Original Article

Frequency of Infertility, Hirsutism and Acne in Patients with Polycystic Ovarian Syndrome and their Association with Body Mass index: A Cross Sectional Study

Dure-e-Shehwar Ali[1], Muhammad Zahid[2], Henna Salman[1], Umema Zaffar[1], Afshan Ali[3] and Mubashra Ali[4]

ABSTRACT

Objective: To determine the frequency of infertility, hirsutism and acne in patients of PCOS and compare it with the body mass index(BMI) of the subjects.

Study Design: Cross-sectional, descriptive study.

Place and Duration of Study: This study was conducted at the Outpatient Department of Obstetrics and gynecology, Mardan medical Complex Teaching Hospital from January 2017 to October 2017.

Materials and Methods: This study was conducted on 250 patients of Polycystic Ovarian Syndrome. Frequency of infertility, hirsutism and acne was compared with the body mass index(BMI). Diagnosis of Polycystic Ovarian Syndrome was done on the basis of 2003 Rotterdam diagnostic criteria.FerrimanGallwey scorewas used for assessment of hirsutism and WHO cut-offs of Body Mass Indexmodified for Asian population was used for assessment of Body mass index.

Results: Ofthe total 250 patients with Polycystic Ovarian Syndrome,the mean age was 25.63± 4.44 years and the mean BMI was 30.12±6.63 Kg/m^2. The frequency of infertility, hirsutism and acne was 64 % (n=151), 72.8 % (n=182) and32 % (n=80) respectively and all had a statistically significant association with obesity.The frequency of obesity in those with infertility, hirsutism and acne was 80.6 %, 89.02 % and 90 % respectively.

Conclusion: Hirsutism, infertility and acne were significantly common in patients with Polycystic Ovarian Syndrome and most of the patients were pre-obese as per WHO cut-offs of Body Mass Index for Asian population.

Key Words: Infertility, hirsutism, Acne, Body Mass Index, Polycystic Ovarian Syndrome

Citation of articles: Ali DS, Zahid M, Salman H, Zaffar U, Ali A, Ali M. Frequency of Infertility, Hirsutism and Acne in Patients with Polycystic Ovarian Syndrome and their Association with Body Mass index: A Cross Sectional Study. Med Forum 2019;30(7):79-82.

INTRODUCTION

Polycystic ovary syndrome (PCOS)is a common endrocrinopathy of reproductive age women[1, 2]. The prevalence of PCOS in women of reproductive age varies with the criteria used for its diagnosis. The reported prevalence ranges from as low as 5-7%[3, 4]based on the original 1990 US National Institutes of Health (NIH) diagnostic criteria.

[1.] Department of Physiology, KMC, Peshawar.
[2.] Department of Physiology, Nowshehra Medical College, Nowshehra, KPK
[3.] Department of Gynae, THQ Hospital, Takhtbai, Mardan.
[4.] Department of Cynae, KTH, Peshawar.

Correspondence: Dr. Muhammad Zahid, Assistant Professor of Physiology, Nowshehra Medical College, KPK
Contact No: 0346,0952776, 0332-9987174
Email: zahidktk@live.com

Received: January, 2019
Accepted: May, 2019
Printed: July, 2019

Using the broader 2003 Rotterdam diagnostic criteria now endorsed by the NIH and accepted internationally, the prevalence of PCOS ranges from 5.5% to 19.9%[5].

The commonly reported associated problems include amenorrhea or oligoamenorrhoea, hirsutism, obesity, acne, androgenic alopecia and reproductive disorders[6]. PCOS however; is not a disease exclusive to fertility and adolescence period; rather it can be associated with varying effects on a person's life.

Women with PCOS commonly suffer from menstrual disturbances including amenorrhea and oligomenorrhea. Whereas 31% women with PCOS have regular menstrual cycle, 86%--91% have oligomenorrhea and 31%--40% have amenorrhea[7]. The menstrual abnormalities mainly contribute to infertility in the affected women, including both primary and secondary infertility.In large number of women with polycystic ovary syndrome, 50% present as cases of primary infertility and 26% present as secondary infertility[8].

Over 80 % of women with PCOS exhibit androgen excess. Hyperandrogenism commonly presentsin the form of hirsutism that affectsup to 71% of women with PCOS. In general population, the frequency of

hirsutism ranges from 6%-15% with appropriate differences according to geographic location and ethnicity[9]. Hirsutism is particularly more severe in patients with abdominalobesity[10].Ferriman-Gallwey scoring system[11] is usually usedfor the evaluation of hirsutism. It assesses hair growth at the seven sites of the body: chin/face, upperlip, back, chest, arms, abdomen and thighs. A zero score indicates absence of terminal hair growth and a score of 4 indicates extensive hair growth. A total score of less than 8 indicates normal hair growth, a score of 8-15 indicates mild hirsutism and a score greater than 15 indicates moderate or severe hirsutism[12,13]. Besides, the androgen excess in PCOS also contributes to the pathogenesis of acne in the affected patients. Acne affects 15-25 % of patients with PCOS and varies significantly with ethnicity[14].

Owing to its high frequency and the allied worrisome complications and healthcare cost, Polycystic Ovary Syndrome is a subject of considerable research in Pakistan like the rest of the world. But there is relative scarcity of data in population of Khyber Pakhtunkhwa.

MATERIALS AND METHODS

It was a cross sectional study. Sample size was 250cases. Women with Polycystic Ovary Syndrome were recruited from the outpatient department of gynecology and obstetrics unit of Mardan Medical Complex Teaching Hospital, Mardan.

Inclusion criteria: Cases aged 20 - 40 years with menstrual cycle irregularities (anovulation or oligo-ovulation), Raised serum testosterone level, hirsutism and ultrasonic features suggestive of Polycystic Ovarian Syndrome as per American Society of Reproductive Medicine and European Society of Human Reproduction and Embryo (ESHRE/ASRM) criteria, 2003 i.e. increased ovarian volume of 10 cm in maximal diameter or 10 or more follicular cysts ranging in size from 2-9 mm were included in the study.

Exclusion criteria: Women with previous history of Cushing syndrome, hyperprolactinemia, pregnancy or those taking medicines that changes the hormonal or biochemical profile were excluded by appropriate clinical and medical examination.

Written informed consent was taken from the head of concerned Gynecology and Obstetricsunit. Written informed consents were also taken from the subjects included in the study. A comprehensive questionnaire form was filled for all the participants, including socio-demographic data, menstrual, marital and reproductive history.

Clinical assessment included measurement of height, weight, body mass index (BMI), pulse, blood pressure, assessment of hirsutism, history of infertility and skin acne. BMI was calculated by Quelet's Formula i.e. dividing weight (kg) by height in meter squared (m^2). Modified WHO criteria of BMI for Asian population, was applied as under:

1. Normal weight (18.5-24.9 kg/m^2)
2. Pre-obese (25-29.9 kg/m^2)
3. Obesity class-I (30-34.9 kg/m^2)
4. Obesity class-II(35-39.9 kg/m^2) and
5. Obesity class-III (> 40 kg/m^2).

Hirsutism was assessed by Ferriman-Gallwey(F-G) scoring according to which a score of 1 to 4 was given for seven areas of body. A total score less than 8 was classified as normal, a score of 8-15 was mild hirsutism and a score greater than 15 was moderate or severe hirsutism

Statistical Analysis: Data was compiled and analyzed using SPSS version 20. The frequencies and percentages were calculated. The frequency of infertility, hirsutism and acne was compared with BMI individually, using Pearson Chi-Square test.

RESULTS

A total of 250 females with PCOS were included in this study. Mean age of the cases was 25.63 ± 4.44 years and the mean BMI was 30.12 ± 6.63 Kg/m^2. Table.1 shows the frequency of infertility, hirsutism and acne in the study population with comparison of Body mass index as per WHO cut-offs of BMI for Asian population.

The frequency of infertility, hirsutism and acne was 64% (n=151), 72.8% (n=182) and 32 % (n=80) respectively and all had a statistically significant association with obesity. The frequency of obesity in those with infertility, hirsutism and acne was 80.6 %, 89.02 % and 90 % respectively. Most of the obese patients however; were in the pre-obese group. Moreover, most of the hirsute patients exhibited mild severity of hirsutism.

Comparison of infertility with BMI was found to be statistically significant (p=0.028), so was the comparison with acne and hirsutism.

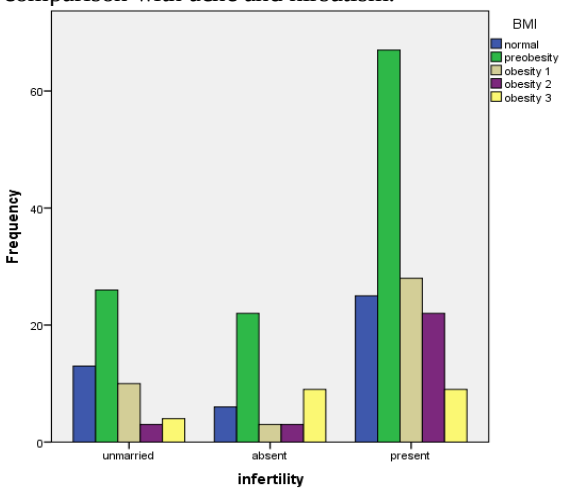

Figure No.1 Comparison of the frequency of patients with and without infertility with their BMI respectively

Table No.1: Stratification of patients with infertility, hirsutism and acne on the basis of Body Mass Index (BMI)

	Categories	**BMI**					
		Normal	Pre-obesity N (%)	Obesity I N (%)	Obesity II N (%)	Obesity III N (%)	P value
Infertility	Unmarried	13 (23.21)	26 (46.42)	10 (1.78)	3 (5.35)	4 (7.14)	0.028
	Nil	6 (13.95)	22 (51.16)	3 (6.97)	3 (6.97)	9 (20.93)	
	Yes	25 (19.37)	67 (51.93)	28 (21.70)	22 (17.05)	9 (6.97)	
Hirsutism	Normal	24 (35.29)	28 (41.17)	10 (14.7)	5 (7.35)	1 (1.47)	0.00I
	mild	20 (10.98)	87 (47.80)	31 (17.00)	23 (12.64)	21 (11.53)	
Acne	Yes	8 (10.00)	33 (41.25)	13 (16.25)	15(18.75)	11 (13.75)	0.008
	Nil	36 (21.17)	82 (48.2)	28 (16.47)	13 (7.64)	11 (6.47)	

DISCUSSION

Polycystic Ovary Syndrome is the most common hormonal abnormality affecting females during their reproductive age[1,2,15]. This syndrome cause reproductive as well as metabolic abnormalities. The reproductive disturbances in Polycystic Ovary Syndrome occur due to abnormality in gonadotropin secretions and increased androgen production causing irregular menstrual cycles, infertility, and hirsutism[15]. The metabolic disturbances include abnormal function of the beta cells of pancreas thereby increasing the risk for Diabetes Mellitus[16]. Obesity is the most common feature of patients with Polycystic Ovary Syndrome. In fact it occurs so frequently in these patients that it becomes difficult to conclude that whether obesity is a manifestation or cause of Polycystic Ovary Syndrome.

The frequency of infertility, hirsutism and acne in patients with Polycystic Ovary Syndrometurned out to be 64 % (n=151), 72.8 % (n=182) and 32 % (n=80) respectively. All these clinical parameters/ complications had a striking and statistically significant association with obesity.

The prevalence of infertility (64 %) is comparable with results of study conducted by Munir SS et al.[17] from Lahore, Pakistan who reported a 67.6 % combined prevalence of primary and secondary infertility in patients with Polycystic Ovarian Syndrome and increasing frequency of infertility, hirsutism and acne with increasing Body Mass Index.The frequency of infertility however; is significantly higher than the reported frequency of 46.42 % by Riaz M et.al in Polycystic Ovarian Syndrome patients from Karachi, Pakistan[18]. This discrepancy in frequency of infertility may be possibly due to population-based differences. The same study however; reported almost the same frequency of 80% of obesity in Polycystic Ovarian Syndrome patients[18]. The difference in frequency of infertility due to a population difference is supported by the finding of significantly lower frequency of infertility (6.4 %) in Chinese population as reported by Li R. et.al[19]. Similarly, meta-analysis of PCOS-related studies reported a very low frequency of infertility (8%) in Irani population[25]. Our findings partially tally with results concluded by Al-azemi et al. who reported that 76.3 % of infertile women exceeded the normal BMI range[23].

Overall, 72.8 % (n=182) of the subjects were found to have hirsutism. Majority of those affected, had mild hirsutism. A strong correlation with obesity was observed with about 89 % of the hirsute subjects being obese. A study from Lahore, Pakistan by Munir SS. et al.[17] reported a slightly lower frequency of hirsutism (67.64 %) in Polycystic Ovarian Syndrome patients with positive concordance in terms of mild severity. The frequency of hirsutism however; clearly exceeds that reported by Riaz M et al.[18](51.61 %) and Haq F. et al.[20] (58.9 %) in population of Karachi, Pakistan.

Acne was observed in 64 % (n=151) of patients with Polycystic Ovarian Syndrome. Among those, 90 % had a Body Mass Index above normal with most being pre-obese. The frequency of obesity was significantly higher than that reported by Munir SS et al.[17] (25.9 %) from Lahore, Pakistan and Hussain R. et al.[21](33.33 %) from Karachi, Pakistan.

Irrespective of population-based differences in the prevalence of clinical features of Polycystic Ovarian Syndrome, the striking association of these features with obesity reinforces the findings of MehrunNisa et al[22], Al-azemi et.al[23], Norman et al.[24] reporting an increase in the frequency and severity of all features of Polycystic Ovarian Syndrome with increasing Body Mass Index. These consistencies in results lend to the idea of focusing more on obesity for both prevention and management of Polycystic Ovarian Syndrome.

CONCLUSION

This study concluded that in patients with Polycystic Ovarian Syndrome, the prevalence of infertility, hirsutism, and acne is higher in patients with high Body Mass Index. All of these strongly correlate with obesity. Thus, weight reduction must be mandatory for patients who are being treated for Polycystic Ovarian Syndrome. Restoration of normal reproductive health requires achieving a normal Body Mass Index.

Acknowledgments: The authors feel indebted to Dr. Muhammad Ishtiaq, Associate Professor, Community Medicine department, Nowshera Medical College, Nowshera for his review of the final manuscript and valuable suggestions in research writing.

Author's Contribution:

Concept & Design of Study:	Dure-e-Shehwar Ali
Drafting:	Muhammad Zahid, Henna Salman
Data Analysis:	Umema Zaffar, Afshan Ali, Mubashra Ali
Revisiting Critically:	Dure-e-Shehwar Ali, Muhammad Zahid
Final Approval of version:	Dure-e-Shehwar Ali

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Ortega-Gonzalez C, Luna S, Hernandez L, Crespo G, Aguayo P, Arteaga-Troncoso G, et al. Responses of serum androgen and insulin resistance to metformin and pioglitazone in obese, insulin-resistant women with polycystic ovary syndrome. J Clin Endocrinol Metabolism 2005; 90(3):1360-5.
2. Pillai AS, Bang H, Green C. Metformin & glitazones: do they really help PCOS patients? While the use of metformin and thiazolidenediones in treating PCOS patients is fairly common, this review revealed little evidence-based support for the practice. J family Pract 2007;56(6):444-54.
3. Asunción M, Calvo RM, San Millán JL, Sancho J, Avila S, Escobar-Morreale HcF. A prospective study of the prevalence of the polycystic ovary syndrome in unselected Caucasian women from Spain. J Clin Endocrinol Metabolism 2000; 85(7):2434-8.
4. Xue Y, Xu P, Xue K, Duan X, Cao J, Luan T, et al. Effect of vitamin D on biochemical parameters in polycystic ovary syndrome women: A meta-analysis. Arch gynecobst 2017;295(2):487-96.
5. Lizneva, D. et al. The criteria, prevalence and phenotypes of PCOS. Fertil Steril 2016;106:6–15.
6. Arshad M, Moradi S, Ahmmadkhani A, Emami Z. Increased prevalence of depression in women with polycystic ovary syndrome. Iranian J Endocrinol Metabolism 2012;13: 582-586.
7. Soares EMM, Azevedo GD, Gadelha RGN, Lemos TMAM, Maranhão TMO. Prevalence of the metabolic syndrome and its components in Brazilian women with polycystic ovary syndrome. Fertility and Sterility 2008;89(3):649-55.
8. Legro RS, Arslanian SA, Ehrmann DA, Hoeger KM, Murad MH, Pasquali R, et al. Diagnosis and treatment of polycystic ovary syndrome: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metabolism 2013;98(12):4565-92.
9. Falsetti L, Gambera A, Andrico S, Sartori E. Acne and hirsutism in polycystic ovary syndrome: clinical, endocrine–metabolic and ultrasonographic differences. Gynecological endocrinol 2002; 16(4):275-84.
10. Briggs A, Sadhir M, Todd M, Omar HA. Effect of metformin on body mass index in adolescent females with polycystic ovary syndrome. J Pain Management 2016;9(1):35.
11. Azziz R. The evaluation and management of hirsutism. Obstetrics & Gynecol 2003;101(5): 995-1007.
12. Landay M, Huang A, Azziz R. Degree of hyperinsulinemia, independent of androgen levels, is an important determinant of the severity of hirsutism in PCOS. Fertility and sterility 2009;92(2):643-7.
13. Archer JS, Chang RJ. Hirsutism and acne in polycystic ovary syndrome. Best Practice & Research Clinical Obstetrics & Gynaecol 2004; 18(5):737-54.
14. Azziz, R. et al. The Androgen Excess and PCOS Society criteria for the polycystic ovary syndrome: the complete task force report. Fertil Steril 2009;91:456–488.
15. Sam S, Dunaif A. Polycystic ovary syndrome: syndrome XX? Trends Endocrinol Metab 2003; 14:365–370.
16. Dunaif A. Insulin action in the polycystic ovary syndrome. Endocrinol Metab Clin North Am 1999; 28:341–359.
17. Munir SS, Sultana M, Rasul S. Heterogeneity of the Polycystic Ovary Syndrome Clinical, Endocrinal and Ultrasound Features. P J M H S 2014;8(1):115.
18. Riaz M, Basit A, Fawwad A, Ahmadani MY, Zafar A, Miyan Z, et al. Frequency of insulinresistance in patients with polycystic ovary syndrome: A study from Karachi, Pakistan. Pak J Med Sci 2010; 26(4):791-794.
19. Li R, Zhang Q, Yang D, Li S, Lu S, Wu X, et al. Prevalence of polycysticovary syndromein women in China: a large community based study. Human Reproduction 2013;28(9): 2562–2569.
20. Haq F, Aftab O, Rizvi J. Clinical, biochemical and ultrasonographicfeatures of infertile women with polycysticovarian syndrome. JCPSP 2007;17(2): 76-80.
21. Hussain R, Jehan S, JehanM. Obesity and Insulin Resistance amongInfertile Women with Polycystic Ovarian Syndrome.J Surg Pak 2013;18(4):175-78.
22. Nisa MU. Impact of Obesity on Frequency and Pattern of Disease in Polycystic Ovarian Syndrome (PCOS). Annals of King Edward Medical University 2010;16(2):75-.
23. Al-Azemi M, Omu FE, Omu AE. The effect of obesity on the outcome of infertility management in women with polycystic ovary syndrome. Arch Gynecol Obstet 2004;270(4):205–10.
24. Norman RJ, Noakes M, Wu R, Davies MJ, Moran L, Wang JX. Improving reproductive performance in overweight/obese women with effective weight management. Human reproduction update 2004;10(3):267-80.
25. Jalilian A, Kiani F, Sayehmiri F, Sayehmiri K, Khodaee Z, Akbari M. Prevalence of polycystic ovary syndrome and its associated complications in Iranian women: A meta-analysis. Iran J Reprod Med 2015;13(10): 591-604.