

Frequency and Factors of Polycystic Ovarian Syndrome in College Going Females

RABAIL JAVED¹, BISMA DAUD², NASEEM JAHAN³

¹Research Officer, Pakistan Health Research Council, National Health Research Complex, Shaikh Zayed Hospital, Lahore

²Lahore College for Women University, Lahore

³Assistant Professor of Physiology, D.G. Khan Medical College Dera Ghazi Khan

Correspondence to: Rabail Javed Email: rabailjaved@hotmail.com, Cell +92-322-6781668

ABSTRACT

Objective: To get an in depth knowledge of various factors affecting polycystic ovarian syndrome and also find the frequency of polycystic ovarian syndrome.

Study Design: Descriptive study

Place and Duration of Study: Department of Gynecology and National Health Research Complex (NHRC), Shaikh Zayed Medical Complex Lahore from 1st January 2019 to 30th June 2019.

Methodology: One hundred and forty seven participants (18-26 years) were enrolled in this study with 46 clinically confirmed polycystic ovarian syndrome females through Rotterdam criteria. Five ml of blood was withdrawn from each participant, serum separated and stored at -20°C until biochemical analysis of LH, FSH and prolactin of these patients. Ferriman Gallwey score was adopted for hirsutism in each participants and BMI was measured by using analogue weighing scale. Food frequency charts were used for recording dietary habits of each participant. The activity rate charts were used for analyzing activity level of each participant.

Results: Thirty one percent of polycystic ovarian syndrome among college going girls with 50% hirsute with majority between 18-20 years. The familial history was present in 23.9% females with 84.7% suffering from oligomenorrhea. The prolactin was normal within polycystic ovarian syndrome. However, the mean LH/FSH ratio was 13:8mIU/ml, whereas, it was 5:5 mIU/ml among controls. Stress followed by sleep apnea was seen in 65% and 35% participants, respectively with 56.5% having sedentary to slow activity rate and 41.3% participants being over-weight to obese. Only 26% participants were having diet according to recommended dietary allowance.

Conclusion: The 31% college going females especially between 18-20 years were suffering from polycystic ovarian syndrome. Stress, activity rate and obesity play a major role in formulation of polycystic ovaries.

Key words: Polycystic ovarian syndrome, Hirsutism, Dietary habits, Fertility, Adolescent females, Lifestyle

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is an endocrine fertility disorder involving over production of immature eggs forming bead like structure inside the ovaries. PCOS effects the normal functioning of fertility hormones such as luteinizing hormone, follicle stimulating hormone, prolactin, estrogen and progesterone. The LH/FSH ratio alters from 1:1 to 2:1 or 3:1 with an additional high prolactin levels in women suffering from polycystic ovarian syndrome.¹

The prevalence of PCOS is increasing rapidly over the globe affecting 4-10% of adolescent females globally and 6-9% in European countries.² In developing countries like Pakistan, the overall reported prevalence of PCOS is 17.6%.

The common factors associated with PCOS formation are obesity, sedentary lifestyle and unhealthy eating habits including over consumption of fatty foods, broiler chicken and tetra packs.³ Although diet, lifestyle modification and exercise have been proven helpful in the management of polycystic ovarian syndrome.⁴ still its frequency is constantly increasing in adolescent females. Additional factors such as stress, depression and sleep deprivation in relation with PCOS are not popularly studied in Asian population and can prove as a significant indicator of provoking PCOS in females worldwide.

The present study assessed the increase in prevalence of polycystic ovarian syndrome in college going females and highlighted additional factors which may be responsible for formation of polycystic ovaries in young girls.

MATERIALS AND METHODS

It was a descriptive study conducted at Department of Gynecology and National Health Research Complex (NHRC), Sheikh Zayed Medical Complex Lahore from from 1st January 2019 to 30th June 2019 and enrolled 147 college going females and were within the age of 18-26 years. Females with virilism, cushing syndrome, pregnancy or any other related syndrome/disorder were excluded. All participants were further interviewed by the help of a well structured questionnaire including clinical symptoms, factors such as stress, smoking, lifestyle, dietary habits, any other hormonal problem and food frequency chart.⁵ History of acne, oligomenorrhea or amenorrhea, sleep disturbance, alopecia was also recorded. The BMI was calculated after measuring height and weight by Hercules Health Scale and blood pressure was monitored by analogue mercurial sphygmomanometer (1400126) of American Diagnostic Corp (ADC). The waist and hip circumference was measured of each participant to find waist to hip ratio.⁶ Hirsutism was also categorized (grade 1-4) by using Ferriman Gallwey scoring method.⁷

A 5ml blood was withdrawn from each study participant. The blood was centrifuged for obtaining serum at 3000rpm and stored at -20°C until analysis. PCOS was categorized in accordance with Rotterdam criteria of diagnosis.⁸ Enzyme Linked Immunosorbent Assay (ELISA) for LH, FSH and PRL was performed using commercially available kits of Cal Biotech (China). The sensitivity of these assays (LH, FSH and Prolactin) was 5mIU/ml. All assays were run in duplicates with three quality control

pools at start and end of the assay batch. The optical density of each assay was measured at 450 nm.

Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 21.0. For quantitative variables t-test and ANOVA was applied. Value of $p \leq 0.05$ was considered significant.

RESULTS

The age between 18-26 years with mean age was 22.2 ± 2.6 years. There were 46 (31%) positive for PCOS. Highest incidence of PCOS was observed within the age group of 18-20 years (14.2%). A significant association (50%) was found between PCOS and hirsutism especially in the age group of 21-23 years (30%). Oligomenorrhea was also noticed in 84.7% study participants confirmed for PCOS and once again predominantly found within the age group of 18-20 years [36.9%] (Fig. 1). The activity rate of PCOS patients showed that 56.5% versus controls 20% were having sedentary lifestyle whereas only 10.8% PCOS participants were doing brisk exercise versus 30% healthy controls. Number of overweight PCOS study participants was 28.2% (Table 1).

Comparing the Body Mass Index (BMI) with waist hip ratio (WHR), it was noted that, 44% normal weight patients had a high WHR value. Most of the overweight had a much higher value of WHR (Table 2). Stress as an important factor was also studied and was found in 65% of PCOS study participants. The higher incidence of stress was observed within the age group of 18-20 years (32.6%). It was also seen that there was a significant association of BMI with stress as 21.7% and 13% study participants that have stress were also overweight and obese respectively (Table 3).

While assessing dietary habits of PCOS patients it was noticed that consumption of fried foods was also highest among 32 patients in comparison to controls. Almost all the patients were consuming white rice. Majority

of the patients was taking broiler chicken in their diets. Twenty two percent PCOS cases were using junk food on alternate days. Consumption of green vegetables was also seen less in PCOS patients (Fig. 2).

The dietary pattern of control participants was also compared with presently reported PCOS patients. It was evidently noticed that healthy females were more inclined towards protein diet than carbs. They consumed pulses, eggs, milk and wheat on daily basis. Consumption of meat was also less while fruits more in healthy females (Fig. 3). In the present study, only 34.7% (16 patients) were having adequate Recommended Dietary Allowance (RDA) level and 65.1% were having inadequate RDA level (Table 4). Familial history of PCOS confirmed patients showed 15.2% patients having a strong history of PCOS and oligomenorrhea which was inherited to them through their maternal parent. None of enrolled participant gave a positive smoking history.

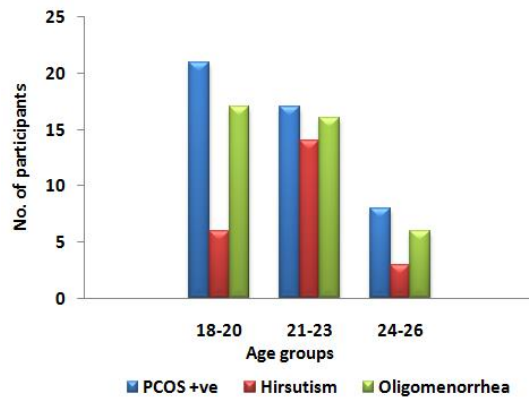


Fig. 1: Age distribution of PCOS positive patients and association with hirsutism and oligomenorrhea

Table 1: Rate of Activity and BMI of PCOS Patients

Age (years)	Activity rate			BMI		
	Sedentary	Active	Brisk	Normal	Over weight	Obese
18-20	15	5	1	15	5	1
21-23	11	3	3	10	4	3
24-26	00	7	1	2	4	2
Total	26(56.5%)	15(32.6%)	5(10.8%)	27(58.6%)	13(28.2%)	6(13%)

BMI normal=18.5-24.9, overweight=25-29.9, obese= ≥ 30

Sedentary= resting state except light activity, Active= able to walk and achieve physical tasks, Brisk= tough work out for >20 min

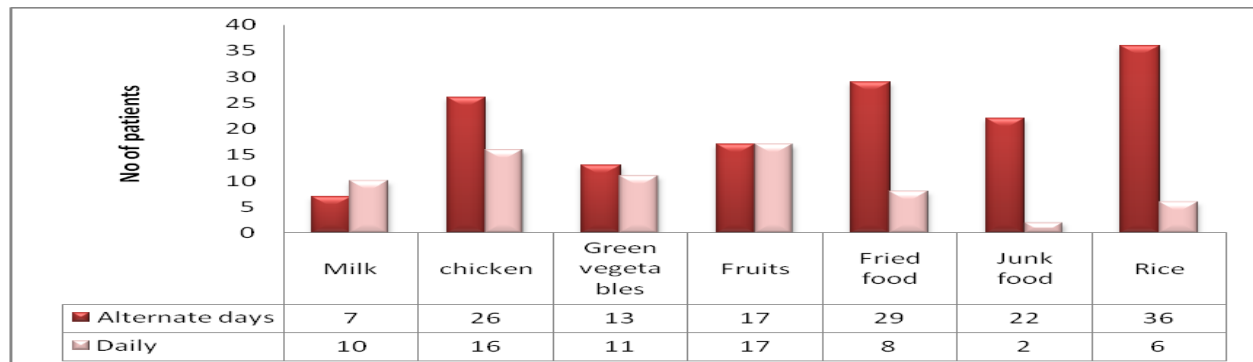


Fig. 2: Dietary habits of PCOS patients

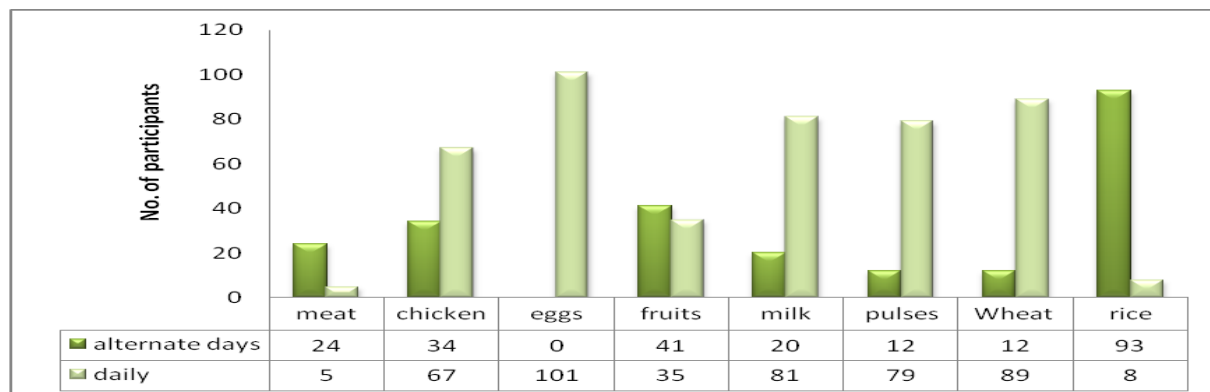


Figure 3: Dietary habits of controls

Table2: Association of BMI and waist to hip ratio

Body mass index	Waist to hip ratio			Total
	Low	Moderate	High	
Normal weight	12	3	12	27
Over weight	0	2	11	13
Obese	2	2	2	6
Total	14	7	25	46

WHR Low= ≤ 0.80 , moderate= $0.81-0.85$, high= ≥ 0.86

Table 3: Incidence of Stress in PCOS Patients and Relation with BMI

Age	Stress	Body Mass Index		
		Normal	Over weight	Obese
18-20	15 (32.6%)	8(17.3%)	5(10.8%)	2 (2.1%)
21-23	12(26%)	6(13%)	3(6.5%)	3(6.5%)
24-26	3 (6.5%)	-	2(4.3%)	1 (2.1%)
Total	30(65%)	14(30.4%)	10(21.7%)	6(13%)

Table 4: PCOS versus Calorie Intake

Calorie intake (kcal)	No.	%
<399	3	6.5
400-699	12	26.0
700-999	15	32.6
1000-1500	16	34.7
Total	46	100.0

DISCUSSION

Polycystic ovarian syndrome is a common endocrine disorder effecting fertility aged females, disturbing the natural process of ovulation. Its prevalence has increased within last few years due to contribution of many new factors.¹

In the present study, estimated prevalence of PCOS was 31% in young girls with higher incidence of oligomenorrhea and hirsutism especially in the age group of 18-20 years of age. It seems that >18 years is more prevalent age for getting PCOS.⁹

International studies elaborates that sedentary life style attributes to weight gain and PCOS development.^{10,11} The present study reports 56.5% PCOS females with inactive lifestyle especially within the age of 18-20 years. This interprets that sedentary life style can be a leading factor in formation of PCOS in young girls.

Out of total PCOS positive patients 58.6% had a normal BMI (n=27). However, almost 50% of these had high Waist to hip ratio. Studies confirm that, high WHR is related with fertility issues as well as other diseases like

cardiovascular and diabetes.^{12,13} This might be a reason of normal BMI females to be PCOS in present study as well. The fat deposits in the lower abdomen of PCOS females ascribe to hormonal imbalance causing a pear shaped body despite of normal BMI.¹⁴

Stress seems as a major contributing factor towards PCOS development as observed in this study. The present study reports that females above 18 years of age did not only suffered from anxiety and depression but had highest chance of PCOS as well. The stress was caused by factors such as academic influence, hormonal changes and sleep deprivation. Another study conducted in Pakistan also reported the same (15). A significant association was also found between stress and obesity with 77.7% overweight or obese participants having stressful life. Studies around the globe also correlate stress, obesity and polycystic syndrome. A study in USA reported that overweight PCOS females were having some kind of stress related factors in their day to day life.¹⁶

In study participants, imbalanced calorie consumption was recorded in present study. A study from Iran reported strong primary relationship between polycystic ovarian syndrome and higher caloric intake.¹⁷ However, in this study, the imbalance was inclined towards low average (a week chart) calorie intake than RDA with more than 80% participants consuming fried items and 50% eating junk food. Their food patterns were filled with unhealthy diet with a very low consumption of vegetables and fruits. Their dietary pattern showed a very high consumption of broiler chicken. The high fat intake could be a major cause of hormonal imbalance in PCOS participants.¹⁸

In current study, no positive association between PCOS and smoking was found as none of the PCOS positive study participants responded positively towards cigarette smoking as reported in the past.¹⁹

CONCLUSION

Thirty one percent of college going females especially between 18-20 years were suffering from polycystic ovarian syndrome. Stress, activity rate, unhealthy dietary habits and obesity play a major role in formulation of PCOS. Maintaining normal body mass index through healthy diet and low calorie consumption and by brisk exercise may prove helpful in controlling/managing this syndrome.

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