

# Association of Primary Subfertility in Polycystic Ovarian Syndrome with BMI and Waist Circumference

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## ABSTRACT

**Background:** To determine the association of primary subfertility in Polycystic Ovaries with BMI and waist circumference. **Methods:** This cross-sectional study was performed from 01-08-2018 to 01-08-2019 at the Department of Obstetrics & Gynecology, Indus Medical College, Tando Muhammad Khan on (n=245) diagnosed with polycystic ovaries in the age group of 18 to 49 years. The study population, having diabetes mellitus, increased prolactin levels, disturbed thyroid function, congenital adrenal hyperplasia, and the couples with contraceptive measures were not included. Mean  $\pm$  SD was computed for numerical data, frequencies and percentages were computed for qualitative data. Chi-square was used as a test of significance with a P-value  $<0.05$  as significant.

**Results:** The mean  $\pm$  SD age of these women was  $33.46 \pm 6.71$  years with a range from 18 to 45 years. The proportion of subfertility in PCOS was 40.41%. The frequency of subfertility in PCO increases from normal weight to obesity significantly. (P-value  $<0.01$ ) Additionally; women presenting with PCOS and increased waist circumference had a higher frequency of subfertility. (P-value  $<0.01$ ).

**Conclusion:** A much higher proportion of women with PCOS who present with obesity, overweight, and higher waist circumference were subfertile. With early screening and treatment for PCOS, weight control also is necessary to prevent the big issue of subfertility.

**Keywords:** Obesity, Polycystic Ovarian Syndrome. Subfertility.

## INTRODUCTION

Polycystic ovary syndrome (PCOS) is a multifaceted as well as diverse endocrine syndrome described by hyperandrogenism, metabolic dysfunctions, overweight/obesity, oligo anovulation, insulin resistance, type 2 diabetes mellitus, dyslipidemia, and amplified risk for developing cardiovascular disease. Among them, a noteworthy clinical manifestation is hyperandrogenism, found pervasively in PCOS patients. Excess levels of androgens influence the functioning of granulosa cells and developing follicles by way of composite mechanisms that escort to insulin resistance and obesity. The majority of PCOS patients with increased androgen levels bear defects in secretion of steroids that might culminate in abnormal follicular genesis and failed prevailing follicle selection.<sup>1,2</sup>

Although, obesity, augmented insulin levels and insulin resistance might be present in adolescents with PCOS, nevertheless, they are not considered the diagnostic criteria for PCOS. Treatment of young persons with PCOS should encompass lifestyle modification, medications, as well as local therapies. Among the medicines, PCOS patients might respond to metformin and oral contraceptive pills for time being.<sup>3</sup> Expert consensus revolution revealed that PCOS is an entrenched medical condition that affects general health, reproductive health, along the quality of life negatively; females with PCOS bear augmented risk of pregnancy-associated worse outcomes as well as also increase the risk for gestational diabetes mellitus. Symptoms and signs of PCOS emerge untimely

in life, especially among the female newborns from PCOS carriers.<sup>4</sup> Polycystic appearances in ovaries were noted in 33.3 percent of the study populace in a study carried out at Baqai Institute of endocrinology, Karachi.<sup>5</sup> Diagnosis of PCOS is made according to the presence of at least two of the three criteria, i.e., polycystic ovaries on ultrasound, chronic anovulation, and increased androgens according to Rotterdam criteria.<sup>6</sup> Primary Subfertility is diagnosed when a couple has not achieved pregnancy after 2 years of having regular unprotected sex. While; infertility is defined as when a man or a woman is in no way able to make someone or become pregnant. Subfertility is the universal dilemma that has reflective communal as well as emotional inferences for the affected individuals. Subfertility is defined as the inability of a couple to conceive after one year of unprotected intercourse. The prevalence of subfertility in Pakistan is 21.9%.<sup>7</sup> The rationale of this study was that subfertility is an important and treatable complication of PCOS. Therefore; it's important to know the exact magnitude of the burden of subfertility in PCOS patients of our population so that they can be provided with maximum care. Also, there is minimal literature available on this topic in Pakistan. Therefore; this fulfills the justification for the current study. As the frequency rate of subfertility among our population of PCO patients turns out to be high, we strongly suggest screening of all patients for subfertility, who are suspected of having PCOS. This early diagnosis and treatment will help prevent fertility-related adverse consequences of PCOS. This study is carried out to

evaluate the occurrence of subfertility among patients presenting with PCOS

**METHODOLOGY**

This cross-sectional study was performed in Obstetrics & Gynecology Department at Indus Medical College, Tando Muhammad Khan. The duration of the study was six months from 01-08-2017 to 31-01-2018. Taking prevalence of PCO as 20.7%,<sup>8</sup> with 5% margin of error, and taking 95% confidence interval, the calculated sample size was 245.

The sampling technique was non-probability purposive sampling. Women of age group 18 to 45 years diagnosed with PCOS and married for 4 to 15 years were included. Patients who had diabetes mellitus, thyroid dysfunction (taking medicine for these diseases as recorded in the medicinal history), with hyperprolactinemia, congenital adrenal hyperplasia (taking medicine for these diseases as recorded in the medicinal history), patients with unexplained sub-fertility and, couples taking contraceptive measures (Noted through complete history) were excluded. Informed consent for inclusion in the study was taken from each patient. They were assured regarding confidentiality and expertise of the physician and were educated for an anticipated better outcome. They were asked for subfertility and their status for fertility was noted. The collected data were entered and analyzed accordingly using SPSS version 21 through its statistical program. Mean ± SD were calculated for quantitative variables like age of the patients, weight, BMI (Kg/m<sup>2</sup>), duration of marriage & duration of PCOS. Frequency and percentages were determined for Qualitative variables like BMI status, subfertility among PCOS patients (Yes/ No). Socio-economic status (privileged/unprivileged). To compare the qualitative variables chi-square test was applied. P-value less than 0.05 was taken as significant.

The current study was undertaken to determine the frequency of subfertility in 245 (calculated sample size) consecutive women who had presented with polycystic ovaries at the outpatient department of Obstetrics and Gynecology Department, Indus Medical College, Tando Muhammad Khan.

**RESULTS**

The mean ± SD age of these women was 33.46±6.71 years with a range from 18 to 45 years. The mean ± SD BMI (kg/m<sup>2</sup>) was 29.28 ± 3.28 with a range from 17.88 to 34.16Kgs/m<sup>2</sup>. The mean ± SD duration to marriage was 8.29 ± 2.91 (Years). Among the study population (n=245), 33.1% of patients were privileged and 66.9% were unprivileged. (Shown in Table No. 1)

Table: 1. Baseline characteristics of patients presenting with PCOS (n= 245)

	Frequency (%)	Mean±SD. Dev
Age of the Patient(in years)	--	33.46±6.71
BMI(kg/m <sup>2</sup> )	--	29.28±3.28
Duration of marriage (Years)	--	8.29±2.71
Duration of marriage (in years)		
4-7	82(33.5)	--
8-11	119(48.6)	--
11-15	44(18.0)	--
Socio-economic status		
Privileged	81(33.1)	--
Un-privileged	164(66.9)	--

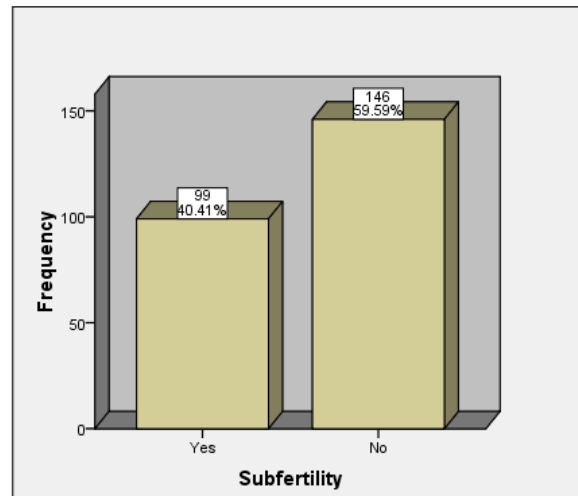


Figure 1: Frequency of Subfertility in PCOS (n=245)

Table: 2. Association of sub fertility in PCOS with BMI status (n=245)

		BMI category			Total	X <sup>2</sup>	p-value
		Normal weight	Overweight	Obese			
Subfertility	Yes	6(2.4%)	25(10.25)	68(27.8%)	99(40.4%)	96.67	<0.01**
	No	93(38.0%)	32(13.1)	21(8.6%)	146(59.6%)		
Total		99(40.4%)	57(23.3%)	89(36.3%)	245(100.0%)		

\*\*highly significant statistically

Table: 3. Association of subfertility in PCOS with waist circumference (n=245)

		waist circumference		Total n (%)	X <sup>2</sup>	p-value
		<80 cm n (%)	>80cm n (%)			
Subfertility	Yes	19(7.8%)	80(32.7%)	99(40.4%)	84.50	<0.01**
	No	115(46.95)	31(12.7%)	146(59.6%)		
Total		134(54.7%)	111(45.3%)	245(100.0%)		

The occurrence of subfertility among PCOS was 40.41%. (Shown in Figure 1)

It was also interesting to note that the obese women were worst hit from subfertility when living with PCOS. The frequency of subfertility in PCO increases from normal weight to obesity significantly, however. (P-value <0.01) Additionally; women presenting with PCOS and increased waist circumference had a higher frequency of subfertility. (P-value <0.01) (Shown in Table No. 2 and 3)

## DISCUSSION

PCOS is the most renowned endocrine dysfunction syndrome in women of this era.<sup>9</sup> PCOS is a hereditarily diverse condition in that females often have to tackle the problem of infertility,<sup>10</sup> endometrial hyperplasia, diabetes mellitus, and cardiovascular hurdles.<sup>11</sup>

The current study was planned and conducted to investigate local women presenting to the tertiary care setup with PCOS and measure the magnitude of the burden of subfertility in them. The current study has found that there was more than expected frequency of subfertility in PCOS i-e; the proportion of subfertility in PCOS was 40.41%. The study by Movando et al.<sup>11</sup> showed 30.4% of the clients had polycystic ovaries while 46.4% showed other pelvic pathology and the rest, 23.2% had normal pelvis scan results. Acne and hirsutism were significantly associated with positive ultrasound imaging results for PCOS. Parker PB, et al.<sup>12</sup> revealed a 19.5% prevalence of infertility in PCOS. Robinson SL, et al.<sup>13</sup> revealed a 9.7% prevalence of PCOS and 71.4% found taking treatment for infertility. This infertility rate is augmented similar to the present study. Muntha Sarosh et al.<sup>14</sup> also revealed that 57.1 percent of married ladies having PCOs were suffering from subfertility. This proportion of infertility was not much less for married ladies with PCOS and these support findings of the present study. Shilpa S et al.<sup>15</sup> and Anju E et al.<sup>16</sup> pointed out an occurrence of as high as 74.98 percent and 72 percent correspondingly. Urooj Z et al.<sup>17</sup> claimed it as the most common presentation in married women.

In the present study proportion of subfertility in women with PCOS, was more prevalent in obese women with increased waist circumference. It is similar to the study by Al-Taie FK, et al.<sup>18</sup> It was revealed that obesity adversely affects the women suffering from PCOS, therefore lifestyle and dietary management can prevent from worst clinical outcomes in obese patients with PCOS.<sup>19</sup> Barrea L.etal<sup>20</sup> also revealed obesity as an important perspective to keep in mind while managing patients with PCOS.

## CONCLUSION

A much higher proportion of women with PCOS who present with obesity, overweight, and higher waist circumference were subfertile. With early screening and treatment for PCOS, weight control also is necessary to prevent the big issue of subfertility.

**Conflict of Interest:** None

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