



Baseline clinical characteristics of primary sub-fertile women with and without polycystic ovary syndrome: A cross-sectional comparative study

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Abstract

Introduction: Polycystic ovary syndrome (PCOS) is one of the common Endocrine diseases among women of reproductive age. The syndrome presents as one of the major problems of involuntary subfertility in women. PCOS presents clinically as hyperandrogenism, ovulatory disorders, and/or polycystic change in ovaries. The purpose of this study was to evaluate and compare the demographical, anthropometrical, and clinical data of subfertile women suffering from PCOS and those not suffering from PCOS.

Methods: This study design is a cross-sectional study comparing the subjects at a point in time for the researchers. This study was carried out at the Fertility Care Centre, Department of Obstetrics and Gynaecology, Dhaka Medical College Hospital, Dhaka, from June 2015 to November 2015. In all, 146 women subjects were selected for the study, equally divided into two study groups – Group A: 73 women presenting primary or secondary infertility with PCOS, and Group B: 73 women presenting primary infertility without PCOS. Statistical analysis was done using the statistical program Statistical Package for the Social Sciences 25.0.

Results: In 146 cases of primary sub-fertility, those with PCOS were similar to those that did not have PCOS with respect to factors, such as age, education, and occupation; however, differences were seen in that Group A included more 31–35-year-olds, whereas Group B included more ≤ 30 -year-olds. Body mass index (BMI) was found to be significantly elevated in patients with PCOS, with more overweight patients, while most patients in all groups had a normal BMI. Hirsutism was found to be more prevalent in patients with PCOS.

Conclusion: Accordingly, in concluding, it could be noted that in sub-fertile women affected by PCOS, BMI values as well as cases of hirsutism have been found to be significantly higher in comparison to women not affected by PCOS, whereas regarding age, as well as level of education and occupation, it has been found that they are quite at par.

Keywords: Ovulatory dysfunction, polycystic ovary syndrome, primary sub-fertility

Introduction

Polycystic ovary syndrome (PCOS) - One of the most common endocrine disorders found in females

in their reproductive age group, also considered to be responsible for causing sub-fertility in females with no history of previous illness or issue. Heterogeneous condition of ovulatory

dysfunction, hyperandrogenism, with polycystic changes in the ovaries, showing differences in prevalence across global populations.^[1] The overall incidence of PCOS varies between 6% and 20% across different populations around the world, depending upon specific diagnostic criteria and ethnicity. Being a multifactorial disorder, PCOS presents many challenges during its treatment and diagnosis.^[2] This applies especially to women who seek treatment due to an accompanying complaint of infertility. Infertility is the most common symptom among PCOS patients, and this is mainly due to anovulatory syndrome and hormone imbalance.^[3] In this regard, primary sub-fertility, or the incapacity to conceive after 12 months of unprotected intercourse without previous conception, may be explained as related to PCOS, with major effects on physical, psychological, as well as social health.^[4] In practice, cases of patients with PCOS have been presented with disorders involving menstrual cycles, hirsutism, obesity, as well as metabolic disorders, which all play critical roles in inferring fertility outcomes.^[5] However, the Rotterdam Criteria, which were proposed in 2003, remain faithful in diagnosing cases of PCOS with two or more of the following: Oligo/anovulation, clinical as well as biochemical hyperandrogenism, as well as clitoral enlargement together with ultrasonographic evidence of polycystic ovaries after excluding endocrine diseases.^[6] These parameters have helped the identification of different forms of PCOS, and this has shown the differences in different characteristics at the baseline. Comparatives, which compare characteristics with and without PCOS, among others, would be very important and essential for the understanding of the pattern and the different approaches used for the management of PCOS. Anthropometric parameters, for instance, body mass index (BMI), may be very crucial for the management and understanding of PCOS. There could be instances of obesity among women with PCOS, which is known to predominate in such cases, leading to insulin resistance and hyperandrogenism.^[7] Nevertheless, there are reports suggesting an increased prevalence of PCOS in lean women, especially in Asian women,

which highlights the significance of tailored clinical assessment for women from different populations.^[8] Previous studies have established a positive correlation between increased BMI and the severity of hirsutism and disorders in menstrual pattern, besides the response to fertility treatment.^[9] Hirsutism is an indicator of the multifunctional syndrome known as hyperandrogenism, which is a defining feature in the diagnosis and manifestation of PCOS, with a great effect on quality of life. There are ethnic variations in the prevalence and severity of hirsutism, which are determined both genetically and endogenously.^[10] Comparative studies have shown that hirsutism is significantly more common in women with PCOS than in non-PCOS sub-fertile women, reinforcing its importance as a clinical marker in infertility evaluation.^[5]

Methods

This is a cross-sectional comparative study conducted at the Fertility Care Centre, Department of Obstetrics and Gynaecology, Dhaka Medical College Hospital, Dhaka, from June 2015 to November 2015. The objective of this study is to describe the baseline clinical characteristics of primary sub-fertile women with and without PCOS. The study population includes primary sub-fertile women aged 18 years and above attending the Fertility Care Centre during the study period. In all, 146 women were enrolled in the study, with equal splits into two study groups: Group A comprised 73 women with PCOS, whereas Group B comprised 73 cases of primary sub-fertility sans PCOS. For diagnosis, the Rotterdam Criteria were used, which demand that patients manifest with two or more of the following: Oligo or anovulation, clinical or laboratory hyperandrogenism, ultrasonographic manifestations of PCOS. For inclusion, patients were either above 18 years of age or gave their informed consent. In terms of exclusion, patients were considered if they were severely ill, unwilling to be enrolled, or suffering from diabetes mellitus, hypertension, or other major diseases, to ensure homogeneity. Data collection involved a thorough medical history, clinical examination, and laboratory tests. The statistics have been

done using the Statistical Package for the Social Sciences version 25.0. Ethical clearance has been taken accordingly from the suitable authority. Informed consent has been taken from the patients. Hence, the research has been done according to the Declaration of Helsinki.

Results

Upon analyzing the sub-fertile females undergoing treatment for infertility, it was observed that the characteristics of females in both groups, namely, Group A with PCOS with 73 females, and Group B with non-PCOS females, were similar. As regards the distribution of females belonging to both groups, namely, females belonging to Group A with PCOS, and females belonging to Group B with non-PCOS, it was observed that the percentage of females in Group A who were ≤ 30 years was low when compared with females belonging to Group B, which was 39.7% and 46.6%, respectively. It was also observed that most females belonging to Group A, that is, females in the range of 31–35 years, were included in the large proportion when compared with females belonging to Group B, which was 42.5% as opposed to 27.4%, respectively. It was also noted that the number of females in Group A, that is, above 35 years, was low compared to females in Group B, that is, 17.8%, compared to 26.0%, respectively. Observations after analysis of the education qualifications are also the same, though. For example, it was noted that in Group A, 43.8% had only primary education, 37.0% had only secondary education, 11.0% were graduates, and 8.2% were illiterate. While in Group B, it was noted that 39.7% had only primary education, 34.2% had only secondary education, 12.3% were graduates, and 13.7% were ill. The majority of the female sample from the two groups consisted of housewives: Group A, 94.5%, Group B, 89.0%, as compared to females engaged in service-related jobs, constituting only 5.5% and 11.0%, respectively [Table 1]. Within Group A, only a few females could be characterized as underweight, that is, those having a BMI < 18.5 (2.74% [$n = 2$]), and in Group B, females belonging to an underweight category are entirely

Table 1: Distribution of baseline characteristics among the participants ($n=146$)

Variables	Group A ($n=73$)		Group B ($n=73$)	
	<i>n</i>	Percentage	<i>n</i>	Percentage
Age				
≤ 30	29	39.7	34	46.6
31–35	31	42.5	20	27.4
> 35	13	17.8	19	26
Mean \pm standard deviation	32.7 \pm 7.9		33.1 \pm 9.2	
Range (min-max)	20–47		20–50	
Education				
Primary	32	43.8	29	39.7
Secondary	27	37	25	34.2
Graduate	8	11	9	12.3
Illiterate	6	8.2	10	13.7
Occupation				
House wife	69	94.5	65	89
Service	4	5.5	8	11

Table 2: Distribution of body mass index characteristics among the participants ($n=146$)

Variables	Group A ($n=73$)		Group B ($n=73$)		P-value
	<i>n</i>	Percentage	<i>n</i>	Percentage	
< 18.5 (Underweight)	2	2.74	0	0	-
Normal (18.5–24.9)	41	65.75	47	63.01	
Overweight (25.0–29.9)	23	31.51	27	36.99	
Mean	26.8 \pm 7.2		24.4 \pm 4.3		0.001s
Range (min-max)	18.0–29.1		18.6–29.0		

Statistically significant results

missing. Most females from Groups A and B had normal weight, that is, BMI within the range of 18.5–24.9, constituting 65.75%. This is reflected in the overweight status, represented by a BMI between 25.0 and 29.9, observed among 31.51% ($n = 23$) Group A participants and 36.99% among Group B. The BMI ranged from 18.0 to 29.1 for Group A participants and from 18.6 to 29.0 for Group B participants. There was observed a

statistical difference between the mean BMI value for PCOS versus the non-PCOS group: 26.8 ± 7.2 versus 24.4 ± 4.3 , respectively. It shows a significant difference in the average BMI of each group [Table 2]. In addition, hirsutism was prevalent among 26.0% of the participants belonging to Group A, compared to considerably low figures when compared to participants belonging to Group B. In fact, only 11.0% of participants belonging to Group B demonstrated signs of hirsutism. A larger number of participants demonstrating no signs of hirsutism, that is, 89.0%, comprised Group B compared to participants belonging to Group A, that is, 74.0%. It was established that the test conducted for participants demonstrating signs of hirsutism for both groups was significant, with $P = 0.019$ [Table 3].

Discussion

From the findings of our study, valuable insights can be gained on the intricate association between PCOS and various demographic, clinical, and biochemical factors across the entity of primary sub-fertility. In our study, the distribution of the subjects by age group revealed that the group of non-PCOS patients (Group B) was significantly younger, with 46.6% of the group having patients aged below or equal to 30 years, compared with the PCOS group (Group A), of whom only 39.7% were below or equal to 30 years. This could imply that concerns of sub-fertility may manifest at an earlier age among the subgroup of PCOS patients. In contrast, a larger number of patients within the PCOS group were aged between 31 and 35 years compared to the non-PCOS group (42.5% vs. 27.4%), which could lean toward the present trends of increased delayed child.^[11,12]

Table 3: Distribution of Hirsutism among the participants ($n=146$)

Hirsutism	Group A ($n=73$)		Group B ($n=73$)		P-value
	n	Percentage	n	Percentage	
Present	19	26	8	11	0.019s
Absent	54	74	65	89	

Statistically significant results

The level of educational attainment among the two groups was similar. However, there was a slightly higher graduates' level in the sub-fertile women cohort within Group B. This could suggest that PCOS and sub-fertility affect women on all levels. In that sense, the need for effective fertility awareness among the wider public cannot be overstated.^[13] Most of the participants of this group were housewives, although slightly more in Group A than in Group B, which comprised 94.5% and 89%, respectively, representing sociocultural factors rather than an association with PCOS itself.^[14] Most notable, however, were variations in BMI across groups; women with PCOS had a higher mean BMI (26.8 ± 7.2), with 31.5% classified as overweight, compared to a mean BMI of 24.4 ± 4.3 in non-PCOS women, where 36.99% were overweight ($P = 0.001$). This result was consistent with other research on the relationship of PCOS to the incidence of being overweight or obese, culminating in hyperandrogenism and diminished fertility.^[15,16] Finally, the most representative manifestation of hyperandrogenism, that is, hirsutism, registered significantly more frequently in the PCOS study population, that is, 26%, as opposed to 11% in the non-PCOS patient population ($P = 0.019$), further emphasizing the implication of this symptom in diagnosing PCOS, as well as the social stigma.^[17] The mean age of the women with PCOS (Group A) was 32.7 ± 7.9 years, slightly younger than those without PCOS (33.1 ± 9.2 years). Most PCOS participants fell into the age category of 31–35 years, while most non-PCOS women were ≤ 30 years old. BMI was significantly greater in women with PCOS (26.8 ± 7.2) than in controls (24.4 ± 4.3 , $P = 0.001$), with 31.5% overweight in Group A compared to 37.0% in Group B, reflecting a tendency toward higher adiposity in PCOS, as stated in international reports, although some studies show an even higher prevalence of overweight. Hirsutism was more frequent in PCOS (26%) than in controls (11%, $P = 0.019$), indicating severe hyperandrogenism in this cohort.^[18]

Limitations of the study

The study was conducted in a single hospital with a small sample size. Hence, the results may not represent the whole community.

Conclusion

Primary sub-fertile women with PCOS exhibited higher BMI and a greater prevalence of hirsutism compared to their non-PCOS counterparts, while age, education, and occupation were broadly similar between the groups. These findings highlight the prominent role of hyperandrogenism and increased body weight as distinguishing clinical characteristics in sub-fertile women with PCOS.

Recommendation

It is recommended that clinicians routinely assess BMI and hyperandrogenic features, such as hirsutism, in primary sub-fertile women to identify those with PCOS early. Incorporating these evaluations into fertility assessments can guide individualized management strategies, including lifestyle interventions and targeted treatments, to improve reproductive outcomes and overall metabolic health in this population.

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