DOI: https://doi.org/10.53350/pjmhs2216236

ORIGINAL ARTICLE

Prevalence of Pre-diabetes and Diabetes Mellitus in Polycystic Ovarian Syndrome (PCOS)

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ABSTRACT

Aim: To determine prevalence of pre-diabetes and diabetes mellitus in polycystic ovarian syndrome (PCOS)
Study Design: Cross sectional study. Non probability consecutive sampling was done.
Sample Size: The estimated sample size was 84 women with 95% confidence level and confidence limit of ±5%.
Setting: Outpatient departments of Medicine and Gynaecology & Obstetrics at a tertiary care hospital of Quetta, Pakistan.
Period: January 2021 to October 2021.
Methodology: All women of age 18-40 years who fulfilled the Rotterdam criteria of PCOS were included. Those having fasting blood sugar (FBS) ≥126mg/dl or 2 hour blood sugar > 200 mg/dl on OGTT were said to have diabetes mellitus. Those having FBS between 100-125 mg/dl were said to have impaired fasting glucose (IFG) and those having 2 hour blood sugar between 141-199 mg/dl were said to have impaired glucose tolerance (IGT). Their age, BMI and Oral glucose tolerance test (OGTT) results were documented in the proforma. For analysis SPSS version 20 was used.
Results: The mean age in our study was 29.12 ± 6.39 years and mean BMI was 30.49 ± 4.83 kg/m^2. A screening OGTT revealed that 7.1 % of PCOS individuals have type 2 diabetes mellitus and 30.9 % had pre-diabetes (IFG, IGT).
Conclusion: The prevalence of pre-diabetes and diabetes is high in PCOS, the main risk factor is increased BMI. Prevention and education should be undertaken in such individuals to avoid future complications.
Key words: PCOS, Diabetes Mellitus, Developing Country

INTRODUCTION

About 5-8% of premenopausal women are having polycystic ovarian syndrome (PCOS) making it one of the common endocrine disorder[1]. The incidence of PCOS is rapidly increasing due to changes in lifestyle, diet and related hormonal imbalance[2]. Rotterdam criteria describe PCOS as follows: to be diagnosed with PCOS, two out of three criteria required to be met: persistent anovulation, clinical and/or biochemical evidence of hyperandrogenism, and polycystic ovaries[3]. PCOS is associated with an increased possibility of developing diabetes mellitus, in addition to the reproductive dysfunction that characterises the condition[4]. Insulin resistance (IR) puts women with PCOS at a higher risk of developing dysglycemia[5]. According to the second National Diabetes Survey of Pakistan (NDSP), the prevalence of obesity in Pakistan was 62.1% in 2016-2017[6]. Obesity plays a significant influence in increasing the risk of PCOS and diabetes mellitus in women. Diabetes mellitus is linked to a slew of complications, including cardiovascular and renal issues.

The goal of our study was to find out how common diabetes mellitus/pre-diabetes is in our area so that early detection, treatment, and prevention of diabetes mellitus in patients with PCOS can be done to avoid future complications.

METHODOLOGY

It was a cross sectional study conducted in outpatient departments of Medicine and Gynaecology & Obstetrics at a tertiary care hospital of Quetta, Pakistan from January 2021 to October 2021 after permission from IRB. Literature search showed that prevalence of diabetes mellitus in PCOS is 5.8%[7]. Therefore, taking the frequency of 5.8% with a 95% confidence level and a confidence limit of ±5%, the estimated sample size was 84 women. Non probability consecutive sampling was done. The research was conducted accordingly to the principles of the declaration after approval from Hospital Review Committee. All the women of age 18-40 years who fulfilled the Rotterdam criteria of PCOS were included in our study. Those having fasting blood sugar equal to or more than 126mg/dl or 2 hour blood sugar more than 200mg/dl after 75gm glucose were said to have diabetes mellitus. Those having fasting blood sugar between 100-125mg/dl were said to have impaired fasting glucose (IFG) and those having 2 hour blood sugar between 141-199mg/dl after 75gm glucose were said to have impaired glucose tolerance (IGT). Their age, height, weight, BMI and Oral glucose tolerance test (OGTT) results were documented in the proforma. Those women who were diagnosed cases of diabetes mellitus or pregnant were excluded from our study. For analysis SPSS version 20 was used.

Received on 05-11-2021
Accepted on 12-02-2022

RESULTS

The mean age in our study was 29.12 ± 6.39 years and mean BMI was 30.49±4.83 kg/m^2. A screening OGTT revealed that 7.1% of PCOS individuals have type 2 diabetes mellitus and 30.9% had pre-diabetes (IFG, IGT).

Table 1: Age and BMI

	Mean ± SD
Age (years)	29.12 ± 6.39
BMI (kg/m^2)	30.49 ± 4.83

Table 2: Biochemical results (OGTT)

	n = 84 (%)
Type 2 Diabetes Mellitus	6 (7.1%)
Impaired Fasting Glucose	8 (9.5%)
Impaired Glucose tolerance	13 (15.5%)
Impaired Fasting Glucose plus Impaired Glucose Tolerance	5 (5.9%)
Normal OGTT	52 (62%)

DISCUSSION

In our study, individuals with PCOS had a prevalence of 7.1% of type 2 Diabetes Mellitus, while according to a study by Mandrelle K et al., diabetes mellitus was diagnosed in 5.8% of persons with PCOS[7]. Pre-diabetes (IFG, IGT) were found in 30.9 % of the patients in our study, which is almost identical to Legro RS et al. study, in which IGT was observed in 30% of the patients[8]. A study from Pakistan done by Anjum S et al. showed that one fourth of the participants have impaired fating glucose or diabetes mellitus[9]. This disparity is attributable to the fact that diabetes has different

prevalence in different parts of the world. A study by A. Gambineri A et al. highlights the importance of frequent diabetes monitoring in PCOS patients over time[10]. The American Diabetes Association recommends screening for diabetes mellitus in overweight or obese adolescent PCOS patients who are at least 10 years old at the time of diagnosis, and then every three years thereafter[11].

The mean age of patients with PCOS in our population was 29.12±6.39 years which is almost same to a study done by Shorakae S et al. in which the mean age was 30±6[12]. While a study by Anjum S et al have a mean age of 27.2±8.13[9]. In our community, the mean BMI of patients with PCOS was 30.49±4.83kg/m^2, whereas in a study by Keskin Kurt R et al., the BMI of individuals with obese PCOS was 31.9±4.1kg/m^2 [13]. Obesity is most common among women with PCOS in the United States and Australia, with 61% and 76% respectively[14]. According to Moran LJ et al[15] meta-analysis, the risk of developing glucose intolerant and type 2 diabetic is 2.5 and 4.1 times higher in women with PCOS than in BMI-matched controls, respectively.

Obesity is the most common cause of PCOS in women, which can lead to a variety of metabolic and reproductive issues. Proper education about the effects of PCOS on female health can aid in lowering the incidence of pre-diabetes, diabetes, and reproductive difficulties in females[16]. Physical activity and weight loss might help a lot in reversing PCOS complications and preventing pre-diabetes from becoming diabetic mellitus[17].

Our study's strength is that it is the first to determine pre-diabetes and diabetes in PCOS in our area. However, it has limitations, such as being a single-center study, and more large-scale studies are needed to corroborate our findings.

CONCLUSION

The prevalence of pre-diabetes and diabetes is high in PCOS, the main risk factor is increased BMI. Prevention and education should be undertaken in such individuals to avoid future complications.

Conflict of interest: Nil

Grant Support and Financial Disclosure: None

Author's Contribution: Habibullah conceived, designed, did data collection and analysis, Kalsoom Noor did data collection and manuscript writing, Abdul Aziz did literature search and critical analysis of the manuscript.

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