

## QUALITY OF LIFE IN WOMEN WITH POLYCYSTIC OVARIAN SYNDROME: REQUISITE OF CLINICAL PHARMACIST INTERVENTION

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### ABSTRACT

**Objective:** Polycystic ovarian syndrome (PCOS) is a lifestyle disorder known to cause profound distress in the physical and emotional well-being of the patient that implicates the need for treatment and lifestyle management. Unawareness and ignorance among patients may be a predominant cause of compromised quality of life (QOL) that necessitates education from health-care professionals. The existing study was designed to assess the impact of counseling on QOL in the above patients.

**Methods:** This hospital-based interventional study was carried out for 6 months. A total of 173 subjects were recruited for the study. The World Health Organization BREF, a validated, reliable tool to assess QOL was administered in two phases of the study, pre-interventional, and post-interventional phase. Awareness regarding disease and lifestyle modification were detailed by a clinical pharmacist to the patients, and its impact was assessed using suitable statistical techniques.

**Results:** The average age of study participants was 23.9±4.5 years. Decreased QOL was observed in the women affected with PCOS when compared to healthy controls, wherein the psychological domain was the most affected. Post-intervention, a positive impact was reflected as higher scores in all the 4 QOL domains.

**Conclusion:** Women suffering from PCOS exhibit varied symptoms which affect both physical and psychological health. The key factor in management is to create awareness on the complications of the disease and the lifestyle modification to minimize severity and progression. The study findings reveal that women with PCOS showed an improved QOL post participation in awareness programs imparted by the clinical pharmacists.

**Keywords:** Polycystic ovarian syndrome, Quality of life, Intervention.

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### INTRODUCTION

Polycystic ovarian syndrome (PCOS) is an emerging lifestyle disease that the public is largely unaware of and that health-care providers do not seem to fully understand. The global prevalence of PCOS is highly variable, ranging from 2.2% to as high as 26% [1]. PCOS is the most mutual endocrine condition among women of reproductive age [2].

It is considered as a multifactorial condition possessing polygenic pathology that manifests with a varied spectrum of signs and symptoms that are related to the disturbances of reproductive, endocrine, and metabolic functions [3]. Thus, involvement of various organ systems at different degrees results in a heterogeneous presentation of the disease. PCOS, an endocrine disorder with no known cure, is the leading cause of female infertility worldwide. The negative widespread effects of PCOS on the physiology and metabolism of the body have led to its recognition as a metabolic syndrome with detectable abnormalities and its serious long-term consequences [4]. Changes in appearance, irregular or absent menstrual periods, difficulties conceiving, and possibly disturbances in sexual attitudes and behavior which remains as the presentable symptoms result in psychological distress [5,6]. Women of childbearing age with PCOS have demonstrated higher rates of mood disorders, including bipolar disorders, depression, anxiety (5–8%), and lower quality of life (QOL) scores than healthy women [7,8]. Few studies have undertaken the issue of the functioning of women with PCOS. However, there is empirical evidence that the accompanying changes in the body's appearance and reproductive organ dysfunctions can affect women's sense of self and lead to frustration, depression, and problems with self-acceptance [9].

The World Health Organization (WHO) defines QOL as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns [10]. The concepts of QOL and quality-adjusted life years in chronic diseases are still emerging concepts in India. The WHOQOL-BREF is a short version of the WHOQOL questionnaire, assessing the QOL of ill or healthy individuals. WHOQOL was adapted to more than 40 cultures in the world. WHOQOL-BREF has four broad domains, namely: Physical, psychological, social relations, and environmental domains. The instrument assesses satisfaction with life as well as the impact of disease or illness, and it captures positive and negative aspects of QOL. Health-related QOL (HRQoL) estimation encourages the assessment of the viability of medical interventions and furthermore identification of groups at risk for psychological or behavioral problems [11].

In this regard, we aimed to study the present QOL status in woman with PCOS in our setup. The findings of this study would beckon the much-awaited avenue of holistic care of the disease with equal importance to the mental well-being and QOL in patients with the disease.

### METHODS

#### Subject recruitment

This hospital-based prospective observational study was approved by the Institutional Ethics Committee (Registration No: ECR/215/Inst/KA/2013/RR-16) and was carried out for a period of 6 months at a tertiary care hospital in Bengaluru. Patients were recruited based on inclusion criteria from the outpatient clinics of the department of endocrinology based on referrals from gynecologists and dermatologists. The study

subjects were selected based on the criteria derived from the 1990 National Institutes of Health conference [12] for diagnosis of the PCOS by simple random technique and were categorized into two groups wherein healthy volunteers of reproductive age group were randomly recruited to serve as control. While patients in the test group were included, if they presented with either oligomenorrhea (cycles lasting longer than 35 days) or amenorrhea (absence of menstrual cycles in the past 6 months) or clinical signs of hyperandrogenism (hirsutism with a Ferriman/Gallwey score of more than 7 [17] or obvious acne) or an elevated total testosterone (normal range – 2.0 nmol/l). Patients with pituitary, adrenal, or ovarian diseases were excluded as they mimic the symptoms of PCOS [13]. Informed consent form was obtained from all the study participants and parents/legal representatives were approached in case of minor subjects. Patient's case sheets were thoroughly studied for medical history, medication history; physical and gynecological examination and anthropometric assessment, i.e., body weight and body mass index (BMI) were carried out.

A clinical review was done to cross verify the above details obtained from the patient.

Patients were later administered WHOQOL-BREF questionnaire to evaluate the QOL in the beginning and at the end of the study. WHOQOL-BREF is the abbreviated version of the original WHOQOL instrument. While the long-form includes 100 items, WHOQOL-BREF has 26 items with a five-point Likert type response scales-generic QOL instrument. It was developed by WHO as a multilingual, multidimensional profile of QOL for cross-cultural use [14,15].

The physical health space incorporates questions relating to sleep, energy, the degree to which pain hinders with normal day to day activities, ad level of fulfillment with their ability for work. The psychological domain centers around the capacity to think, confidence, self-perception, the degree to which they feel their life is important, the recurrence of positive or negative sentiments, i.e., blue state of mind, despair, nervousness, and sadness. The social relationships domains involve questions relating to involvement in relationships, social support system, and sexual fulfillment. The fourth space, the environment, incorporates questions identified with well-being and security, home and physical condition fulfillment, back, i.e., does the respondent have enough cash to address their issues, wellbeing/social care accessibility. The WHOQOL-BREF contains five Likert style response scales: "Very poor to very good" (evaluation scale), "very dissatisfied to very satisfied" (evaluation scale), "none to extremely" (intensity scale), "none to complete" (capacity scale), and "never to always" (frequency scale). One can receive a maximum of 20 points within each of the domains. The results of the particular spheres have a positive direction – the greater the number of points, and the greater the QOL.

After initial recruitment of patients in respective groups, On day 1 a clinical pharmacist intervention was planned through preparation and provision of tailor-made counseling content in both English and local language Kannada according to the needs of individual patients. Counseling was provided through telephonic call and personal interview. Patients were provided with patient information leaflets for better understanding of the disease and tip to reduce the prognosis of the condition. The patients were followed up in their subsequent visits in outpatient department. Those patients who failed to come for visit were contacted through phone. A 3-month gap was provided after which the questionnaire was re-administered to analyze the response shift of their understanding from pre- to post-educational programs. Pre- and post-questionnaire scores were transformed into Excel Sheet for further statistical analysis.

Confidentiality, anonymity, and professional secrecy were maintained during and after the study. The informed consent form was obtained from all the study participants, and parents/legal representatives were approached in case of minor subjects.

### Statistical analysis

Statistical analysis was performed using software Statistical Package for the Social sciences IBM SPSS® version 20.0, Armonk, New York. The Kolmogorov–Smirnov test was used to test the normality of distribution for relevant demographic and clinical characteristics. Student's *t*-test was applied to compare each of the domains indicating the health-related QOL of PCOS participants compared to healthy individuals. The clinical characteristics of those affecting appearance, i.e., acne, hirsutism, and obesity, were scored and compared for each domain of the WHOQOL-BREF using a one-way analysis of variance (ANOVA). The differences between subcomponents of each characteristic were analyzed using Chi-square test. A minimum  $p \leq 0.05$  was considered statistically significant for all inferential statistics. Multiple regression analysis was conducted to determine the predictors of QOL.

### RESULTS

A total of 173 subjects were included in the study among which 83 were subjects who met the exclusion criteria and 90 subjects were controls. Table 1 shows the patient's characteristics. The average age of participants was  $23.9 \pm 4.5$  years. Most women, i.e. 85% reported an education level with or above the diploma level. Close to half of the participants were students and nearly half of them were married in the study group. The largest group (32; 38.5%) consisted of women between 21 and 25 years; the youngest participant was of 16 years old. Mean menarchal age was  $12.72 \pm 1.38$  years.

Average BMI was  $29.1 \pm 6.35$  kg/m<sup>2</sup>; 31.3% and 40.9% of the participating women were overweight and obese, respectively. About 59% followed a non-sedentary lifestyle. In many cases, irregularity of menstrual cycles (77%) was one of the first reasons for seeking treatment followed by hirsutism (48%) and weight gain (42%). Hypothyroidism was the most common condition which was found in 49% of the patients while 46% of them had Type 2 diabetes mellitus. Thyroid function tests were

Table 1: Study subjects demographics

Patient characteristics	Study subjects (n)	Control (n)	p value
Age group in years			
10–15	1	0	0.324
16–20	13	25	
21–25	32	56	
26–30	21	8	
31–35	13	1	
36–40	3	0	
Marital status			0.157
Married	43	34	
Unmarried	40	56	
Working status			0.157
Working	39	46	
Not working	44	44	
BMI			0.000
Underweight < 18.5	3	18	
Normal 18.5–24.9	18	51	
Overweight 25–29.9	28	14	
Class 1 obesity 30–34.9	21	7	
Class 2 obesity 35–39.9	9	0	
Class 3 obesity > 40	4	0	
Lifestyle			0.157
Sedentary	34	49	
Non sedentary	49	41	
Age at menarche in years			0.199
Below 10	3	1	
11–15	75	87	
16–20	5	2	
Comorbid conditions			0.287
Hypothyroidism	41	0	
Type 2 diabetes	38	0	
Hypertension	3	0	
Others	1	0	
Nil	8	90	

carried out for patients with hypothyroidism and an average thyroid-stimulating hormone of 6.8% was detected. Of those with PCOS most of the married woman (55%) did not previously consult the doctor though they had symptoms. It was only for the reason of infertility did they opt for consultation. It was observed that adolescent girls (51%) were worried about their appearance due to acne, hirsutism, and overweight and consulted the physicians for their appearance as the main complaint.

**QOL**

The mean scores for all four domains of WHOQOL-BREF were lower in women with PCOS than in controls, indicating a low QOL among the affected women, with the lowest score being in the psychological domain. All the domains were found to be significantly lower in women with PCOS than in controls (Table 2).

**Factors associated with QOL**

Table 4 shows the mean scores for clinical variables among women with PCOS, within each domain of the WHOQOL-BREF. The mean score for QOL domains was lower among obese women, people with hypothyroidism as a comorbid condition, oligo/amenorrhea, hirsutism, and acne. However, multiple linear regression analysis did not reveal oligo/amenorrhea, acne, hirsutism, obesity or hypothyroidism as being significant predictors of poor QOL among women with PCOS.

p>0.05 is considered as significant, Chi-square test has been employed to find association between parameters.

More than 1 comorbidity may be present in a single patient.

Table 1 illustrates the demographic details in the study population.

**Table 2: The QOL scores among study subjects**

WHOQOL-BREF Domains	Study group		Control group		Statistical analysis
	Mean	SD	Mean	SD	
Physical health	49.4	8.51	63.81	17.13	p=0.000
Psychological	43.67	10.68	65.81	14.28	p=0.000
Social relationships	47.12	15.17	66.84	13.57	p=0.000
Environment	48.36	9.9	66.03	11.86	p=0.000

WHOQOL-BREF: World health organization Quality of life-BREF

**Table 3: The QOL scores after awareness regarding the disease condition**

Domains	Mean	SD
Physical health	58.4	8.79
Psychological	53.45	10.71
Social relationships	58.06	13.51
Environment	57.34	9.80

QOL: Quality of life

**Table 4: The mean scores for clinical variables among women with PCOS, within each domain of the WHOQOL-BREF**

Characteristic	n	Physical mean (SD)	Psychological n=83 mean (SD)	Social n=83 mean (SD)	Environmental n=83 mean (SD)	Mean
Irregular menstrual cycle	66	49.6 (8.8)	43.8 (9.8)	47.5 (15.3)	47.5 (9.3)	47.1
Hirsutism	38	51.1 (9.8)	44.5 (10.1)	48.6 (16.2)	49.9 (10.3)	48.5
<24.9	62	48.04 (8.2)	45.1 (10.2)	44.3 (15.8)	49.8 (6.9)	46.8
>25	21	49.87 (8.7)	43.18 (10.94)	47.87 (10.8)	47.8 (10.8)	47.1
Hypothyroidism	38	47.6 (9.2)	44.2 (10.4)	47.4 (16.13)	49.8 (836)	47.2
Inability to lose weight	38	44.8 (11.3)	48.2 (14.1)	46.8 (10.3)	58.7 (9.2)	49.62
Acne	41	49.51 (8.2)	44.1 (11.5)	44.17 (15.2)	47.6 (9.8)	46.3
Non sedentary	51	49.4 (8.)	43.82 (11.1)	46.1 (15.01)	49.5 (10.7)	47.2
Sedentary	32	49.3 (8.2)	43.4 (10.2)	48.6 (15.7)	46.4 (8.4)	46.9

PCOS: Polycystic ovarian syndrome, WHOQOL-BREF: World health organization Quality of life-BREF

p>0.05 is considered as significant, Chi-square test has been employed to find association between study group and control group for QOL domains.

Average mean scores of each domain are collated in this table.

Mean scores of QOL in each domain based on symptomatic parameters.

One-way ANOVA test has been employed to find interrelationship between each domain with parameters such as age, BMI, lifestyle, menarche age, and comorbid conditions. p>0.005 is considered statistically significant. Significance was not observed here.

Fig. 1 shows the comparison of quality of life pre- and post-intervention.

**DISCUSSION**

Since the discovery of PCOS in 1930 to date it remains a mysterious condition despite several studies. Research reveals that PCOS adversely affects women's QOL, wellbeing, self-esteem, psychological status, and body status [16-18]. The purpose of this paper was to assess the QOL and satisfaction with life of women with PCOS, as well as their characteristics.

The prevalence of PCOS as reported from various studies among studies among Caucasian populations (Europe, North Africa, the Horn of Africa, Western Asia, Central Asia, and South Asia) using NIH criteria ranges from 5% and 8% while studies within India show a higher prevalence in the range of 9.13-36% among adolescent girls as of 2011 [19]. PCOS, thief of womanhood, has affected women the highest in the age group of 15-35 years worldwide [5,20]. The disease although presents with an orchestra of symptoms, the present study has predominantly found weight gain, irregular menstrual flow, discolored skin, and hirsutism as the most common symptoms which is consistent with other studies. The physical consequences in particular predisposes teens to a lifetime of adverse health outcomes that tend to worsen throughout adulthood [21,22]. In addition mental health depression, anxiety, negative body image, and psychosexual dysfunction are the most common exacerbations of the negative impact of PCOS. A study conducted by Laitinen *et al.*, in the year 2003 showed that weight gain precedes the onset of PCOS [23]. Obesity is the most common finding worldwide. Around 40-80% of PCOS affected patients report to either be overweight, obese, or centrally obese while our study revealed a 41% prevalence of obesity [24-26]. Obesity that ensues due to hormonal disturbance is also one of the most initial symptoms seen that contributes to a negative impact on overall health [27-29]. The disease poses a risk of weight gain in a short span of time that becomes resistant despite rigorous attempts in dieting and increased strenuous exercise. All the above factors infuriate the patients and compel them to seek medical help with a sense of dissatisfaction and low mood.

Lifestyle, whether sedentary or non-sedentary defines the eating habits of a person that is likely to influence disease progression [30]. This study revealed that the study participants were physically active with

moderate exercises and had a strict diet control, which is not significant with other studies. This positive attitude can be attributed to patient's knowledge regarding lifestyle modifications.

Infertility being that the worst complication of PCOS was one of the main reasons of consultation in this study. Infertility and reproductive failure have been identified as major life stressors. It was hypothesized that sclerocystic thickening of the ovarian cortex prevented the expulsion of the oocyte and hence led to disturbance of ovulation [31]. For a couple with infertility, the chances of conception are 25% each month. Therefore, it is perhaps not surprising that in women with PCOS, irregular menses and infertility issues have been suggested to cause tensions within the family, altered self-perception, impaired sexual functioning, and problems in the workplace.

A few studies have found an association between precocious puberty and PCOS [32,33]. Although there were no early menarchal age subjects found in our study, an attempt was made to find the association with disease. Only few studies have emphasized that precocious puberty can result in hyperinsulinemia, ovarian hyperandrogenism and obesity yet other mechanisms are to be explored [34,35].

Although the pathophysiology behind PCOS and thyroid disease occurring concomitantly is not well established, the possible mechanism illustrated remains increased BMI and insulin resistance appearing in both the conditions [36]. A couple of studies have previously analyzed prevalence of subclinical hypothyroidism in PCOS subjects. Enzevaei et al. observed that 25.5% of Iranian subjects to have subclinical hypothyroidism while in a study conducted by Sinha et al. among Indian population to be 22.5% subjects with PCOS while our study revealed two-fold increase in prevalence (49%). This heightened prevalence necessitates proper screening and diagnosis for both hypothyroidism and PCOS as they present with similar kinds of symptoms and often misdiagnosed.

Studies have ascertained a predisposition of Type 2 diabetes and impaired glucose tolerance in women with PCOS with a prevalence of 31–35% and 7.5–10.0%, respectively. In addition women with PCOS have been reported to rapidly develop type 2 diabetes from impaired glucose tolerance 5–10 times that of normal women. Our study reported 45% prevalence of new and existing type 2 diabetes [37,38].

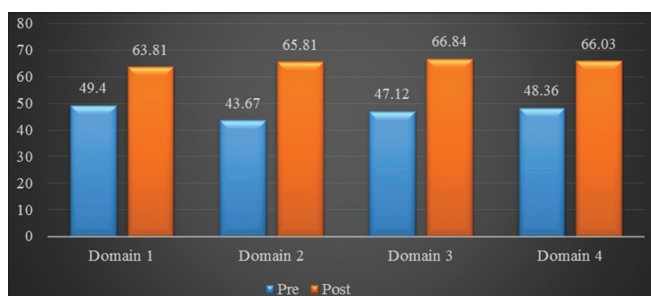


Fig. 1: Comparison between pre- and post-quality of life scores

Table 5: The regression model for the WHOQOL-BREF variable with regard to overall QOL. There was no statistical significance found which can be attributed to low sample size

Domain	Physical health		Psychological		Social		Environmental	
	B	p	B	p	B	p	B	p
Age	0.013	0.860	0.000	0.996	-0.027	0.512	-0.039	0.588
BMI	0.165	0.052	0.108	0.136	0.048	0.326	-0.099	0.214
Lifestyle	-0.007	0.291	-0.003	0.635	-0.001	0.742	0.001	0.846
Menarche age	-0.058	0.002	0.034	0.033	-0.015	0.165	0.003	0.879
Comorbid condition	-0.005	0.747	-0.004	0.769	-0.012	0.180	0.013	0.376

BMI: Body mass index, WHOQOL-BREF: World health organization Quality of life-BREF

**QOL**

PCOS being a multifactorial condition possessing polygenic pathology which manifests with a spectrum of signs and symptoms not only affects physical health but also is a cause of mental distress resulting in overall reduction of a person's QOL.

The WHOQOL-BREF had been previously tested for cross-cultural use and highly recommended for assessing the outcomes of gynecological morbidity in developing countries. WHOQOL-BREF is not a disease-specific instrument but a generic instrument has been employed in our study. The generic instrument used for the assessment of the HRQoL in PCOS in the previous decade was mainly the SF-36. However, the WHOQOL-BREF additionally seeks information on the well-being and functioning, such as acceptance of physical changes and satisfaction with sex life that are more relevant to women with PCOS. The instrument assesses satisfaction with life as well as the impact of disease or illness, and it captures positive and negative aspects of QOL. Our study was designed in such a way that after determining QOL in diseased and health volunteers, an awareness program was conducted to address the issue. A study done by Kumarapeli et al. involved patients from South Asia showing a highest reduction in the psychological QOL domain, and lowest in the social domain [20]. Among many symptoms that contribute to the lower QOL, the effect of infertility is higher among both genders. A review of 14 studies that investigated the effect of infertility on QOL revealed lower scores in several QOL domains; mainly mental health, social functioning, and emotional behavior.

Consistent with other studies worldwide this study too showed a reduced QOL in diseased individuals compared to controls. The most significantly affected domain in our study was in psychological area showing an average score of 43.76± 10.6. Predictors for low QOL were assessed in this study. This study predicted that physical factors were the most important reason for the reduction in overall QOL. A positive association between physical parameters such as acne, inability to lose weight, and hirsutism was seen with physical domain of QOL. Various studies have elucidated the association of hirsutism and obesity with QOL domains.

Hahn et al. and McCook et al. reported a significant correlation between FG score correlated and emotional subscales in their study instruments while Ching et al. correlated BMI significantly with general health questionnaire 30 scores [9,39,40]. The variability in scores in QOL can be attributed to multiple symptoms and intensity of the disease. Contradictory to above studies, hirsutism and BMI were not found to be significant predictors of low QOL which may be due to low sample size.

QOL improved significantly in the study group following intervention.

Awareness regarding the disease and its severity serves as an important factor to improve QOL which was replicated in our study. There was a response shift toward positive side which reveals that the study participants knew the seriousness of the condition and started on lifestyle modifications and adhered to treatment well. Considering the effect of PCOS on women's QOL, the patients' condition must be studied to prioritize care appropriately. Understanding of PCOS patients perceived QOL may help enhanced care provided by health-care



professionals, improving its quality and better fulfilling the patients' expectations. More studies need to be done to find the status of QOL after imparting education so as to show the impact of counseling.

## CONCLUSION

Women's health in India is still facing a recognition challenge. With the dismal condition of healthcare in India, the provisions for health care are even worse when it comes to women-specific diseases. In general, women's health receives attention only during pregnancy. This remains as the patriarchal understanding of women's role in society. South Indian women with PCOS have significantly low QOL agonizing their existing clinical characteristics. Hence, screening among reproductive women, health education, and counseling is recommended to improve health status of women.

## AUTHORS' CONTRIBUTIONS

Ramya R - Data collection and writing article. Mamatha K - Editing. Surya Narayana KM - Editing.

## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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