

Frequency of Impaired Glucose Tolerance in Women with Polycystic Ovary Syndrome (PCOS)

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ABSTRACT

Objective: To determine the frequency of impaired glucose tolerance in women with polycystic ovary syndrome (PCOS).

Study Design: Cross-sectional study

Place and Duration: Department of Obstetrics and Gynaecology, Unit-I, ShaheedMohtarma Benazir Bhutto Medical University of Medical Sciences, Larkana. Study was carried out over a period of six months from 23rd March 2018 to 22nd September 2018.

Subjects and Methods: A total of 120 patients were recruited in this study. 75g oral glucose tolerance test was performed. The 2ml blood sample was obtained by using BD syringe. Those patients having whole blood glucose value >140-200mg/dl were labeled as having impaired glucose tolerance test.

Results: Mean age of the patients was 24.6±6.4 years. Mean BMI 28.5±2.8 kg/m². Out of 120 cases, 69 patients (57.5%) were married while remaining 51 patients (42.5%) were unmarried. Out of 69 married patients, 24 (34.8%) were primigravida and 45 (65.2%) were multigravida. Mean duration of PCOS was 1.6±0.8 year. Frequency of IGT was observed in 20 patients (16.7%). Symptoms were as follows: Oligomenorrhea 58 (48.3%), hyper-androgenism 29 (24.2%) and increased ovarian volume 33 (27.5%). Stratification with regard to age, BMI, marital status, parity, duration of PCOS and symptoms was also carried out.

Conclusion: Women with PCOS are at a high risk for the development of IGT (16.7%) and subsequently Type 2 DM. While managing the hirsutism and menstrual irregularities, metabolic evaluation of the patient should be done.

Keywords: Polycystic ovarian syndrome, Impaired glucose tolerance, Androgen excess

INTRODUCTION

Chronic anovulation (oligomenorrhea or amenorrhea), hyperandrogenism, and polycystic ovarian morphology are the three hallmarks of polycystic ovary syndrome, also known as PCOS [1]. PCOS is a prevalent endocrinopathy that affects women while they are of reproductive age. A clinical diagnosis of polycystic ovarian syndrome is made when two or more of the following characteristics are present in the patient:

- i Oligo-ovulation or anovulation that occurs on a chronic basis
- ii Androgen excess
- iii Polycystic ovaries

It is the most prevalent cause of anovulatory infertility and affects anywhere between 5 and 10 percent of women of reproductive age. In women who have polycystic ovary syndrome (PCOS), taking metformin for a prolonged period of time may improve menstrual cyclicity, lead to an increase in ovulation, and lower blood testosterone levels. Metformin use may also lead to an improvement in hirsutism [2, 3]. Women who have PCOS have an increased likelihood of developing glucose intolerance as well as type 2 diabetes [4]. Because of this, it is advised that screening for alterations in glucose metabolism be performed on all patients who have PCOS [2, 5]. Insulin resistance is hypothesized to be a significant pathophysiological aspect of PCOS, contributing to reproductive and metabolic problems associated with the condition. In terms of reproduction, insulin resistance leads to hyperandrogenism because insulin boosts ovarian androgen synthesis, both on its own and in conjunction with luteinizing hormone, while simultaneously lowering the amount of hepatic sex hormone-binding globulin that is produced. Insulin resistance may potentially be a factor in the elevated cardiovascular and metabolic risk that is associated with PCOS [6-8]. In women who have polycystic ovary syndrome (PCOS), one study found that the frequency of impaired glucose tolerance was 15.6 percent [9]. According to the findings of another study [10], women who have PCOS had a prevalence of 29.6 percent of impaired glucose tolerance. The purpose of this study is to determine the prevalence of impaired glucose tolerance in women diagnosed with PCOS. It has been demonstrated in the research that a significant proportion of females who have PCOS also have impaired glucose tolerance. Diabetes can develop later in life as a result of impaired glucose tolerance. There was a wide range of evidence regarding the presence of impaired glucose tolerance in females diagnosed with

PCOS that was reported in the literature. Consequently, the purpose of this study is to ascertain whether or not the problem affects a significant portion of the local population. The information on prevalence of IGT would assist physicians in assessment and treatment of risk in females with PCOS.

MATERIALS AND METHODS

This cross sectional study was conducted at the department of Obstetrics and Gynaecology, Unit-I, ShaheedMohtarma Benazir Bhutto Medical University of Medical Sciences, Larkana. Study was carried out over a period of six months from 23rd March 2018 to 22nd September 2018. Total 120 Females of age 15-40 years presenting with PCOS with symptoms of oligomenorrhea, hyperandrogenism (clinical examination) were included in this study. Diabetes mellitus (BSR>200mg/dl and taking antiglycemic drugs), hypertension (B1:140/ 90mmHg), pregnant women and unwilling to participate were excluded.

Informed consent will be taken Demographic data (name, age, BMI, marital status, parity and duration of symptoms) was noted. Then 75g oral glucose tolerance test was performed. The 2ml blood sample was obtained by using BD syringe. All samples were sent to the laboratory of the hospital for assessment of blood glucose level. Those patients having whole blood glucose value >140-200mg/dl was labeled as having impaired glucose tolerance test.

Data were entered and analyzed through SPSS 21.0 Quantitative variables like age, BMI and duration of PCOS was presented as mean±SD. Qualitative variables like marital status, parity, symptoms and impaired glucose tolerance was described as frequency and percentage. Data were stratified for age, BMI, marital status, parity, duration of PCOS and symptoms Post-stratification, Chi-square test was applied with p-value ≤ 0.05 was taken as significant.

RESULTS

Mean age of the patients was 24.6±6.4 years. Mean BMI 28.5±2.8 kg/m². Out of 120 cases, 69 patients (57.5%) were married while remaining 51 patients (42.5%) were unmarried. Out of 69 married patients, 24 (34.8%) were primigravida and 45 (65.2%) were multigravida. Mean duration of PCOS was 1.6±0.8 year. (Table 1)

Table 1: Baseline Details of All the Included Patients

Variables	Frequency No.	%age
Mean Age (years)	24.6±6.4	-
Mean BMI (kg/m)	28.5±2.8	-
Duration of PCOS	1.6±0.8	-
Marital Status		
Married	69	57.5
Unmarried	51	42.5
Parity (n=69)		
Primigravida	24	34.8
Multigravida	45	65.2

Symptoms were as follows: Oligomenorrhea 58 (48.3%), hyper-androgenium 29 (24.2%) and increased ovarian volume 33 (27.5%).

Table 2: Distribution of patients by symptoms

Symptoms	Number	Percentage
Oligomenorrhea	58	48.3
Hyper-androgenium	29	24.2
Increased ovarian volume	33	27.5

Impaired glucose tolerance was found in 20 (16.7%) patients while 100 (83.3%) patients had no IGT. (Figure 1)

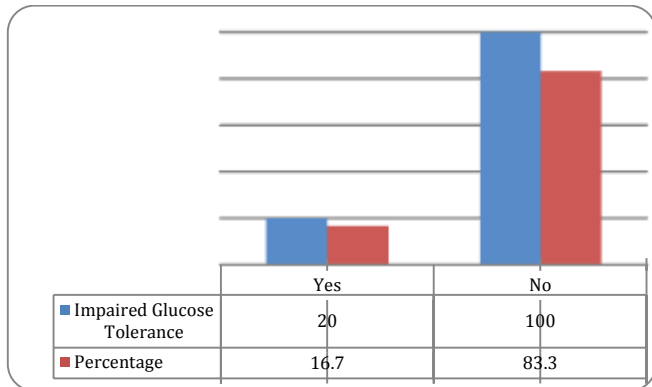


Figure 1: Frequency of IGT among all the patients

Stratification with regard to age, BMI, marital status, parity, duration of PCOS and symptoms was also carried out. Table 3-8

Table 3: Stratification for age

Age	Impaired Glucose tolerance		Total	P value
	Yes	No		
15-25	12	62	74	P=0.867
26-40	08	38	46	
Total	20	100	120	

Table 4: Stratification for BMI

BMI	Impaired Glucose tolerance		Total	P value
	Yes	No		
≤ 25	5	15	20	P=0.273
> 25	15	85	100	
Total	20	100	120	

Table 5: Stratification for marital status

Marital status	Impaired Glucose tolerance		Total	P value
	Yes	No		
Married	11	58	69	P=0.804
Unmarried	9	42	51	
Total	20	100	120	

Table 6: Stratification for parity

Parity	Impaired Glucose tolerance		Total	P value
	Yes	No		
Primigravida	3	21	24	P=0.568
Multigravida	8	37	45	
Total	11	58	69	

Table 7: Stratification for duration of PCOS

Duration (Year)	Impaired Glucose tolerance		Total	P value
	Yes	No		
1-2	14	85	99	P=0.107
3-4	6	15	21	
Total	20	100	120	

Table 8: Stratification with respect to symptoms

Oligo-menorrhea	Impaired Glucose tolerance		Total	P value
	Yes	No		
Yes	18	40	58	P<0.001
No	2	60	62	
Total	20	100	120	

hyper-androgenium	Impaired Glucose tolerance		Total	P value
	Yes	No		
Yes	16	13	29	P<0.001
No	4	87	91	
Total	20	100	120	

Increased ovarian volume	Impaired Glucose tolerance		Total	P value
	Yes	No		
Yes	17	16	33	P<0.001
No	3	84	87	
Total	20	100	120	

DISCUSSION

In women of reproductive age, polycystic ovarian syndrome is one of the most common metabolic illnesses, affecting between 4 and 12 percent of women. Infertility owing to anovulation is the most common cause of infertility [11]. A person's genetic propensity to the disease is worsened by environmental variables and a sedentary lifestyle [12]. The condition is more common in women between the ages of 15 and 25 years old, and it typically presents during the reproductive years [13]. Ovulation dysfunction and hyperandrogenism are the most common symptoms. It has been found that women with PCOS have an increased chance of developing type 2 diabetes. These women, who are more likely to develop gestational diabetes, present with diabetes at a younger age [14]. Early detection of PCOS is critical because it has lifelong consequences, including a higher risk of metabolic syndrome, type II diabetes, cardiovascular disease, endometrial hyperplasia, infertility, and depression [15]. Preventative and corrective measures can be taken by screening for IGT. Obesity, centripetal fat distribution, insulin resistance and hyperinsulinemia are only a few of the many risk factors that contribute to type 2 diabetes. Type II diabetes affects 7 to 10 percent of people, and IGT affects 30 to 35 percent [11]. Having an IGT puts you at a higher risk for the development of diabetes than most other risk factors. IGT to type II diabetes will increase by a factor of five to fifteen in women with PCOS [16]. Patients can go for lengthy periods of time without experiencing any symptoms during the IGT stage. Because of these androgen-excess symptoms, abnormal gonadotropin production, and insulin signalling defects in women with PCOS, clinical exams and early identification of IGT are common in these individuals. When blood sugar levels are elevated but not dangerously so, this is known as impaired glucose tolerance (IGT). It is frequently asymptomatic, and an oral glucose tolerance test (OGTT) is required to diagnose it. [18] Since Type 2 diabetes mellitus (DM) is a major health issue and its incidence varies among various groups, methods to prevent or at least delay its emergence have recently gained a lot of interest. An endocrine problem that affects many women, polycystic ovarian syndrome (PCOS) is one of the most frequent [20] and is accompanied by symptoms like hirsutism, irregular periods, obesity, and insulin resistance. As a result of their insulin resistance, those with PCOS are also at risk for developing impaired glucose tolerance or Type 2 DM. This study found IGT in 16.7% of patients, which is similar to the findings of Piepoli et al. According to our findings, women with PCOS have a greater tendency to experience glucose intolerance. Ehrmann et al [21] found that IGT affected 10% of the population. BMI differences between participants in the two trials may be to blame for this discrepancy. Insulin resistance in women with PCOS isn't simply a result of obesity, although obesity is still a significant role in the development of the condition. These anomalies occur

prior to the beginning of diabetes, according to the theory that macrovascular disease occurs before microvascular disease. Since IGT is a non-fasting state condition, metabolic abnormalities during a fasting period might not be sufficient [23]. Women with PCOS have a 5 to 10 fold increase in the rate of progression from IGT to Type 2 DM [21]. In light of these findings, we recommend that women with PCOS undergo regular testing to determine whether or not they have glucose intolerance. The improvement in insulin sensitivity in PCOS has resulted in improved metabolic and gynaecological characteristics, such as oligomenorrhea and easier pregnancies, with metformin and troglitazone being the most often used treatments [24-25]. The most common complaint of women with PCOS is hirsutism, and the doctor may not pay enough attention to the disease's metabolic manifestations. Patients may go for lengthy periods of time without experiencing any symptoms during the IGT stage. Women with PCOS, on the other hand, are more likely to have androgen-excess symptoms, which can lead to early identification of IGT.

CONCLUSION

In conclusion, women with PCOS are at a high risk for the development of IGT (16.7%) and subsequently Type 2 DM. While managing the hirsutism and menstrual irregularities, metabolic evaluation of the patient should be done.

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