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Original Article

Association of Socio-Demographic factors with Polycystic Ovarian Syndrome; A Comparative Study

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ABSTRACT

Objective: To compare the association of Socio-demographic factors in Polycystic Ovarian Syndrome (PCOS) patients with healthy controls.

Study Design: Comparative cross-sectional study.

Place and Duration of Study: Department of Biochemistry and Molecular Biology, Army Medical College, Rawalpindi, Pakistan, in collaboration with Department of Gynecology and Obstetrics PEMH, Rawalpindi, Pakistan from Apr to Aug 2023.

Methodology: The study comprised 300 females within reproductive age groups. Participants were separated into two groups. Group-I included 150 diagnosed PCOS patients, and Group-II had 150 healthy females selected by non-probability purposive sampling.

Results: The PCOS patients exhibit a higher mean weight than the control Group (*p*-value; 0.017). The comparison of PCOS patients and controls showed significant association with physical activity (*p*-value: 0.038), hirsutism (*p*-value: 0.010) and Ferriman-Gallwey score (*p*-value: 0.001) and consanguineous marriages (*p*-value: 0.076).

Conclusion: This study underscores the significance of socio-demographic factors in the manifestation of PCOS in Pakistan, emphasizing the need for early diagnosis, intervention, and tailored healthcare strategies, particularly among young women.

Keywords: Hirsutism, Infertility, Physical activity, Polycystic ovarian syndrome (PCOS).

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INTRODUCTION

Polycystic ovarian syndrome (PCOS) affects up to 20% of women of childbearing age.[1] The prevalence of PCOS varies greatly over the world, ranging between 6 and 10%.[2] Up to 70% of women with PCOS also experience infertility, making it a well-known cause of female infertility. Women with PCOS who are unable to conceive may not have a good ovarian response to fertility therapies, which might decrease pregnancy success and increase miscarriage risk.[3,4]

Certain environmental factors and genetic predisposition have been observed as disease-driving elements.[5] Environmental factors such as poor nutrition and insufficient exercise may contribute to the aetiology and progression of PCOS.[6] Observed contributing risk factors for PCOS include age, BMI, menstrual irregularity, and family history of PCOS.[7,8] Due to the high rate of intrafamily marriages and the prevalence of obese women, the Pakistani community is genetically predisposed to metabolic disorders.[9] Intra-family marriages encourage the transmission of IR, a known inheritable factor that aggravates the phenotype of PCOS and related metabolic problems during pregnancy.

Because of the high prevalence of the disease and relationship with several risk factors, it is necessary to determine the demographic and clinical characteristics linked to PCOS. Therefore, this study aimed to determine the demographic and clinical parameters linked to PCOS.

METHODOLOGY

The comparative cross sectional study was conducted at the Department of Biochemistry and Molecular Biology, Army Medical College, Rawalpindi, Pakistan in collaboration with the Department of Gynecology and Obstetrics, Pak Emirates Military Hospital, Rawalpindi, Pakistan from April to August 2023, after approval was obtained from the Institutional Ethical Review Committee (ERC/ID/272).

Inclusion Criteria: Female patients aged 15-49 years diagnosed with PCOS according to the Rotterdam criteria were inlcuded. Controls were healthy females within the reproductive age group selected from PEMH who participated voluntarily.

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Exclusion Criteria: Pregnant or lactating women, and those with pre-existing medical conditions such as diabetes mellitus, hypothyroidism, hyperthyroidism, hyperprolactinemia, pituitary tumours and adrenal insufficiency were excluded.

Anthropometric variables were taken from all participants according to WHO guidelines.[10] Hirsutism was defined by the growth of excessive male pattern hair in women after puberty. The menstrual cycle length greater than 35 days was considered as Oligomenorrhea.[11,12]

Before data collection, informed written consent was obtained from all subjects, and a preformatted proforma was employed to record the required information systematically. Detailed histories of 300 subjects were taken. BMI was calculated by dividing weight in kg by height in square meters. WHO criteria classify BMI into underweight (<18 kg/m^2), normal (18.5-24.9 kg/m^2), overweight (25-29.9 kg/m^2) and obese (>30kg/m^2) category.[13]

Statistical Package for Social Sciences (SPSS) version 26.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Chi-square test and Independent sample t-test was applied to explore the inferential statistics. The *p*-value of ≤0.05 was set as the cut-off value for significance.

RESULTS

A total of 300 participants participated in the study. Patients had a mean age of 30.11±5.77 years. There was notable discrepancy in socioeconomic status between the two groups, with more PCOS patients falling into the lower class category (*p*-value-0.065) (Table-I). PCOS patients exhibit a higher mean weight than the Control Group (*p*-value: 0.017). Mean BMI values were similar between the two groups, (Table-II).

The comparison of PCOS patients and controls showed a significant association with physical activity (*p*-value: 0.038), hirsutism (*p*-value= 0.010), and the FG (Ferriman-Gallwey) score (*p*-value=0.001), (Table-III). The frequency of infertility between both groups was 76 and 38, respectively, with a significant difference (Figure).

DISCUSSION

In this study, 300 participants were enrolled and equally distributed into two groups. Subsequently, patients were categorized by age, and the analysis revealed that more than half of them were under the age of thirty. One study reported that PCOS patients had a mean age of 23.55, with the majority falling between the ages of 20 and 29 (72.7%).[14] While some symptoms of PCOS may manifest as early as menarche, the majority of issues typically do not become evident until a woman reaches her early twenties or thirties. Consequently, diagnosis tends to be more prevalent in the later stages of life.[15]

Table-I: Socio-Demographic Characteristics of Study Participants (n=300)

Characteristics	Group-I (PCOS Patients) (n=150)	Group-II (Control Group) (n=150)	*p*-value
Age (years)	Mean±SD 30.1±5.78	Mean±SD 30.14±5.72	0.748
Education			
Uneducated	5(1.7%)	2(0.7%)	0.164
Primary	19(6.3%)	29(9.7%)	
Middle School	45(15%)	52(17.3%)	
High School	58(19.3%)	42(14%)	
Graduation	23(7.7%)	25(8.3%)	
Marital Status			
Unmarried	7(2.3%)	13(4.3%)	0.353
Married	141(47%)	135(45%)	
Divorced	1(0.3%)	2(0.7%)	
Widowed	1(0.3%)	0(0%)	
Socio-Economic Status			
Lower Class	35(11.7%)	30(10%)	0.065
Middle Class	106(35.3%)	118(39.3%)	
Upper Class	9(3%)	2(0.7%)	
Occupation			
Housewife	121(40.3%)	128(82.7%)	0.385
Student	7(2.3%)	10(3.3%)	
Teacher	12(4%)	11(3.7%)	
Others	3(1%)	8(2.7%)	

Table-II: Anthropometric Characteristics of Study Participants (n=300)

Characteristics	Group-I (PCOS Patients) (n=150) (Mean ± SD)	Group-II (Control Group) (n=150) (Mean ± SD)	*p*-value
Height	2.48±0.1m	2.51±0.17m	0.259
Weight	62.58±8.8kg	63.0±8.8 kg	0.017
BMI	25.26±3.5 kg/m^2	25.10±3.7 kg/m^2	0.335

PCOS is a recognized major healthcare concern in Pakistan due to its high prevalence, with the potential to lead to various adverse chronic conditions if not detected early, including diabetes, high blood pressure, obesity, and cardiovascular disorders. While

Table-III: Comparison of Family History and other Characteristics (n=300)

Parameters	Group-I (PCOS Patients) (n=150)	Group-II (Control Group)(n=150)	*p*-value
Consanguineous Marriages			
No	57 (19%)	53(17.7%)	0.076
Yes	93(31%)	92(30.7%)	
Unmarried/ Widowed	0(0%)	5(1.7%)	
Family History			
Negative	77(25.7%)	72(24%)	0.213
Positive	39(13%)	52(17.3%)	
No information	34(11.3%)	26(8.7%)	
Physical Activity			
Moderately Active	78(26%)	56(18.7%)	0.038
Less Active	70(23.3%)	91(30.3%)	
Very Active	2(0.7%)	3(1%)	
Exercise			
No	25(8.3%)	21(7%)	0.116
Infrequent	83(27.7%)	84(28%)	
30 minutes daily	17(5.7%)	8(2.7%)	
30 minutes 3 times a week	25(8.3%)	37(12.3%)	
Hirsutism			
Nil	71(23.7%)	84(28%)	0.010
Yes	79(26.3%)	66(22%)	
FG Score (Ferriman-Gallwey score)			
Mean ± SD	5.91±2.6	1.20±1.3	0.001

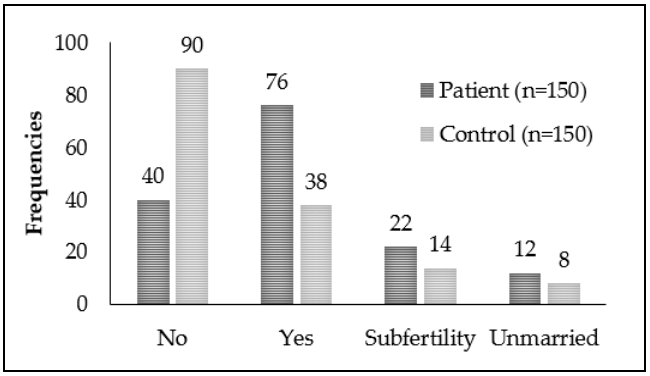

Figure : Frequency Comparison of Infertility Between two Groups (n=300)

some of the disease's symptoms may manifest even before puberty, many women remain undiagnosed during their adolescent years. Consequently, several women postpone seeking medical attention until they actively attempt to conceive. Early diagnosis and treatment are imperative, as they can significantly reduce the risk of infertility and bring about life-altering improvements for these young women.[16,17]

Demographic characteristics of the patients revealed that the majority had a high school degree (33%), followed by middle school (32.3%) and primary school (16%). A significant portion of the participants were married (92%), with 61.6% of them having consanguineous marriages, reflecting a genetic predisposition to metabolic disorders due to the prevalence of intra-family marriages and obesity in our community. The socioeconomic distribution showed that 224(74.6%) patients belonged to the middle class, 65(21.6%) to the lower class, and 11(3.6%) to the upper class. Hirsutism was present in 48.6% of the patients. These demographic findings indicate a correlation with PCOS, which is consistent with the findings of various studies.18

The mean BMI of the patients was 25.88±3.2, categorizing them as overweight, while the control group had a mean BMI of 24.50±3.8. BMI serves as an indicator of obesity and is linked to the pathogenesis of PCOS, as evidenced by this study. Notably, this research revealed that obesity was more common among younger individuals. Analysis of the physical activity levels of patients revealed that 46(15.3%) engaged in no exercise, 167(55.6%) reported infrequent exercise, 62(20.6%) exercised three times a week, and 25(5%) engaged in daily 30-minute exercise. Furthermore, 134(44.6%) were categorized as mildly active, 161(53.6%) displayed less activity, and only 5(1.6%) were considered very active. These findings suggest a potential link between reduced physical activity and obesity in the development of PCOS.

Among the participants, 112(37.3%) presented with primary infertility related to PCOS, while 36(12%) experienced sub-fertility due to PCOS. It is important to note that infertility significantly impacts family stability in a wide range of cultures, particularly in underdeveloped nations, where childlessness can have adverse social consequences. Additionally, it is vital to acknowledge that many fertility treatment methods are based on research conducted on Caucasian populations.[18]

These results emphasize the need for early diagnosis, intervention, and tailored healthcare strategies to mitigate the effects of PCOS, particularly in young women. Future research and public health initiatives should address these socio-demographic determinants to improve the overall well-being of PCOS patients in Pakistan.

CONCLUSION

Our study underscores the critical role of socio-demographic factors in the prevalence and manifestation of Polycystic Ovarian Syndrome (PCOS) in Pakistan. Our findings highlight the influence of education, consanguineous marriages, family history, obesity, physical activity, and infertility on the development and impact of PCOS in this population.

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Conflict of Interest: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

MB & NA: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

IAS & HGK: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

AR & RTZ: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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