

PCOS with Metabolic Syndrome & Psychological Distress

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Abstract

Objective: to identify and compare the possible relationship between psychological distress among PCOS and associated risk of metabolic syndrome, contributing the mental health".

Introduction: Psychological correlates of polycystic ovary syndrome (PCOS) are the source of profound morbidity and impair health-related quality of life. Body images & pathogenesis of PCOS are associated with physical, metabolic and psychological disturbances in young women. 33% of PCOS women suffer from metabolic syndrome (MS), which may result in cardiovascular diseases, diabetes, cancer & other morbidities. Depression and anxiety are more in PCOS having MS, but these are often overlooked and undiagnosed. So our study tried to identify the possible relationship between psychological distress among PCOS and associated risk of metabolic syndrome, contributing the psychological disorders.

Method & Material: This prospective cross sectional study was conducted among 120 young PCOS patients who attended the OPD of ZHSWMCH between 1st January 2020 to 1st June 2020. The diagnosis of PCOS was done according to Rotterdam criteria. Also MS = 50 were picked up from them, diagnosed by IDFC. PCOS without metabolic syndrome A=70. All participants completed the 12-item version of General Health Questionnaire (GHQ-12), 36-item Beck Depression Inventory (BDI), and State-Trait Anxiety Inventory (STAI) to measure current mental states.

Results: 38% of PCOS women suffer from psychological disturbances. PCOS with MS had marked incidence of mental distress (80%) according to GHQ-12. PCOS with MS had more mental distress than PCOS without MS [80% vs 35.7%, $p < .0001$]. Incidence of Depression [7.1% vs 38%, $p = .002$], Anxiety [28.6% vs 56%, $p < .002$] and Bipolar [0 vs 3%, $p < 0.002$] were much in PCOS with MS. Again eating disorder [74% vs 55.7%, $p < 0.101$] was higher in PCOS with MS but was not statistically significant.

Conclusion: Despite its high prevalence, psychological distress among PCOS is a neglected entity; this distress is more evident in PCOS with MS which is undoubtedly stigmatizes and lowers their quality of life. Again Metabolic syndrome in PCOS is associated with long-term complications of CVD, DM and Cancer. So meticulous assessment of metabolic syndrome and mental health is very important for all PCOS women so that we may institute holistic treatment to prevent the devastating consequences.

Keywords: PCOS, metabolic syndrome, depression, anxiety, hyperandrogenism.

INTRODUCTION

Polycystic ovary syndrome (PCOS) is a heterogeneous disorder; it is the most common endocrine disorder in women, having 15%–20% prevalence among infertile women¹. It occurs in 6%–10% of women

of reproductive age with a higher prevalence in obese women². The prevalence of PCOS depends on ethnicity, environmental and genetic factors, as well as the Rotterdam criteria used to define it. Clinical features of PCOS include menstrual irregularities, sub-fertility, hyperandrogenism, and hirsutism. On the

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other hand, metabolic syndrome is a constellation of metabolic disorders, which include abdominal obesity, insulin resistance, impaired glucose metabolism, hypertension and atherogenic dyslipidaemia. Metabolic disturbances are prevalent in two-thirds of women with PCOS, which may lead to the high risk of cardiovascular diseases and type-2 diabetes mellitus in them³. Psychosocial problems arise in patients with PCOS, as shown by various investigators,^{4,5} particularly due to obesity, excessive body hairs, infertility, and changes in the physical appearances.

Depression and anxiety are common in women with PCOS but are often overlooked and therefore left untreated. Along with the physical disturbances, many mental problems are also associated with PCOS, which remain unnoticed. Therefore, PCOS not only associated with reproductive but also has associated crucial metabolic and psychological health risks with increasing age of the patients. Because of the increased number of cases with PCOS around the world it is important to highlight the mental health and metabolic syndrome.

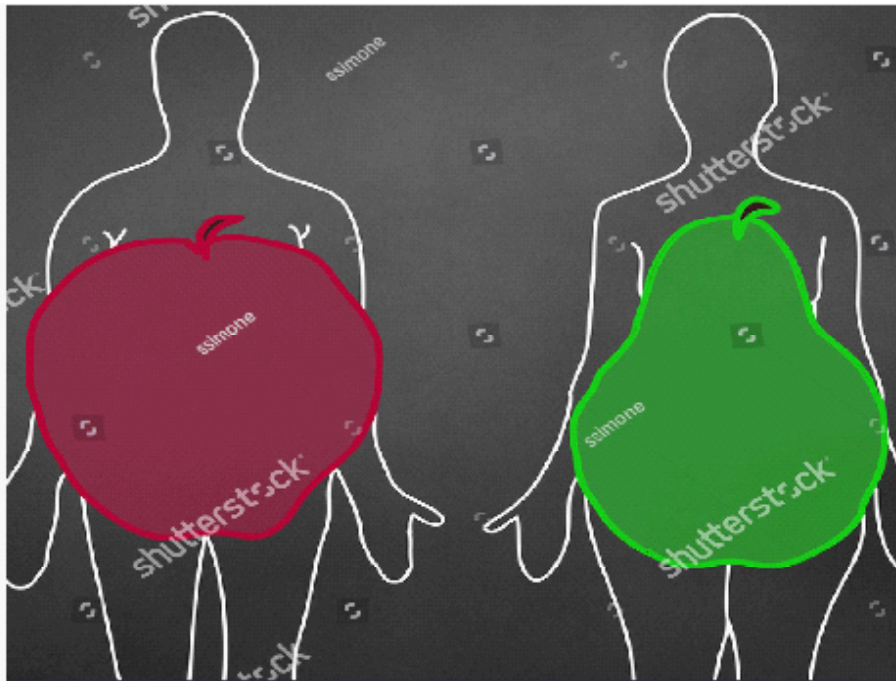


Figure 1. PCOS associated with Gynoid adiposity Photo courtesy -Shutterstock

Metabolic syndrome is associated with insulin resistance in women with PCOS. Hyperinsulinemic-euglycemic clamp studies have shown that both obese and lean women with PCOS have some degree of insulin resistance. Given the association with insulin resistance, all women with PCOS require evaluation for the risk of metabolic syndrome (MS) and its components. Obese women with PCOS are at increased risk for MS (in figure 1) with impaired glucose tolerance (IGT; 31 to 35%) and type 2 diabetes mellitus (T2DM; 7.5 to 10%)⁶. It is shown that the prevalence of metabolic syndrome is as high as 33% in women with PCOS⁷, and is associated with long-term consequences such as cardiovascular disease (CVD), diabetes type II, cancers, sleep apnoea and psychological problems.

Several surveys have confirmed that PCOS is clearly

associated with psychological disorders such as depression, anxiety, and binge eating disorder, and poor health-related quality of life (HRQoL)^{8,9,10,11} in women of reproductive age, and about 40% women with PCOS experience depression¹².

Most studies concerning the impact of PCOS on women's psychological health originate from developed countries. Due to differences in genotype, ethnics, cultures, society, and clinical symptoms, the surveys used in these studies may not fully reveal the mental health status, among Bangladeshi women with PCOS. Nevertheless PCOS with hyperandronism alters the physical appearance & it has been described poetically as "the thief of womanhood in all over the world"¹³. Most PCOS patients present following characters (Table 1).

Table 1. Characteristics of PCOS are summarized in.

Features of Polycystic Ovary Syndrome.
By definition: <ul style="list-style-type: none">• Oligomenorrhea• Hyperandrogenism: acne or hirsutism, or• Hyperandrogenemia: elevated total or free testosterone or DHEA-S
Also frequently seen: <ul style="list-style-type: none">• Insulin resistance• Hyperinsulinemia• Elevated LH:FSH ratio• Abdominal obesity• Polycystic ovaries by ultrasound*• Infertility
DHEA-S, dihydroepiandrosterone-sulfate; LH, luteinizing hormone; FSH, follicle-stimulating hormone. *Polycystic ovaries are not part of the definition of PCOS because they are also found in 24% of normal cycling, nonhyperandrogenic women. ⁸⁴

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PATHOGENESIS

Pathogenesis of PCOs is still uncertain although there is evidence that both genetic and environmental factors may play a role resulting impaired insulin sensitivity and ovarian hyperandrogenism. Women with PCOS have a higher prevalence and a greater degree of hyperinsulinemia,^{14,15} and insulin resistance¹⁶, than weight-matched control subjects¹⁷. Insulin resistance and Excess androgen due to hormonal imbalance are important factors in pathogenesis¹⁸.

Insulin resistance is worsened by the coexistence of obesity, which is also increased in the PCOS population¹⁹. More than 40% of PCOS patients are obese^{20,21}.

However, the pathophysiology of depression and mental stress during PCOS is linked to various changes that include psychological changes such as high activity of pro-inflammatory markers and immune system during stress²².

METHODS & MATERIALS

This prospective cross sectional study was conducted among 120 young PCOS patients who attended the OPD of ZHSWMCH and medinova consultation center between 1st January 2020 to 1st January 2020.

Written consent was taken from all patients & ethical approval was taken from the hospital at the beginning of the study.

The diagnosis of PCOS was done according to 2003 Rotterdam criteria including evidence of chronic oligo or anovulation (irregular menses, amenorrhea, oligomenorrhea), hyperandrogenism (Obesity, hirsutism, acne, acanthosis nigricans and polycystic ovaries in USG (peripherally placed follicle of 8-10 mm in necklace pattern and increased volume of stroma). Also metabolic syndrome (MS) N=50 were picked up from them. MS was diagnosed according to IDFC (International diabetic federation criteria) and they were grouped in B. PCOS without metabolic syndrome A=70.

All participants completed the 12-item version of General Health Questionnaire (GHQ-12), 36-item short-form health survey (SF-36),

Beck Depression Inventory (BDI), and State-Trait Anxiety Inventory (STAI). The GHQ-12 was developed as a reliable and valid aid to measure current mental states^[6,7] and comprises 12 items; each having a 4-point scale ("never," "a few times," "several times," and "always") scoring from 1 to 4, with a total score of 12 to 48. Lower scores indicate healthier

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mental states. Psychological morbidity was defined as scoring >27, and scoring no more than 27 was considered “normal.” The BDI was administered to assess the severity of depression and is a self-report inventory comprised 21 multiple-choice questions, each scored from 0 to 3. Questionnaires were given to patients based on the most current version, mild, moderate, and severe depression were defined by scores of 5–8, 9–16, and >16, respectively. “Not depressed” was defined as scoring no more than 4. Based on the *Diagnostic and Statistical Manual of Mental Disorders-4th Edition* criteria of depression, its reliability and validity has been attested²³.

The severity of anxiety was assessed by the Dutch version of the STAI, a self-report scale including 2 separate subscales: the State-Anxiety Inventory (SAI) comprised 20-item, where each item is scored on a 4-point scale of frequency from 1, “never,” to 4, “always.” Participants were asked to choose the most appropriate frequency statement based on their current feelings. Based on a total score ranging from 20 to 80, SAI scores >55 indicated state anxiety²⁴. Hirsutism was assessed according to the Ferriman-Gallwey (F-G) standard, and F-G scores >5 were considered as evidence of hirsutism. The exclusion criteria were suffering any other conditions except infertility; being in treatment for psychiatric disorders;

being pregnant or lactating; BMI was measured by taking height and weight Kg/ht (m)².

Data was collected and analyzed by SPSS, $p < 0.5$ was taken as significant.

RESULTS

Primary outcome - To measure and compare psychological distress among PCOS with MS and without MS

Secondary Outcome - Incidence of MS among PCOS Hirsutism.

38% of PCOS women suffer from some form of psychological disturbances. PCOS with MS had marked incidence of mental distress (80%) according to GHQ-12.

More PCOS women without MS can cope with this condition [psychologically normal] [64.3% vs 20% $p = < .001$]. PCOS with MS had more mental distress than PCOS with out MS [80% vs 35.7%, $p = < .0001$] Incidence of depression [7.1% vs 38%, $p = .002$], anxiety [28.6% vs. 56%, $p = < .002$] and Bipolar [0 vs 3%, $p = < 0.002$] were much in PCOS with MS. Again eating disorder (74% vs. 55.7%, $p = < 0.101$) & Hirsutism (30.4% vs 54%, $p = 0.481$) was higher in PCOS with MS but, not statistically significant.

Table 2. Basic Information PCOS patients

	PCOS without MS=70	PCOS with MS=50
Age	15.80+-3.8	16.0+-35
Menarche	12.4+-1.0	11.0+-1.3
Hirsutism	10.0	13.0

Table 3. Educational status of all PCOS Women.

Educational status	PCOS without MS, N=70	Percent	PCOS with MS, N=50	Percent	p- value
Undergraduate	41	58%	35	70%	0.199
Graduate	29	41.45%	15	15%	0.199

Table 4. BMI of all PCOS Women

BMI	PCOS without MS, N=70	Percent	PCOS with MS, N=50	Percent	p-value
>30	20	28.6%	28	56%	.002
25-30	45	64.3%	22	44%	.002
<25	5	7.1%	0	0	.002

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Table5. Mental state according to General health questionnaire -12 items version.

Mental coping with GHQ-12	PCOS without MS, N=70	Percent	PCOS with MS, N=50	Percent	p-value
GHQ-12 <27	45	64.3	10	20	<.001
GHQ-12 >27	25	35.7%	40	80%	<.001

Table6. Incidences of Psychological disturbances

Events	PCOS, without MS, N=70	Percentage	PCOS with MS, N=50	Percentage	p-value
Depression	5	7.1	19	38.0	0.002
Anxiety	20	28.6	28	56	0.002
Eating disorder	39	55.7	37	74	0.101
Mood fluctuation	31	43	13	26	0.101

DISCUSSION

The psychological impact of PCOS has become major concern with in healthcare industry for adolescents and women who suffer from PCOS with its long-term complication from this syndrome²⁵. The clinical concern such as depression, social isolation, anxiety, mood disorders are result of many of psychological changes that are experienced by adolescents and women with PCOS. Therefore PCOS should be viewed as a major concern of psychological health due to lifelong overwhelming psychological effects²⁶.

In our study, the prevalence of mental disorders as assessed by the GHQ-12 was found in 35.7% in the PCOS without MS group, but 80% in PCOS with MS, which is significantly higher. Depression (7.1%) and anxiety (56%) were found in group B. Incidences of both depression and anxiety were significantly higher in PCOS women with MS compared to PCOS without MS. Our study is similar to the study of Cinar et al and others^{27,28,29} who showed PCOS suffer more from mental problems. Though most of the studies compared between PCOS and non PCOS group unlike ours one where we tried to study to look at PCOS and PCOS with MS. Incidence of hirsutism was 13 v/s 23 among group A and Group B. In our study who had hirsutism they had some mental agony but we did not found any major psychological disorder. Similarly Jing Tan et al in his study showed that hirsutism did not produce any major psychological disorder. On the contrary, in some studies showed hirsutism were reported as independent predictors of dissatisfaction with self-image and depression^{9,30}.

Regarding infertility PCOS (n=36) regardless of

MS, all who suffered from infertility showed more psychological distress (GHQ-12>27) and women feel greater pressure but again we did not find any major Psychological disorders (depression and anxiety), probably because our study population was small. Increased pressure and disturbed stress responses result in higher risks of psychiatric disorders and decreased quality of life in PCOS with infertility was found in the study of Benson et al³¹. It is shown that the prevalence of metabolic syndrome is as high as 33% in women with PCOS⁷, and is associated with long-term consequences such as cardiovascular disease (CVD), diabetes type II, dyslipidaemia, different types of cancers, sleep apnoea, stroke and psychological problems. We have 50 women having MS among 120, PCOS women, which is quite high. Also we found major psychological disorders both depression and anxiety were significantly higher in MS group, probably this is the 1st study of comparison among MS and without MS group of PCOS women.

PCOS is a common complex condition in women associated with psychological, reproductive and metabolic disturbances. The study of Cipkala –Gaffin et-al showed in Brazilian study that PCOS suffer from 58% depression, 78% behavioural changes, 26% major depression and 11% bipolar disorder³². The evidence-synthesis analysis showed that PCOS diagnosis is associated with an increased risk of moderate and severe depressive and anxiety³³. Along with these researches our study clearly reflected that PCOS is associated with mental disorders and MS, therefore assessment of MS and mental status is very important for holistic management of PCOS women to prevent long-term disasters.

Drawback of our study is patients were recruited from one hospital and from one consultation centre instead of multicentre. Second, the study sample was small and cannot be used to analyse the effects of PCOS from rural areas. To get more information, a multiple centre survey with a larger sample study is required.

CONCLUSION

Despite its high prevalence, psychological distress among PCOS is a neglected entity; this distress is more evident in PCOS having metabolic syndrome so meticulous assessment of metabolic syndrome and mental health for all PCOS is important. PCOS results in a reduced quality of life and an increased risk of mental disorders, such as depression and anxiety. Metabolic syndrome in PCOS is associated with long-term complications.

Multiple mechanisms have been proposed for the evolution of psychological disorder & metabolic syndrome in PCOS. No doubt this issue warrants much research. However both metabolic syndrome and psychological disorders need to be screened routinely among all PCOS women to enable earliest diagnosis and to institute holistic treatment thereby preventing the devastating consequences.

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