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Research Article

POLYCYSTIC OVARY SYNDROME, BLOOD GROUP & DIET: A CORRELATIVE STUDY IN SOUTH INDIAN FEMALES

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ABSTRACT

Aim: To find out the co-relation between polycystic ovary syndrome (PCOS) with blood group & diet in South Indian females, between the age-group of (20-30) years. **Objectives:** Correlative analysis of ABO & Rh system, dietary habits & alcohol consumption with PCOS. **Materials & Methods:** 100 patients between (20-30) years, diagnosed with PCOS were selected. A standard PCOS questionnaire was given. Blood group & dietary status data were collected. Patients were grouped according to ABO & Rh system considering their diet & alcohol intake (p 0.05 significant). **Result:** Our data revealed that the highest risk of PCOS was observed in females with blood group 'O' positive followed by 'B' positive who were on mixed diet & used to consume alcohol. Our study also suggests that Rh negative individuals didn't show any association with PCOS. **Conclusion:** The results of our study suggest that 'O' positive females, are more prone to PCOS. Though the relative frequency of B positive individuals are more in India, females with blood group O positive are more susceptible to PCOS, contributing factors being mixed diet & alcohol intake. So, early screening of 'O' positive & 'B' positive females of reproductive age-group in South-India, could be used as a measure for timely diagnosis of PCOS, better management & also prevention of complications. However, further research should be done to investigate the multifaceted mechanisms triggering these effects.

Keywords: Polycystic ovary syndrome, Blood group, Diet, Alcohol.

INTRODUCTION

The first description of the human blood group system was published by Karl Landsteiner in 1900, working to understand the unpredictability of haemolytic reaction resulting from early attempts at transfusion.¹ International society of blood transfusion (ISBT) currently recognizes 285 blood group antigens.² In Humans, among these, ABO system is the most important blood group system & Rh is the second most significant. Anthropologists use ABO

blood types extensively as a guide to the development of early diseases, especially digestive disorders, cardiovascular diseases, cancer & infection.³⁻⁷ Some blood types are associated with inheritance of other diseases; for e.g., the Kell antigen is sometimes associated with Mc. Leod syndrome.⁸ Certain blood types may affect susceptibility to infections, an example being the reduced susceptibility to vivax malaria in individuals lacking duffy antigen.⁹ Positive

correlation has been seen with group A & ischemic heart disease.

Polycystic ovary syndrome (PCOS) is one of the most common syndromes in the modern world in women during their reproductive age. Polycystic ovary syndrome is a complex metabolic, endocrine & reproductive disorder affecting approximately (5-10) % of the female population in India.¹⁰ PCOS, a complex syndrome of unclear etio-pathogenesis, appears to involve genetic & environmental components.¹¹ It has also been associated with coronary heart disease, diabetes & other metabolic syndromes & hence the estimation of high PCOS prevalence rates appear in the countries where obesity & type 2 diabetes are more common.¹² Even though women with PCOS vary in degree of overweight, (30-75%) of the cases contend with being overweight/obese.¹³ In the past two decades, developing countries began relying on westernized diets & lifestyles. It is predicted that they may see up to 6 fold increase in the obesity prevalence in the next 10 years, especially from India who already has the highest rates of diabetes in the world.¹⁴ Though genetic predisposition plays an important role, many studies also show that dietary habits & exercise can also influence the causation of the disease.¹⁵ Treatment of PCOS is mainly aimed at lowering insulin resistance levels, restoration of fertility & regular menstruation, treatment of hirsutism/ acne & prevention of endometrial hyperplasia & endometrial cancer though the optimal treatment is still doubtful.^{16,17}

Polycystic Ovary Syndrome

Polycystic ovary syndrome (PCOS) is a complex heterogeneous disorder, with a strong evidence of it being classified as a genetic disease.¹⁸ PCOS is the most common cause of anovulation in women with normal serum FSH and estradiol levels.¹⁹ This condition was first described in the year 1935 by American gynaecologists Irving F. Stein, Sr. & Michael L. Leventhal from whom the original name of Stein-Leventhal Syndrome is taken.²⁰ PCOS includes signs & symptoms with varying degree of mildness & severity in affecting the reproductive, endocrine and metabolic functions.²¹ PCOS is the commonest cause of an ovulatory subfertility. The symptoms are usually excessive weight gain, oligomenorrhea/amenorrhea, high triglyceride & insulin levels in the blood, etc., It is also associated

with other types of menstrual disorders & infertility which generally results from chronic anovulation.²² The most common signs are acne, hirsutism, hypermenorrhea,²³ etc., Though the exact cause of PCOS is yet unknown, there is strong evidence that it is a genetic disease. Such evidence includes the familial clusters of cases, greater concordance in monozygotic compared with dizygotic twins and heritability of endocrine and metabolic features.²⁴

In India, nowadays the adolescents & teenagers are more attracted towards the western food habits. The intake exceeds the burning of calories, thus resulting in the accumulation of fats in the adipose tissue. There is in general agreement that, obese women with PCOS are insulin resistant.²³ There are some long term health complications of PCOS like, those with hyper-insulinemia are at a greater risk of developing type-II diabetes & gestational diabetes, hyper-androgenic individuals are more prone towards developing arterial diseases, etc.,¹⁶ For a PCOS patient, it is always advised to have a proper diet rich in fibers, vitamins & a low glycemic index (GI) diet in which a significant part of total carbohydrates are obtained from fruit, vegetables & whole grain sources.²⁵ It is well known that Vitamin D deficiency may play a significant role in exacerbating PCOS & so, vitamin D supplementation is found to be effective in the management of this syndrome.²⁶ As we all know, regular exercise is required to keep us healthy, it has been seen that, low-carbohydrate diets & sustained regular exercise may help practically to improve every parameter of PCOS, e.g., in obese, an ovulating PCOS women, weight loss restores ovulation & pregnancy rates.

Blood Group & Diseases

A study has shown that about 39% of the Indian population belongs to blood group B, followed by blood group O (31%) & A (21%). Only about 9.0% of the Indian population belongs to blood group AB. About 95% of these people are Rh⁺ & 5% are Rh⁻.²⁷ Relationship between blood group O & peptic ulcer is well established.² A study of association between ABO blood groups, peptic ulcer & gastric cancer showed that there is an increased risk of gastric cancer in A & AB blood groups & a low risk of stomach ulcers in all the non O groups relative to blood group O. A longitudinal study of the association between ABO phenotype & the total serum

cholesterol levels in a Japanese cohort showed that the total cholesterol levels are elevated on an average by about 4mg/dl in phenotype A as compared to non A groups, thus indicating that phenotype individual may be more predisposed to the cardiovascular diseases through one of its major risk factors⁷. Common health complications of PCOS include endometrial cancer, heart disease, diabetes, metabolic syndrome, etc.,¹⁶

Till date, no relevant study has been conducted to show whether any association exists between blood groups & PCOS. So, the present study was designed to find out the relationship of blood group & diet with polycystic ovary syndrome (PCOS) in females of reproductive group.

MATERIALS & METHODS

Study design & setting: this is a hospital based cross sectional study which included patients between the age-group of (20-30) years, diagnosed with PCOS, from Kasturba Medical College Hospitals & Government Lady Goshen Hospital, Mangalore, Karnataka, India. The study protocol was approved by the Institutional Ethics Committee. At orientation, each patient was explained the purpose, procedures & confidentiality of this study prior to their written informed consent. The duration of the study was one year.

Inclusion criteria: patients between the age group of (20-30) years, diagnosed of PCOS, were taken into the study.

Exclusion criteria: patients diagnosed of suffering from any chronic illnesses (except diabetes mellitus) were not included in the study.

Method of study

The study involved 100 patients between the age group of (20-30) years, diagnosed with PCOS, in our hospitals. A PCOS questionnaire was handed over to the patients included in the study & data was recorded in the proforma for each patient.^{28,29} Patients were grouped according to their blood groups & food habits including alcohol consumption. A correlative analysis of the data was then be made accordingly.

Statistical analysis: parameters were analyzed using one way ANOVA(Tukey's Multiple Comparison Test). p 0.05 was considered as significant.

RESULTS

Fig. 1 represents that females with blood group "O" positive have the highest risk of developing PCOS (p 0.05), followed by women of blood group B positive. Also, Rh negative individuals didn't show any association with PCOS.

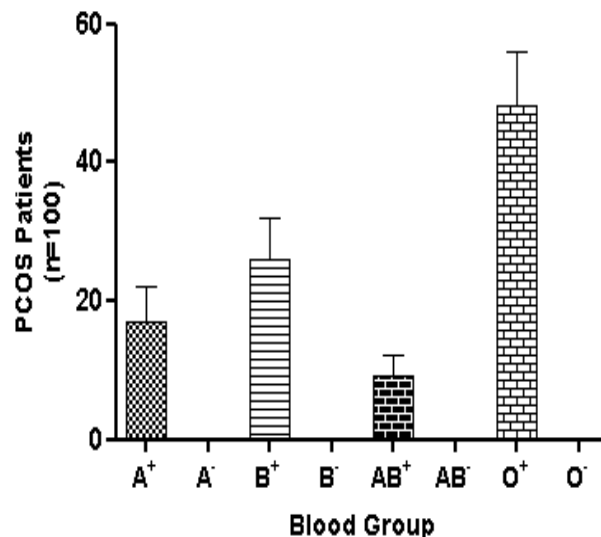


Fig 1: Co-relation between blood group & PCOS (Values are represented as Mean \pm SD, p 0.05 significant)

The data in Fig 2 show that females on the mixed diet were found to have a significant risk of developing PCOS as compared to those on vegetarian diet only. Alcohol intake was an additive factor to that.

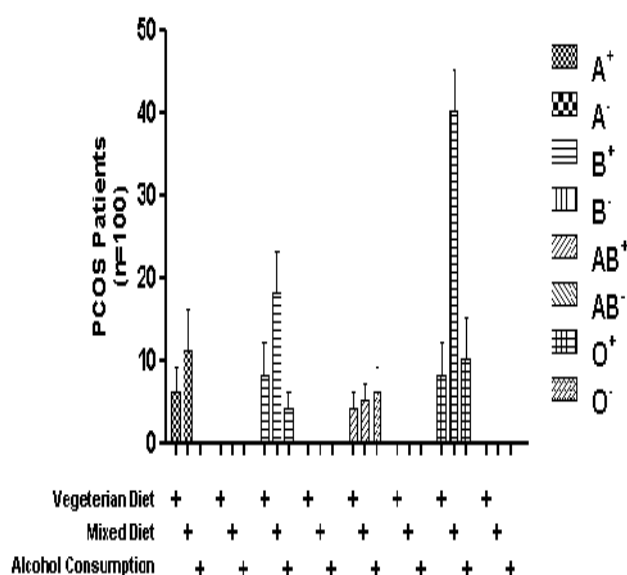


Fig 2: Co-relation of PCOS with blood group & food habits. (Values are represented as Mean \pm SD, p 0.05 significant)

DISCUSSION

There is increasing evidence that blood group substances play a major role in the causation of a disease/in the protective mechanism against it. A study conducted showed a significant positive association with blood group A & negative association with blood group O in myocardial infarction, a significant positive association with all the blood groups except for blood group O in valvulo-pathic (rheumatic) diseases, a positive association with A phenotype & negative with B in arterial hypertension, in males only & no association of ABO blood groups & congenital heart diseases.¹Differential diagnosis of PCOS includes, hypothyroidism, congenital adrenal hyperplasia, Cushing's syndrome, hyper-prolactinemia, androgen secreting neoplasms, other pituitary/adrenal disorders, etc.,²⁹

The most commonly used blood group systems in humans are ABO & Rh systems due to their importance in blood transfusion & association with various diseases.²⁹Polycystic ovary syndrome affects approximately (5-10) % of the female population in India¹⁰.It is well known that the prevalence rates of PCOS are rising in countries, where obesity & type 2 diabetes are more common.¹²It is known that in PCOS individual's serum levels of insulin may be elevated. Around 40% of females with PCOS have some degree of glucose intolerance. So, blood glucose level testing for diabetes is usually recommended. Studies have shown that anti-diabetic medications like, metformin, etc., have shown encouraging results, particularly in obese patients who are suffering from chronic anovulation.¹⁶India having the highest rates of diabetes in the world with an increasing trend towards obesity in this modern era, is expected to have a high prevalence of PCOS in the next few years.¹⁴Literature surveys shows that blood group substances have significant association with the causation of disease, e.g., blood group A with arterial hypertension & myocardial infarction, blood group O& peptic ulcer, etc.,¹The present study showed that females with blood group O positive have the highest risk of developing PCOS, followed by women of blood group B positive. Though the relative frequency of B positive individuals are more in India, females with blood group O positive are more susceptible to PCOS. Standard diagnostic

assessments for PCOS include, history taking, signs & symptoms, various laboratory tests, but pelvic ultrasound still remain the major diagnostic tool.¹⁶A previous study conducted on blood group &breast cancer showed no relation exists with the Rh factor &breast cancer.^{30,31}Similarly, our findings also reveal that, Rh negative individuals didn't show any association with PCOS. Researches have shown that dietary habits can influence the causation of the disease.¹⁵The present findings are in accordance with previous studies which shows that mixed diet & alcohol are contributing factors for the development of the disease.

CONCLUSION

Early screening of O positive & B positive females of reproductive age-group in South-India especially those on mixed diet & alcohol could be used as a measure for early diagnosis of PCOS, better management & also prevention of complications.

LIMITATIONS OF THE STUDY

Though the present study showed that females with blood group O positive have the highest risk of developing PCOS, followed by women of blood group B positive & Rh negative individuals didn't have any association with PCOS, further research should be done to investigate the multifaceted mechanisms triggering these effects.

Generalization of the obtained findings would not be possible till replication of the same is carried out on the patient population in other parts of the country.

Conflict of interest: None

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