral (central) phenotype, is associated with supra normal estrogen production, due to increased activity of the aromatase system. PCOS women with central adiposity have higher estrogen concentrations compared with women with a peripheral fat distribution [2] an increased risk of self-reported PCOS symptoms was observed among 30-year-old overweight or abdominally obese women who had either normal weight in adolescence or who were overweight or obese at both adolescence and adult age [16].

There is a large body of evidence that android Body fat distribution (BFD)affects the majority (between 50% and 60%) of women with PCOS regardless of BMI [5] There is also evidence that elevated serum testosterone concentrations may modify BFD in women during adulthood. In women with PCOS, it is possible that android BFD per se contributes to hyperandrogenaemia through its adverse effects on insulin sensitivity and consequent co-gonodotrophic effects of hyperinsulinaemia on the ovaries. Thus, in women with PCOS, android BFD may be both a cause and an effect of hyperandrogenaemia. There is a vicious circle and further exacerbates the predisposition towards weight gain in women with PCOS. The cycle can be interrupted by dietary intervention and/or use of insulin- sensitizing drugs. As PCOS is a condition associated with (and worsened by) obesity, it is possible that abnormalities in appetite- and weight-regulating hormones may play a role in its etiology [3].

The prevalence of PCOS is likely to increase in parallel with the obesity epidemic. The complex etiology of PCOS is influenced by genetic and environmental (particularly dietary) factors. Both of these factors determine adiposity, which in turn influences the severity and expression of PCOS. Given the complexity of adipocyte physiology and pathophysiology, it is likely that we have only just begun to understand the mechanisms linking adiposity and obesity with PCOS. In our study all women belongs to similar socio-economic status and need to improve nutrition as well as quality of life. In our study all women belongs to similar socioeconomic status and they need to improve diet, nutrition, regular exercise and quality of life.

Conclusion

There is increased prevalence of obesity with age in female of age group 18 to 30 with PCOS. Obesity is often encountered in PCOS and modifies significance both hormonal and metabolic phenotypes of this women. There are marked increases in deposition of abdominal fat distribution and prevalence of abnormal waist hip ratio; hence because of this women were at high risk of metabolic syndrome.

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