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Original Article

Characteristics of Body Composition in Different Phenotypes of South Indian Women with Polycystic Ovary Syndrome and Relation with Body Image and Psychological Profile

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ABSTRACT

Purpose of the study: To study characteristics of body composition in different phenotypes of South Indian women with polycystic ovary syndrome and relation with body image and psychological profile
Methods: Non-comparative cross-sectional open label study to be carried out over the period of 12 months on PCOS patients attending gynecology outpatient department. Personal medical history to be obtained from every woman according to a customized prepared questionnaire. Presence of at least two criteria from clinical, hormonal, and abdominal USG category were considered diagnostic of PCOS. Hirsutism was scored according to modified Ferriman Gallawayscore. Recruited women have their body fat percentage calculated using Health Sense BF 414 Ultra Lite Body Fat Monitor .The bioelectrical impedance analysis (BIA) method was used to estimate body fat percentage.
Results: The most common menstrual abnormality identified in study was irregular menstrual cycles followed by a combination of amenorrhea and irregular cycles. The commonest phenotype was ovulatory dysfunction with polycystic morphology in 42.7% cases. The body dysmorphic disorder was the commonest psychological problem in about 25.6%closely followed by major depressive illness.
Conclusion: Our study suggested that psychological and neurological factors may play a role in the pathophysiology of PCOS. Therefore, psychological intervention should be an aspect of PCOS management.

Key Words: *Phenotypes of PCOD, body image, psychological profile*

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INTRODUCTION

The polycystic ovary syndrome (PCOS) is an endocrine metabolic disorder affecting 7% to 10% of women during reproductive age [1]. It is a systemic disorder with reproductive, psychological, cosmetic, and oncologic consequences. It also has a metabolic component involving hyperglycemia and insulin resistance. This results in increased cardiovascular risk and type II diabetes mellitus [2]. Polycystic ovarian syndrome (PCOS) is a highly prevalent disorder [2, 3] affecting multiple aspects of a women's overall health, with long-term effects that transcend well beyond the reproductive age [4, 5]. The symptoms of PCOS include, somewhat variably, hyperandrogenism (HA), ovulatory dysfunction (OD), polycystic ovarian morphology (PCOM), gonadotropic abnormalities, and insulin resistance and compensatory hyperinsulinism. The disorder has high degree of heritability with complex genetic trait.

- **Epidemiology/ severity of the problem**

The syndrome is characterized by chronic anovulation and hyperadrogenism. It is manifested by hirsutism, cystic acne, hair loss, insulin resistance, and weight gain. It is also one of the primary causes of infertility all of which leads to decrease in health-related quality of life [6]. Studies showed PCOS exhibited high rates of psychopathology, with 52.7% of the sample suffering from a psychiatric condition [7].

Asian Indians have higher percentage body fat, abdominal adiposity at lower or similar BMI levels as compared to white Caucasians. In lower or similar BMI levels Asian Indians have higher percentage of abdominal adiposity as compared to white Caucasians. Studies indicate that the cut-off BMI corresponding to the cut-off of percentage body fat is lower for Asian Indians from various parts of India very broad spectrum of clinical manifestations and associated morbidities [8]

Over the last several decades, significant efforts have been made to classify PCOS; however, global consensus regarding a PCOS criterion remains controversial [9-12]. Currently proposed criteria are predominantly based on expert opinion [9-12]

The introduction of Rotterdam criteria led to a substantial increase in the number of patients diagnosed with PCOS, as well as broadened the heterogeneity of PCOS phenotypes as compared with the NIH definition [13] The distribution and morbidity associated with specific PCOS phenotypes has been the object of extensive research, as reported by studies conducted in Europe [14-17], the Middle East [18], Asia [19], the Americas [20, 21]

As noted above, the presentation of PCOS can be subdivided into four phenotypes: phenotype A: androgen excess and ovulatory dysfunction, phenotype B: androgen excess and polycystic ovarian morphology; phenotype C: ovulatory dysfunction and polycystic ovarian morphology; and phenotype D: ovulatory dysfunction, androgen excess and polycystic ovarian morphology.

Distribution of PCOS Phenotypes

Understanding the distribution of PCOS phenotypes is essential in defining the epidemiology of PCOS in a population. Multiple studies from different regions around the world have reported the distribution of phenotypes in clinical cohorts of PCOS patients [22, 23, 24, 25 & 26]. Overall, published data indicate that more than half of PCOS patients identified within the clinical setting demonstrate phenotype A, whereas the other three phenotypes (i.e., B, C and D) have almost equal prevalence. The classic form of PCOS (i.e., phenotypes A and B) constitutes approximately two-thirds of the total of PCOS patients identified within the clinical setting [27]. Unfortunately, few data exist regarding the distribution of phenotypes in women with PCOS identified in medically unbiased (i.e., unselected) populations, which would more accurately reflect the distribution of phenotypes in PCOS in the ‘‘natural’’ state.

The array of symptoms such as obesity, acne, scalp hair thinning, menstrual irregularity, and sub fertility in PCOS contribute to psychological impairment [28]. Studies have evaluated the relation between PCOS and psychiatric disorders; however, most have evaluated psychiatric symptoms based on self-report measures [29]. There remains, therefore, an unclear relationship between PCOS and psychiatric disorders. Cross sectional epidemiological studies have reported that individuals with PCOS are more likely to have anxiety or depressive disorders when compared to those in the general population [30] Two studies have shown depression, bipolar disorder, anxiety disorders, and binge eating disorder are more frequent among women with PCOS compared with control [31, 32, 33, 34, 35 & 36].

In light of the above mentioned, the purpose of the present study is to perform a study mood (bipolar disorder, dysthymia, or major depressive disorder), obsessive–compulsive spectrum disorders, trauma- and stressor-related disorders, anxiety disorders, psychotic disorders, somatic symptom and related disorders, binge eating disorders and eating disorders among women with different phenotypes of PCOS

As a result of significant body changes like hirsutism, irregular menses, obesity, acne and hair thinning Women with PCOS may report clinically significant symptoms of anxiety or depression 2, 7. Previous research indicates that alterations in body image may contribute to psychological distress among women with PCOS [37]. The neurophysiologic etiology of anxiety and depression is not fully understood but the dysregulation of the HPA axis has been linked to stress and, although less extensively, its putative association with anxiety and depression disorders has also been studied [38].

- **Type of study**

Study design

Non-comparative cross-sectional open label study to be carried out over the period of 12 months on PCOS patients attending gynecology outpatient department. Patients with irregular menses and /or subfertility were enrolled as per inclusion and exclusion criteria after taking written informed consent.

Personal medical history to be obtained from every woman according to a customized prepared questionnaire. Menstrual cycle history documentation including a general review since menarche and a detailed recall of the last 2 to 3 year interval. Ovulatory dysfunction was defined as less than eight cycles per year, and regular menstrual cycle as 21–35 days in length. Clinical examination was performed in each person to confirm diagnosis.

Presence of at least two criteria from clinical, hormonal, and abdominal USG category were considered diagnostic of PCOS. Women with complain of irregular menses or oligomenorrhea (absence of menses for 35-182 days) or amenorrhea (absence of menses for > 182 days), signs or symptoms of hyperandrogenism, abdominal USG showing at least 12 follicles (2-9 mm in diameter) arranged peripherally around a dense core of ovarian stroma or scattered throughout an increased amount of stroma were enrolled in the study. Transvaginal ultrasound (LogIQp3ultrasonic machine, Ge) was used for all patients. Cut-off body mass index (BMI) with body fat as Standard Consensus Statement for Indian population was considered, i.e., Normal BMI: 18.0-22.9 kg/m2 , Overweight: 23.0-24.9 kg/m2 Obesity: >25 kg/m2 BMI $\geq$ 25 was considered as obese [39].

Hirsutism was scored according to modified Ferriman Gallaway score [40]. Grading of severity based on the score was assessed as <8 normal, 8-14 - moderate, ≥15 - severe.

Recruited women have their body fat percentage calculated using Health Sense BF 414 Ultra Lite Body Fat Monitor. The bioelectrical impedance analysis (BIA) method was used to estimate body fat percentage. The general principle behind BIA: two or more conductors are attached to a person's body and a small electric current is sent through the body. The resistance between the conductors will provide a measure of body fat between a pair of electrodes, since the resistance to electricity varies between adipose, muscular and skeletal tissue. Fat-free mass (muscle) is a good conductor as it contains a large amount of water (approximately 73%) and electrolytes, while fat is anhydrous and a poor conductor of electric current. Factors that affect the accuracy and precision of this method include instrumentation, subject factors, technician skill, and the prediction equation formulated to estimate the fat-free mass. There is little scope for technician error as such, but factors such as eating, drinking and exercising must be controlled [41] since hydration level is an important source of error in determining the flow of the electric current to estimate body fat. The instructions for use of instruments typically recommended not making measurements soon after drinking or eating or exercising, or when dehydrated. Population-specific equations used for making them more reliable [41].

Sample size

Non random sampling, Sequential inclusion of the women who met the study criteria, Inclusion [42, 43]

1) Clinical or biochemical hyperandrogenism Increased serum androgens and/or progressive hirsutism
2) Oligo-/anovulation Oligo-/amenorrhea for at least 2 years, or primary amenorrhea by age 16 years.
3) Polycystic ovarian Morphology Ovarian volume >10 cm3.

Exclusion

Patients having any major systemic illness, congenital adrenal hyperplasia, hyperprolactinemia, acromegaly, functional hypothalamic amenorrhea, and patients receiving drugs for any other systemic illness. In patients complaining of amenorrhea, pregnancy was ruled out whenever necessary.

Withdrawal criteria

The patients were withdrawn from study due to Loss of follow up, Withdrawal of consent

METHODOLOGY

Ultrasound (LogIQp3ultrasonic machine, Ge) was used for all patients in defining the ovarian volume and morphology. The psychiatric illness were identified using standardized questionnaires

Data management & statistical analysis

Data was collected in outpatient departments of obstetrics and gynecology

Statistical analysis

Data analysis to be performed using the SPSS. The Student's t-test to be used for inter-group comparisons of continuous variables. Fisher's least significant difference (LSD) post hoc test to be used to determine significant differences between groups. Categorical variables to be compared using chi-square tests. Results are expressed as mean ± SEM and statistical significance for all analyses was defined as a two-tailed P-value of<0.05. Data analyzed using Fisher's exact test. P value < 0.05 to be considered significant.

RESULTS

The most common menstrual abnormality identified in study was irregular menstrual cycles followed by a combination of amenorrhea and irregular cycles. On ultrasound pcos morphology was found 42.3% and ovarian volume was more than 10ml in 12.8%. Simultaneous occurrence of both the features occurred in 44.9% Hirsuitism of more than 8 ferrimanngallaway score was seen in 42.7% cases. I this study we demonstrated the commonest phenotype was ovulatory dysfunction with polycystic morphology in 42.7% cases. Classical phenotype D: ovulatory dysfunction, androgen excess and polycystic ovarian morphology was demonstrated in 28.8% cases we also could demonstrate the body dysmorphic disorder was the commonest psychological problem in about 25.6%closely followed by major depressive illness.

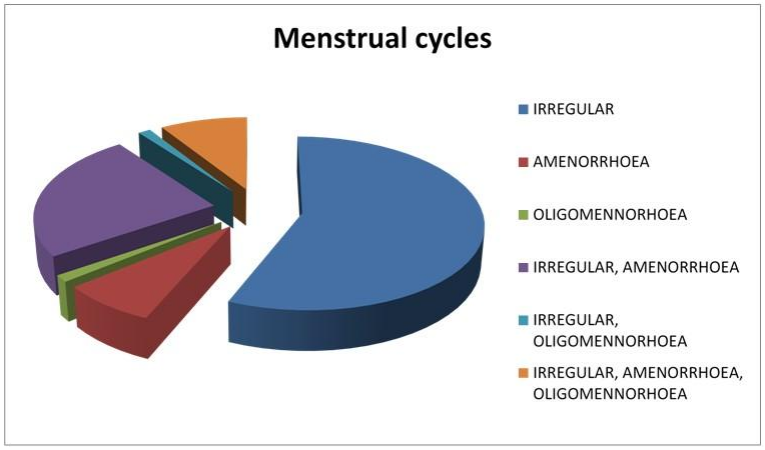
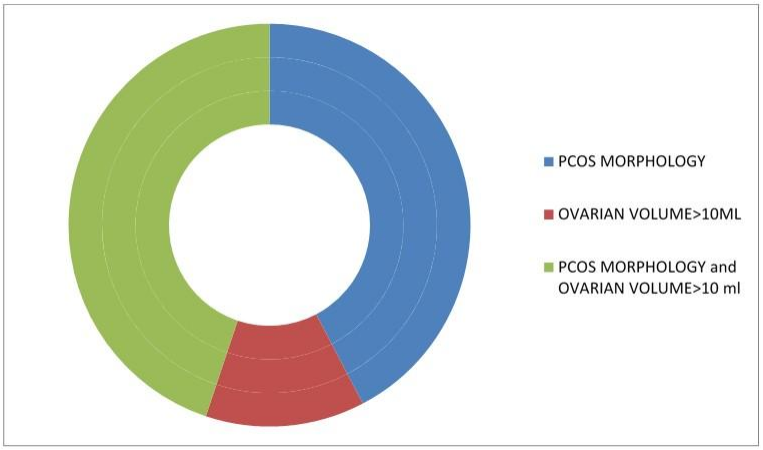


Figure: 1



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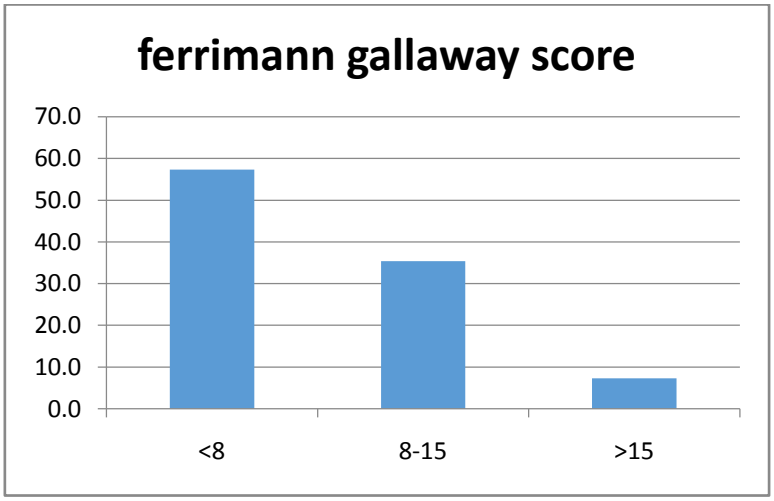

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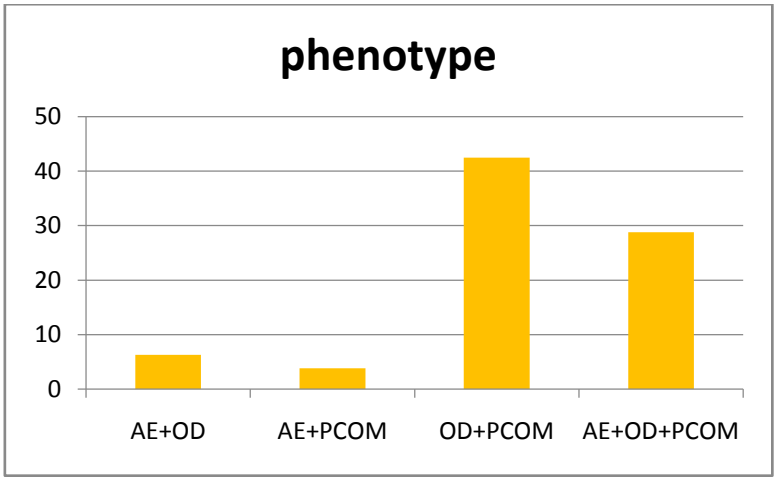

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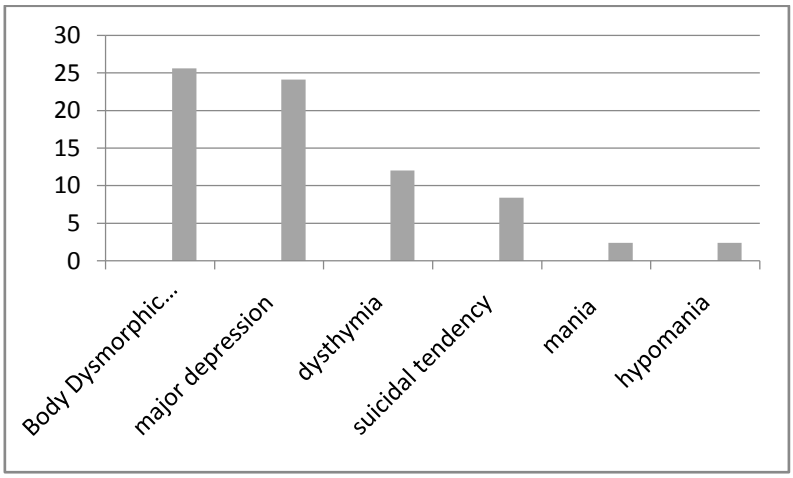

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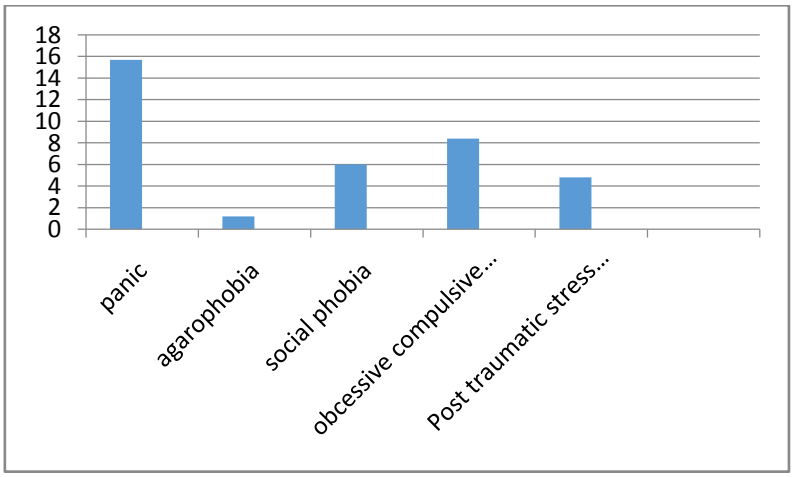

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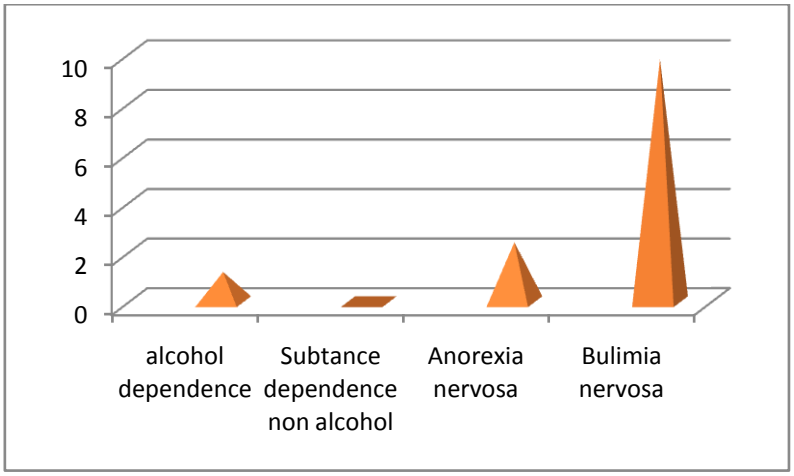

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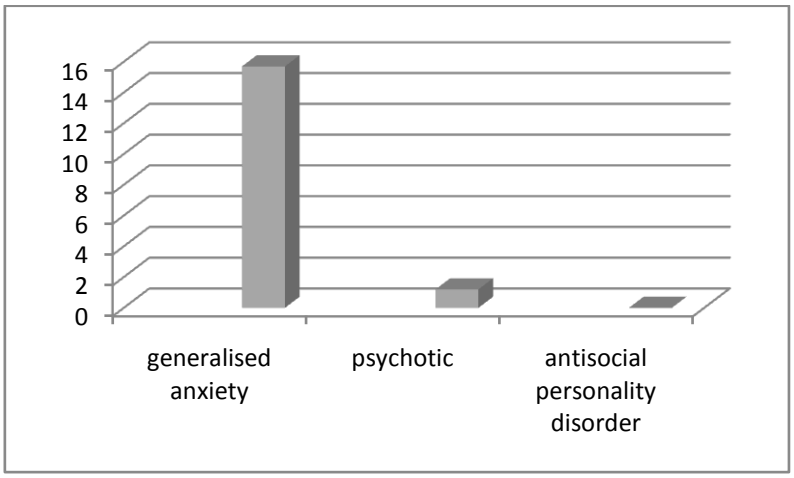

Figure: 8

DISCUSSION

Polycystic ovary syndrome (PCOS) being one of the most common endocrine disorders, empirical evidence shows relationship between psychological factors and physiological changes in PCOS women [44]. In this study, we demonstrated that levels of anxious and depressive symptoms were significantly higher in patients with PCOS the incidence of phobia also is higher. Mc Cook et al. [46] For instance, depression, increased incidence of psychological disorders, increased susceptibility to external pressures, and decreased quality of life could be observed commonly in PCOS patients [47]. The prevalence of depression in PCOS women has been reported to be as high as 24.1 [48].

Elsenbruch et al. [49] reported that PCOS patients have significantly higher chance of developing obsessive-compulsive disorder, interpersonal stress and depressive symptoms than healthy population.

Our study suggested that psychological and neurological factors may play a role in the pathophysiology of PCOS [49]. These findings indicate that PCOS patients usually have obvious psychological problems. Our study demonstrated that anxiety and depression are also significantly associated with PCOS. Therefore, psychological intervention should be an aspect of PCOS management [50]

Conflict of Interest: The authors declare that we have no conflict of interest.

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Proforma

Characteristics of body composition in different phenotypes of South Indian women with polycystic ovary syndrome and relation with body image and psychological profile

NAME AGE HOSPITAL NUMBER

HEIGHT WEIGHT BMI

OVERWEIGHT	CLASS 1`25-29.9	CLASS 2 30-34.9	CLASS 3 35-39.9	CLASS 4/MORBID >40

WAIST HIP RATIO

BODY FAT %

MENSTRUAL CYCLES	IRREGULAR	AMENORRHOEA	OLIGOMENNORHOEA	

USS	PCOS MORPHOLOGY	OVARIAN VOLUME>10ML

FERRIMAN GALLAWAY	<8	8-15	>15

PHENOTYPE	AE+OD	AE+PCOM	OD+PCOM	AE+OD+PCOM

Body dysmorphic disorder
Major depressive episode
Dysthymia
Suicidality
Maniac
Hypomaniac
Panic
Agoraphobia
Social phobia
Obcessive compulsive disorder
Posttraumatic stress disorder
Alcohol dependence/abuse
Substance dependence (non-alcohol)
Psychotic disorders
Anorexia nervosa
Bulimia nervosa
Generalized anxiety disorder
Anti social personality disorder