



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1286243>Available online at: <http://www.iajps.com>

Research Article

**ASSOCIATION OF OBESITY AND FAMILY HISTORY WITH
HYPERGLYCEMIA IN POLYCYSTIC OVARIAN SYNDROME
PATIENTS**¹Dr. Sana Batool, ²Dr. Unsa Ghafoor, ²Dr. Javeria Mahmood¹MBBS, Fatima Jinnah Medical College, Lahore, Pakistan²Lahore General Hospital, Lahore**Abstract:**

Objective: To assess the diabetes in polycystic ovarian syndrome patients and their association with obesity and family history.

Methods: Over period of 6 months, from January to June 2017, patients who visited gynecology department of Govt. Sardar Begum Teaching Hospital Sialkot, Pakistan were studied, by following descriptive cross sectional study design. 289 PCOS patients who visited outdoor gynecology clinic were included in study. The age group was from 13 to 35 years. BMI was more than 23.

Results: mean age of all participants was 22.4±4.2 years. 86 (29.7%) patients had hyperglycemia. All patients were confirmed cases of PCOS. Most common age group was from 13 to 20 years. 153(52.9%) patients belonged to 13 to 20 years age group, out of which 19 (12.4%) patients had hyperglycemia. 167 (57.9%) patients had obesity and 119 (41.1%) had family history of PCOS.

Conclusion: Hyperglycemia is a common complaint seen among PCOS patients. Proper screening and management of this issue must be done in all set ups.

Keywords: Polycystic ovarian syndrome, obesity, hyperglycemia, family history.

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Please cite this article in press Sana Batool et al., Association of Obesity and Family History with Hyperglycemia in Polycystic Ovarian Syndrome Patients, Indo Am. J. P. Sci, 2018; 05(06).

INTRODUCTION:

Polycystic ovary syndrome is a common disorder seen in women during child bearing age. The disease is characterized by presence of hirsutism, acne, hyperpigmentation, oligomenorrhea or amenorrhea, obesity and diabetes mellitus [1, 2]. The exact mechanism of disease is unknown. But hyperandrogenemia is mainly involved in the occurrence of abovementioned signs and symptoms. The infertility rate in PCOS patients is very common. It leads to anxiety and depression in patients. The major cause of mental stress is the infertility rate in PCOS females [3]. Hirsutism is seen in almost 60% of females with PCOS, it's the most common sign [4]. Acanthosis nigricans and hyperkeratotic skin and alopecia are the other common signs [5]. Obesity is defined in terms of BMI, according to WHO the ranges for normal overweight and obese BMI are as under.

18.5 to 24.9 kg/m² is normal range, between 25 to 30 kg/m² is overweight, more than 30 kg/m² is obese and more than 40 kg/m² is severely obese [6]. The understudy topic aims in determining the possible association between hyperglycemia or insulin resistance in PCOS patients and obesity along with family history of PCOS. Gonzalez F studied the fact that hyperglycemia causes release of tumor necrosis factor alpha among obese PCOS patients. Tumor necrosis factor alpha has a direct association with amount of truncal fat. This raised level of serum TNF-alpha leads to insulin resistance among obese PCOS patients [4]. However, further studies needs to be done in order to find the exact mechanism of this correlation between obesity and diabetes in PCOS.

MATERIALS AND METHODS:

Patients visiting Govt. Sardar Begum Teaching Hospital, Sialkot, Pakistan were included in study. Only diagnosed cases of polycystic ovarian syndrome, who visited outdoor clinic of gynecology department were considered part of study population. Informed written consent was signed from all participants and no ethical certificate was obtained from hospital ethical committee. Study sample was 289.

Only those patients were included who were in their reproductive age group i.e. from 13 to 35 years and

had BMI in above normal range. Those who were already suffering from diabetes mellitus, those taking oral contraceptives, steroids or having high grade fever were excluded from study population. Those who met following criteria were considered confirmed cases of PCOS.

Oligomenorrhea or amenorrhea, hyperandrogenemia, amenorrhea was defined as menstrual cycle more than 180 days. Oligomenorrhea is cycle length more than 35 days. Hyperandrogenemia is clinically presented as hirsutism, acne, hyperpigmentation, hair loss, follicles more than 8 to 10 in number with size more than 2mm to 8mm. Fasting BSR was calculated by drawing 2ml fasting blood sample. 75grams sugar was given to lady 2 hours after BSR estimation. Whole test was performed on fully automated chemical analyser SELECTRA E. mg/dl was the unit used to measure BSR. Impaired glucose tolerance was defined as BSR between 140 to 200mg/dl, 2hours after taking 75grams of sugar. SPSS 16 was used to analyse data. Percentages and frequencies were calculated for categorical while mean and SD for numerical data. Chi square test was applied. P value <0.05 was labelled significant.

RESULTS:

289 patients with mean age of 22±4 years were enrolled. 86 patients had hyperglycemia, out of 289, i.e. 29.7% of total. On age stratification 153(52.9%) patients were from 13 to 20 years age, between 21 to 30 years were 93 patients (32.1%), 43 were from 31 to 35 years age group, making 14.8% of total sample. Hyperglycemia in these age groups was 19 (12.4%), 29 (31.1%), 38 (88.4%) patients. Age and hyperglycemia association was statistically insignificant (p value 1.00).

167 (57.7%) patients had BMI in obese range. 65 patients had raised BSR. Out of 122 with normal BMI (42.2%), 21 (17.1%) patients had hyperglycemia. Raised BMI and hyperglycemia association was statistically significant. 119 individuals had family history of PCOS, 41.1% out of which 57 (41.7%) patients had raised BSR. Patients without family history were 170, out of which only 29 had hyperglycemia, 17%. The statistically significant association was observed (p value 0.000).

Table: 1 Classification on basis of age.

| Age in years | Hyperglycemic | Non hyperglycemic | Total | P value |
|--------------|---------------|-------------------|-------------|---------|
| 13 to 20 | 19 (12.4%) | 134 (87.5%) | 153 (52.9%) | 1.00 |
| 21 to 30 | 29 (31.1%) | 64 (68.8%) | 93 (32.1%) | |
| 31 to 35 | 38 (88.3%) | 5 (11.6%) | 43 (14.8%) | |
| Total | 86 (29.7%) | 203 (70.2%) | 289 | |

Table :2 Relationship between obesity and diabetes in PCOS.

| BMI in obese range | Hyperglycemia | Non hyperglycemia | Total | P value |
|--------------------|---------------|-------------------|-------------|---------|
| Yes | 65 (38.9%) | 102 (61%) | 167 (57.7%) | 0.001 |
| No | 21 (17.2%) | 101 (82.7%) | 122 (42.2%) | |
| Total | 86 (29.7%) | 203 (70.2%) | 289 | |

Table: 3 Correlation between family history and diabetes in PCOS.

| Family history | Hyperglycemia | Non hyperglycemia | Total | P value |
|----------------|---------------|-------------------|-------------|---------|
| Present | 57 (47.9%) | 62 (52.1%) | 119 (41.8%) | 0.001 |
| Absent | 29 (17%) | 141 (83%) | 170 (58.8%) | |
| Total | 86 (29.7%) | 203 (70.2%) | 289 | |

DISCUSSION:

Polycystic ovarian syndrome is a common disease seen in child bearing age. The prevalence is 6 to 10% of child bearing age females. Around to 30 to 40% females have hyperglycemia and obesity in PCOS [5,6]. The need to find better treatment options for the problems associated with PCOS have urged scientists to conduct several trials using several combination regimens. Tao T, et al also conducted a trial in which metformin and saxagliptin monotherapy was compared with combination therapy and results were in favor of hypothesis leading to improvement in signs and symptoms associated with PCOS [6].

Thrombo-embolic states are usually seen in PCOS patients leading to cardiovascular complications. Raised serum cholesterol and LDL was seen in PCOS patients and HDL level was below normal, studied by Bilal M, et al. [7] For quite long time scientists are looking for finding the exact cause behind the PCOS, many hypotheses have been formulated and tested through several trials. Radojevic AS, et al. concluded in a study conducted on hypothesis that Glutathion S transferase polymorphism could be a possible early marker in polycystic ovary syndrome patients and results were in favour of the hypothesis [10].

The relationship between age and diabetes among PCOS patients was studied by the authors in the understudy topic but the results were statistically insignificant. In the same time, the correlation between obesity and family history with hyperglycemia was studied and statistically significant correlation was found with p value 0.001. However, there is need to conduct further studies in which the exact mechanism behind this correlation should be sorted out so that more effective treatment regimens can be introduced [8,9].

CONCLUSION:

Hyperglycemia is a common complaint seen among PCOS patients. Proper screening and management of this issue must be done in all set ups.

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