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Psychological Implications of Poly Cystic Ovary Syndrome: Depression, Anxiety, Stress, Body Satisfaction, Self-Esteem, and Quality of Life

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Abstract

Poly Cystic Ovary Syndrome (PCOS) is an endocrine disorder commonly affecting women of reproductive age. Along with a large variety of physical symptoms, PCOS also comes with many psychological issues. This study aimed at developing an overall understanding of the mental health of women suffering from PCOS in India, by comparing it to those without PCOS. The major objectives of the study were to compare depression, anxiety, stress, self-esteem, body satisfaction, and quality of life of women with and without PCOS. Sixty-five women who met the Rotterdam criteria and fifty-nine controls without PCOS participated in this study. t-test was used to compare the scores of PCOS and non-PCOS groups. Results showed that women with PCOS had significantly higher scores in depression, anxiety and, stress, lower scores in self-esteem, body satisfaction and, physical, psychological domains of quality of life, in comparison to women without PCOS. No significant difference was observed for the social and environment domains of quality of life. The results of the study point towards the need for a holistic approach to the treatment of PCOS that involves the integration of both physical and psychological aspects of PCOS.

Introduction

Poly Cystic Ovarian Syndrome (PCOS) is a metabolic, reproductive, and hormonal disorder that affects women of reproductive age and is now more common among women than ever before. Only a few studies have been conducted in India regarding the prevalence of PCOS. With the limited amount of information available, Indian Fertility Society reported the prevalence

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of PCOS to range from 3.7 to 22.5 per cent (Malik et al., 2014). The most common symptoms of PCOS are menstrual irregularities, lack of ovulation causing infertility, insulin resistance, diabetes, weight gain, excessive hair growth on body and face (hirsutism), baldness, acne, increased risk for cancer, acanthosis nigricans and the list goes on (Ramanand et al., 2013). Endocrine Society suggests physicians use the 2003 'Rotterdam criteria' to diagnose PCOS (Legro et al., 2013). According to this, to diagnose a woman with PCOS, she should have at least two of the following symptoms: polycystic ovaries observed in ultrasound, menstrual irregularities or ovulatory problems, and hyperandrogenism (Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group, 2004).

Most of the research has gone into understanding the physical manifestation of PCOS. Only a few studies focus on the mental health aspect of PCOS. A study conducted by Chaudhari et al. in 2018 found that the prevalence of anxiety and depression was 38.6% and 25.7% among Indian women with PCOS. Other studies have also shown that women with PCOS are three times more likely to report anxiety compared to women without PCOS (Blay et al., 2016). Asdaq & Yasmin (2020) found that the odds of developing stress were significantly higher in PCOS cases compared to control participants. Studies have also shown that various symptoms of PCOS cause women to have lower self-esteem (Açmaz et al., 2013; Bazarganipour et al., 2013). Furthermore, research has also found that women with PCOS experience higher body image issues compared to healthy controls (Himelein, 2006; Bazarganipour, 2013; Deeks et al., 2011). All of these issues further result in lower quality of life, specifically in the domains of physical health, psychological aspects, and social relationships. A study by Månsson et al. (2008) revealed that suicide attempts were seven times more common in the PCOS group than in the control group. Hence, it is of absolute importance to understand the mental health of women with PCOS considering more and more women are being diagnosed with the same. The hormonal imbalance in PCOS could be causing mood disturbances and anxiety in women with PCOS. However, the symptoms associated with this condition like infertility, facial hair, obesity, thinning of scalp hair, and acne are more likely to contribute to depression, anxiety, and stress and would eventually lead to body dysmorphia,

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lower self-esteem, and lower quality of life. Most often physicians who see patients with PCOS do not enquire about their psychological difficulties. On the other hand, physicians who see patients for psychological problems may not ask about features of PCOS that may be causing their difficulties (Doretto et al., 2020). Understanding the mental health impact of PCOS, its symptoms or even the effects of medicine used to treat them, needs to be of top priority.

Only a very few studies have been conducted in India to understand the mental health impact of PCOS. This study has tried to provide a comprehensive understanding of PCOS by evaluating all possible psychological difficulties that women may go through due to PCOS. Considering more women are being diagnosed with PCOS in India, it is imperative to understand the psychological side effects of the condition, making this study relevant.

Method

A case control approach was used to understand the psychological effects of PCOS by comparing scores of depression, anxiety, stress, self-esteem, quality of life and body satisfaction in PCOS and non-PCOS group. For this, survey methodology, using self-rated questionnaires, was employed. Based on previous research findings, the following hypothesis was formed, "there will be significant difference between PCOS and non-PCOS group for depression, anxiety, stress, self-esteem, body satisfaction and for physical, psychological and social domains of quality of life." Since there was no significant difference between PCOS and non-PCOS group for socio-economic status, it was assumed that there will be no significant difference between both groups in the domain of environment.

Sample

PCOS group included non-menopausal, non-pregnant Indian women aged between 19-45 years, with a diagnosis of PCOS according to the Rotterdam criteria or an official diagnosis of PCOS from a physician and have given consent to participate. Non-PCOS group included non-menopausal, non-pregnant women within 19-45 years of age, who are not known to have PCOS

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or any other endocrine or metabolic disturbances that might be related to or confused with PCOS and are willing to participate in the study.

Table 1: *Comparison of socio-demographic characteristics of PCOS and non-PCOS group*

Characteristics		**Groups**		***p***
		PCOS	*Controls*	
Age mean (SD)		24.10 (6.22)	23.75 (4.59)	.722[a]
BMI (kg/m^2) mean (SD)		22.15(3.909)	23.79 (5.63)	.069[a]
Education (%)	High school	4.61%	3.38%	.406[b]
	Diploma	0%	1.69%	
	Graduate	46.1%	32.20%	
	Post graduate	41.53%	52.54%	
	Professional	7.69%	10.16%	
Employment	Student	60	72.88	.354[c]
	Unemployed	21.53	13.55	
	Employed	18.46	13.55	
Marital status	Married	12.30	11.86	.887[b]
	Unmarried	87.70	88.13	
Socio-economic-status	Upper class	1.53	3.38	.553[b]
	Upper middle	70.76	59.32	
	Lower middle	24.61	35.59	
	Upper lower class	3.07	1.69	

a: t-test, b: Fisher exact test, c: Chi-square test

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A total of 124 women (65 with PCOS and 59 non-PCOS), aged 19-45 years (mean=24.10) participated in the study. There was no significant difference in age (t= .356, p=.722), BMI (t=1.838, p=.069), education (p=.406), employment ($\chi 2$ =2.347, p=.354), marital status (p=.887) and socio-economic status (p=.553) of PCOS and non-PCOS group (Table 1).

Procedure

An online survey form, with all the questionnaires combined, was created. Self-administered questionnaires were used in this study, since it provides anonymity and has the advantage of economy, lack of research bias and speed. Only those who voluntarily agreed to participate filled the form. Participants who met the criteria for PCOS were included in the PCOS group, and the participants who did not meet this criteria were included in the non-PCOS group. From these groups, only the participants who met the inclusion criteria and did not meet the exclusion criteria were selected.

Materials

A socio-demographic sheet, Rotterdam criteria for PCOS (Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group, 2004), Depression, Anxiety, Stress Scale (DASS 21; Lovibond & Lovibond, 1995), Rosenberg Self Esteem scale (Blascovich et al., 1991), WHO Quality of Life scale- BREF and Body Area Satisfaction Scale of the Multidimensional Body Self Relations Questionnaire (MBSRQ; Cash, 2000) were the materials used in this study.

Statistical analysis

Socio-demographic data of the two groups were compared using student's t-test for two independent means, for continuous variables. For categorical variables, chi-squared test or Fisher exact test (if expected frequency of cell is below five) were used. In addition, mean, standard deviation and percentages were also used to describe the sample characteristics. t-test was used to compare the scores of depression, anxiety, stress, self-esteem, body satisfaction and quality of life of women with and without PCOS.

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Result

Summarized in Table 2 is a comparison of scores of depression, anxiety, stress, body satisfaction, self-esteem and quality of life, obtained by PCOS and non-PCOS group. The hypothesis, there will be significant difference between PCOS and non-PCOS group for each of these variables, was tested using t-test.

Table 2: *Comparison of scores of PCOS and non-PCOS group*

	N	Mean	*SD*	*t*	*df*	*p*
Depression						
PCOS	65	9.91	4.729	-6.419	122	.000**
Non-PCOS	59	4.69	4.268			
Anxiety						
PCOS	65	6.88	4.364	-5.783	118.643	.000**
Non-PCOS	59	2.86	3.335			
Stress						
PCOS	65	7.80	5.807	-4.795	116.047	.000**
Non-PCOS	59	3.47	4.170			
Body satisfaction						
PCOS	65	29.32	7.810	3.695	114.754	.000**
Non-PCOS	59	33.76	5.459			
Self esteem						
PCOS	65	27.54	6.083	2.787	122	.006**
Non-PCOS	59	30.34	4.985			
Quality of life						
Domain 1 (physical health)						
PCOS	65	62.78	17.28	2.942	122	.004**

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Non-PCOS	59	71.10	13.78			
Domain 2 (psychological)						
PCOS	65	52.25	21.08	4.101	122	.000**
Non-PCOS	59	68.25	22.37			
Domain 3 (social relationships)						
PCOS	65	67.12	17.38	-.317	122	.752
Non-PCOS	59	66.17	16.02			
Domain 4 (environment)						
PCOS	65	70.66	15.06	.710	122	.479
Non-PCOS	59	72.56	14.63			

Based on the results of t test and mean scores, it can be seen that PCOS group scored significantly higher for depression (M =19.81, SD =9.45 versus M =19.81, SD =9.45, t(122) = -6.419), anxiety (M = 13.75, SD = 8.72 versus M = 5.72, SD = 6.67, t(118.643) = -5.783) and stress (M = 15.6, SD = 11.61 versus M = 6.94, SD = 8.34, t(116.047) = -4.795). The results also show that PCOS group has lower body satisfaction (M = 29.32, SD = 7.810 versus M = 33.76, SD = 5.459, t (114.754) = 3.695) and self-esteem (M = 27.54, SD = 6.083 versus M = 30.34, SD = 4.985, t (122) = 2.787) than non-PCOS group. When it comes to quality of life, PCOS group scored significantly lower in domain 1, that is, physical health (M = 62.78, SD = 17.28 versus M = 71.10, SD = 13.78, t (122) = 2.942) and domain 2, that is, psychological (M = 52.25, SD =21.08 versus M = 68.25, SD = 22.37, t (122) = 4.101). No significant difference was observed between PCOS group (M = 67.12, SD = 17.38) and non-PCOS group (M= 66.17, SD= 16.02) in domain 3 (social relationships) and no significant difference between PCOS group (M = 70.66, SD = 15.06) and non-PCOS group (M=72.56, SD= 14.63) in domain 4 (environment).

Discussion

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The present study aimed at understanding the mental health impact of PCOS. Depression, anxiety, stress, body satisfaction, self-esteem and quality of life of 65 women with PCOS and 59 women without PCOS were compared.

Poly Cystic Ovary Syndrome (PCOS) is an endocrine disorder commonly affecting women of reproductive age. It is a syndrome causing wide range of difficulties. The most common symptoms are menstrual irregularities, infertility, insulin resistance, diabetes, weight gain, excessive hair growth on body and face (hirsutism), baldness, acne, increased risk for cancer, acanthosis nigricans and so on (Ramanand et al., 2013).The hormonal imbalance in PCOS could be causing mood disturbances and anxiety in women with PCOS. However, the symptoms associated with this condition like infertility, facial hair, obesity, thinning of scalp hair and acne are more likely to contribute to depression, anxiety, and stress and would eventually lead to body dysmorphia, lower self-esteem and lower quality of life.

The results of this study showed that PCOS group had greater depression than non-PCOS group. Several other studies have also shown a similar result (Asdaq & Yasmin, 2020; Deeks et al., 2011; Månsson et al., 2008; Alur-Gupta et al., 2019; Annagür et al., 2014; Pastore et al., 2011).Some Indian studies have also found an increased level of depression in PCOS than in non-PCOS cases (Pal-Kaur et al., 2019; Bhattacharya & Jha, 2010). Researchers are still trying to find out the underlying mechanism that binds depression with PCOS. A biological explanation to this could be the hormonal changes in women with PCOS. Study by Weber et al. (2000) observed an increased level of testosterone in women with depression. In women with PCOS, excess of androgen causes insulin resistance, which increases the level of insulin in blood (Rasgon et al., 2003). Increased level of insulin stimulates the ovaries to produce testosterone, which could be associated with depression (Annagür et al., 2013). Moreover, the symptoms associated with PCOS are likely to be responsible for greater rate of depression among women with PCOS. Hirsutism, baldness, infertility, dark patches in skin, weight gain can all contribute to depression.

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It was also found that there was a significant difference in the scores of PCOS and non-PCOS group for anxiety, with the PCOS group scoring greater than non-PCOS group. Previous studies have found that women with PCOS are three times more likely to report anxiety in comparison to women without PCOS (Blay et al., 2016). Many studies have found that anxiety is significantly higher in PCOS group in comparison to non-PCOS group (Pal-Kaur et al., 2019; Asdaq & Yasmin, 2020; Deeks et al., 2011; Månsson et al., 2008; Alur-Gupta et al., 2019). Similar to that of depression, the relation between PCOS and anxiety is unclear. However, two major explanation to this relation include; anxiety caused due to biological changes and anxiety caused due to the symptoms of PCOS. A study by Manti et al. (2018) conducted on PCOS mouse model found that maternal androgens can influence anxiety in offspring. Research has also shown that corticotrophin releasing hormone (CRH) contributes to the expression of anxiety related behaviors (Arborelius et al., 1999). In PCOS cases, there is a hyperactivity of the HPA axis leading to increased levels of CRH and cortisol, which may contribute to anxiety (Wang et al., 2017). In addition, even the diagnosis of PCOS can bring lots of anxiety. The uncertainty regarding the treatment, insensitive attitude of the doctors, fear of being infertile, fear of judgment from others for their symptoms, anxious about getting a good marriage alliance or fear of having marital discord due to the 'infertile' aspect of PCOS, anxious about having serious conditions in the future and so on makes their mental health worse.

As expected, a t-test comparing the scores of stress of PCOS and PCOS group found a significant difference between the two groups, with PCOS group scoring higher than non-PCOS group for stress. It has been found that the endocrine system is more sensitive in women with PCOS due to hyperactivity of HPA axis, because of which, even small amount of stress could have greater impact (Benson et al., 2008; Barry et al., 2011). Hyperactivity of HPA axis can cause prolonged elevation of cortisol levels, which can affect the immune system, worsen insulin resistance and thereby lead to excess production of androgen hormones. Stress can also affect certain hormones produced by the brain such as include Luteinizing Hormone (LH), Follicle Stimulating Hormone and prolactin, which results in irregular menstrual cycle (Schliep et al.,

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2015). Thus, women with PCOS are more prone to stress and being stressed results in increased severity of symptoms. Being diagnosed with a chronic illness such as PCOS itself can be stressful. Difficulty in conceiving a child or the marital discord that comes along with it can add to this stress. Doing everything possible to manage PCOS and yet not seeing observable changes in weight or regularity of menstrual cycle can be a stressor. Getting constant comments about body weight, hair loss, acne or facial hair can also add to stress. Thus, it is important to incorporate stress management practices while taking treatment for PCOS.

Statistical analysis has also shown that women with PCOS have significantly lower body satisfaction compared to women without PCOS. It was important to note that there was no significant difference in the body mass index of PCOS and non-PCOS group, indicating that PCOS group experienced greater body dissatisfaction even after controlling BMI. Thus, being overweight is not the only issue that makes them dissatisfied with their body. Body hair, acne, dark patches in skin, hair loss, facial hair can all contribute to it. Previous researches have shown that women with PCOS experience greater body image issues compared to healthy controls (Himelein, 2006; Bazarganipour, 2013; Deeks et al, 2011). The major issue of most women with PCOS is that they are finding it difficult to achieve the socially constructed feminine ideals.

It was also found that women with PCOS has significantly lower self-esteem compared to those without. The major reason that can be attributed to the poor self-esteem in women with PCOS is the physical manifestation of the condition. Gaining weight, acne, facial hair, male pattern baldness, dark patchy skin, all of which can make them feel self-conscious and insecure about themselves. Chances of being infertile can make them question their worth and identity as a 65 women. It can make them feel inadequate. Moreover, PCOS increases the risk of having conditions like endometrial cancer, diabetes and cardiovascular issues (Daniilidis & Dinas, 2009). The possibility of suffering from these conditions at a young age or the fear of developing them in future can affect their self-worth. Low self-esteem can also lead to increased body dissatisfaction, which further becomes a risk factor for developing eating disorders (Tay et al, 2019).

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The quality of life measure used in this study had four domains; physical health, psychological domain, social relationships and environment. The issues associated with PCOS are likely to lower quality of life, specifically in the domains of physical health, psychological aspects and social relationships. However, it is unlikely that the environmental domain of quality of life gets affected, as it includes financial resources, transport, physical and home environment, which may not differ for those with and without PCOS. From Table 2, it can be observed that there PCOS group scored significantly lower compared to non-PCOS group in the domains of physical health and psychological domain. Whereas, no significant difference was observed between both the groups for the domains of social relationship and environment.

According to World Health Organization, quality of life includes 4 main domains. The scores of two domains significantly differed in PCOS and non-PCOS group, which are; physical health, that involves energy, pain, sleep, use of medical aids and ability to work. The other one is psychological domain, that includes self-esteem, body image, learning, spiritual beliefs, memory, thinking and concentration (Whoqol Group, 1998). Participants with PCOS scored the least in this domain. As mentioned before, PCOS can take a toll on physical as well as mental health. In addition to the physical symptoms of PCOS, it also increases the chances of having long term adverse health problems such as diabetes, cardiovascular issues, increased risk of obesity and even cancer (Franks, 1995). Also, the symptoms and associated co-morbidities of PCOS worsens the mental health of the individual. Coping with PCOS, fears about being infertile, loss of femininity, body dissatisfaction and low self-esteem can lead to poorer mental health outcomes. Thus, it is obvious that both physical and psychological domain of quality of life will be poorer in women with PCOS.

The two domains that did not significantly differ in both groups were social relationships and environment. Social relationships domain is concerned with personal relationships, social support and sexual activity (Whoqol Group, 1998). It was assumed that the social relationships of women with PCOS would be affected since they might be concerned with their appearance,

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causing them to interact less with their friends or family. Constant negative comments made by relatives could also prevent them from stepping out of their comfort zone. Previous studies have also shown that women with PCOS scored low in the social relationship domain (Prathap et al., 2018). On the contrary, no difference was observed in the social relationship domain of women with and without PCOS group, in the current study. This could indicate that women with PCOS in this study received adequate social support. It is also important to be noted that only three questions were included in this domain. These three questions focused on personal relationships, support from friends and sex life. Perhaps, if a comprehensive questionnaire, that included questions on support from parents, relatives, social isolation or social interaction, was used to measure the social relationship domain, the results would have been different. As expected, there was no significant difference in the scores of PCOS and non-PCOS group for the environment domain. A similar result was observed in Kumarapeli et al.'s (2011) study. The major aspects that come under this domain are financial resources, safety, freedom, security, accessibility to quality health care, good environment at home, opportunities for recreation, good quality physical environment, and accessible transport system (Whoqol Group, 1998). Having an illness such as PCOS is less likely to impact these aspects of life, and hence the lack of difference between PCOS and non-PCOS group is warranted. Moreover, this result can also be explained by the absence of significant difference in both groups in terms of socio-economic status, which directly or indirectly may have an effect on the environment domain. Scores of both PCOS and non-PCOS group were highest for the environment domain, suggesting that their quality of life, in terms of the environment they live.

Limitations and suggestions for future research

The sample size of this study was small, compared to some large scale studies. Exploration of finer nuances of experiences of women with PCOS were not undertaken. Future research could include more participants from diverse regions of the country, from different socio-economic classes. The results of holistic approach to treating PCOS can be studied and compared with the traditional approach. Further research could also focus on which aspects or symptoms of PCOS

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contributes most to different psychological issues. Additionally, biological basis of the association between depression, anxiety, stress and PCOS can also be looked upon.

Conclusion

The findings of this study confirm the results obtained in many previous studies that PCOS has an impact on mental health. The clinical implication of this study is that physicians treating women with PCOS should be aware that these women are a high risk group for depression, anxiety and stress. In addition to the medical treatments provided for improving PCOS-related physical symptoms, it is worth considering the integration of psychological counseling to further improve quality of life of women with PCOS. All women with PCOS who are admitted to a gynecology outpatient clinic should be screened for psychological conditions like anxiety and depression. The effective interventions might include patient education about PCOS and its long-term impact, successful implementation of early improved lifestyle changes, stress management and treatment of physical features of PCOS.

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