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Research Article

**IN ADULT POPULATION OF LAHORE THE PREVALENCE OF  
DIABETES MELLITUS AND IMPAIRED GLUCOSE  
TOLERANCE TEST**<sup>1</sup> Dr Nisar Haider Anjum, <sup>2</sup> Mujahid Israr, <sup>3</sup> Sadia Inam, <sup>4</sup> Dr Sana Iqbal Bokhari<sup>1</sup> Senior Registrar, Jinnah Hospital, Lahore, <sup>2,3</sup> Senior Registrar, Services Hospital, Lahore, <sup>4</sup> WMO, Jinnah Hospital, Lahore.

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**Abstract:**

**Objective:** The purpose of this analysis was to evaluate the prevalence of impaired glucose tolerance test (IGT) and diabetes in the population of Lahore using a (FPPPG) flexible postprandial plasma glucose test as a screening test.

**Study design:** A cross-sectional study.

**Place and duration:** In the Endocrinology department of Services Hospital Lahore for one year duration from March 2018 to March 2019.

**Methodology:** 938 subjects were selected randomly; 406 of them were male, 532 were female. All were analyzed with FPPPG test by sampling time from 30 to 120 minutes after breakfast / snack / lunch.

**Results:** Of the 406 men, (81%) 329 were normal, diabetic were 36 (8.87%) and IGT in 41 (10.1%) in the, and of the 532 women 329 were found normal, 66 (12.4%) had diabetes and (13.72%) 73 had deteriorated glucose tolerance test.

**Conclusion:** The overall diabetes mellitus prevalence for the population of Lahore was 10.87% and IGT in 12.15%.

**Key words:** Diabetes mellitus, Prevalence, FPPPG, IGT.

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**INTRODUCTION:**

Diabetes mellitus is a chronic hyperglycemia syndrome. Type 2 diabetes mellitus: formerly (NIDDM) non-insulin dependent diabetes mellitus or adult diabetes is a metabolic disease determined by increase level of blood sugar in the reference of resistance to insulin and absolute deficiency of insulin or both [1-3]. It is supposed to have affected more than 150 million people globally and in the year 2030 it affected 370 million [4]. The WHO ranks seventh in Pakistan's diabetes prevalence list. In Pakistan, 6.9 million people are diabetics and the IDF estimates that it will rise to 11.6 million by 2026, if no measures were adopted combat the disease [5]. According to the IDF estimates, in 2007, globally 246 million people were diabetic; this makes it the most common noncommunicable diseases in the world and one of the fourth cause of death [6]. The classic diabetes mellitus symptoms are polydipsia, polyuria, fatigue, weight loss and polyphagia. Diabetes is generally irreversible and long-term complications due to high BSR levels may raise the risk of stroke, heart attack, amputation and Renal failure, even if patients have a reasonably normal lifestyle [7]. Late complication causes high health costs and reduced life expectancy. The rising prevalence of sedentary lifestyles and obesity is one of the main causes of diabetes mellitus type II and is the fastest growing public health issue worldwide, which brings about a high financial burden and cost of medical care [8]. Type 2 diabetes is mainly because of genetics and lifestyle factors. The WHO definition of diabetes, symptoms or glucose tolerance or fasting plasma glucose ( $126 \text{ mg / dl}$ )  $\geq 7.0 \text{ mmol / L}$ , 2 hours after the oral dose,  $\geq 11.1 \text{ mmol / l}$  ( $200 \text{ mg / dl}$ ) plasma glucose [9]. Diabetes screening test is advised for most of the people in different life stages and in any of the various risk factors. Many researchers suggests adults between 40 and 50 years of age should be done with universal screening at regular intervals [10]. The earliest screening tests are usually suggested for people with risk factors such as family history of diabetes, obesity, high-risk ethnicity, gestational diabetes history. In a test report

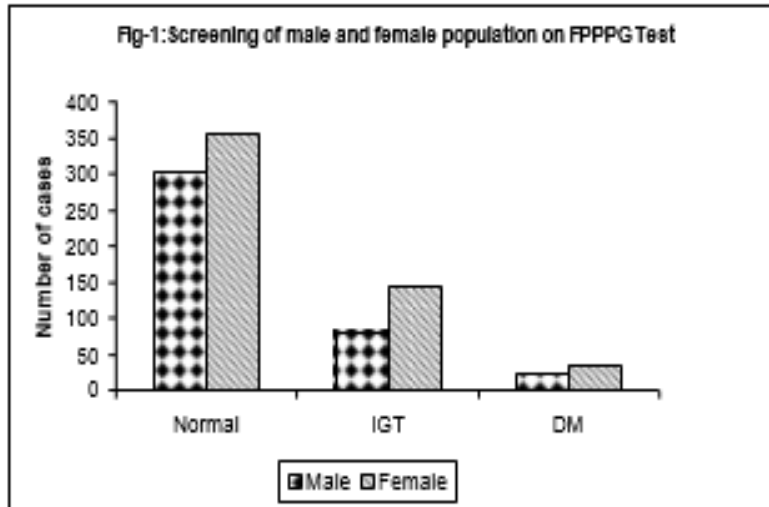
from the Health Quality and Research Agency in 2005, it was supposed that there was proof that a combination of exercise, diet and drug therapy (acarbose, metformin) could be used.

**MATERIALS AND METHODS:**

This cross-sectional study was held in the Endocrinology department of Services Hospital Lahore for one year duration from March 2018 to March 2019. 938 subjects were selected randomly; 406 of them were male, 532 were female. All the subjects in the study did sedentary work and women were housewives. All selectees were interviewed and included only who give consent to complete the study. The cross-sectional study was done to determine the diabetes mellitus prevalence in adult men and women between 30 and 60 years of age in the Lahore population using (FPPPG) single flexible postprandial plasma glucose test with sampling time after 30 to 120 minutes of breakfast / snack / food. Subjects with blood glucose (7-11 mmol / L after breakfast / snack / 30-120 minutes after meal) were subjected to OGTT. The first sample was collected in starvation and the other 2 were taken after oral glucose load of 75 grams. According to WHO criteria; results were interpreted. Data were analyzed by the SPSS version 17.0. Significance level was determined as 0.05. Chi-square test and Student's test (t) were recommended for statistical analysis.

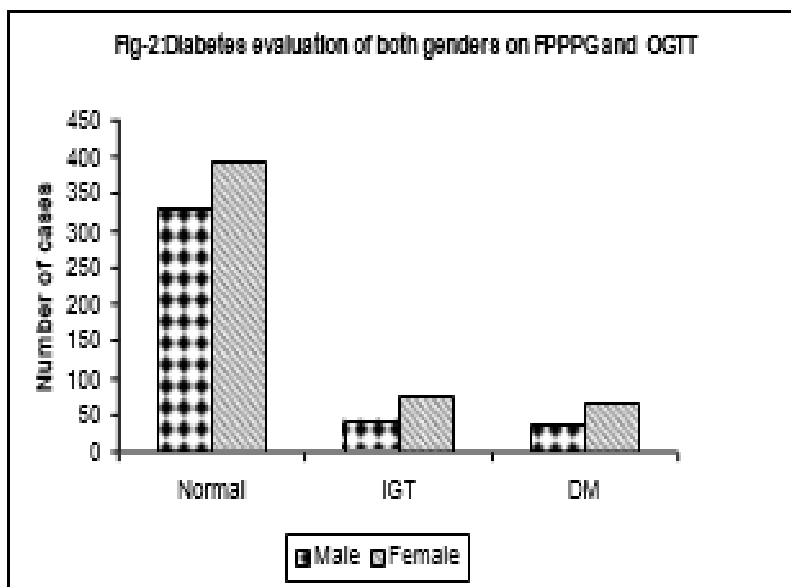
**RESULTS:**

406 male were selected for FPPG; 7-11 mmol / L blood glucose levels was noted in Eighty one of them (20.1%), blood glucose below 7 mmol / l was noted in (74.9%) and twenty three diabetic has 11 mmol / l or above. OGTT was recommended in 81 individuals with FPPG levels ranging from 7 to 11 mmol / l, of which 8.5-10.9 mmol / l blood glucose levels was in 41, 13 of them had a level higher than 11 mmol / l and 27 normal bloods. The patient was diagnosed with diabetic and FPPG for 23 patients. Therefore, diabetic patients were diagnosed in 36 patients (Figure 1).



532 total women were selected for the study. Of the 532 subjects, the FPPPG level was  $<7$  mmol / l in three hundred and fifty-three volunteers, while one hundred and forty-four has FPPPG levels (7-11) mmol / l and 35 had greater than 11 mmol / l of 7 to 11 mmol / l blood glucose level. OGTT was applied to the group consisting of 144 people with a value of these, 73 (8.4-10.8) had impaired glucose tolerance

test with two hours blood glucose ranging from 1 mmol / l, 31 had  $> 11.1$  mmol / l blood glucose levels and normal glucose level in 40. Finally, thirty-five patients were diagnosed with diabetes and thirty-one patients were diagnosed with diabetes as OGTT, thus a total of 66 people were diagnosed with diabetes. The overall diabetes mellitus prevalence was 13.7% (n = 73) IGT and 12.4% (n = 66) diabetics (Fig. 2).



Using (FPPPG) flexible postprandial plasma glucose test with a sampling time of 30 to 120 minutes after snack / breakfast / lunch as a screening test at 7.0 mmol / l cut-off value for screening diabetes and IGT, 100% sensitivity for diabetes detection showed 66.% specificity with 55% positive predictive value. 83.3% was Sensitivity for IGT, 91.3% specificity and 83.3% was the positive predictive value.

#### DISCUSSION:

The overall diabetes mellitus prevalence for the Lahore population was 10.87% and 12.15% for IGT (impaired glucose tolerance), respectively. The diabetes mellitus prevalence in our analysis can be compared with the data published by Punjab, Baluchistan, North West Region (NWFP) and Sindh

from four other provinces of Pakistan [11]. In the Punjab study, the diabetes prevalence was 9.83% for women and 12.14% for men. Total intolerance to total glucose (IGT and diabetes) was present in 16.67% of men and in 19.37% of women. In NTFPs, the overall IGT and NIDDM prevalence in men and women was 9.4% and 11.1%, respectively [12]. Gender-specific diabetes prevalence was 11.6% in women and 9.2% in men. In Balochistan, incidence of IGT and diabetes in both genders are 11.9% and 10.8% (urban) and 11.2% and 6.5% (rural) respectively [13]. The diabetes prevalence in urban and rural areas was 11.1% in males, 10.6% in females, 10.3% in males and 4.8% in females. In the Sindh region, the diabetes prevalence in males was 16.3% (8.90%, 7.2% newly diagnosed) and 11.7% in women. In our study, the diabetes mellitus prevalence is comparable to other populations in developing countries such as Iran 2%, Oman 10%, Argentina 7%, Palestine 9.6%, Taiwan 8.1% and Porto 9.7% [14]. The diabetes mellitus prevalence and IGT was 15.9% and 22.01%, respectively, in studies conducted by Martin et al. A similar diabetes mellitus prevalence was observed in Malaysia. IGT and Diabetes mellitus in the population were 11.3% and 4.7%, respectively. Hamman et al reported a different prevalence of diabetes in two different ethnic groups (Hispanic and Anglo-Saxon) living in similar conditions. [15] The overall prevalence of diabetes was higher in Hispanic (6.6%) than Anglo-Saxons (3.6%). This variable prevalence of the most common endocrine disease is due to environmental and social factors. The increase in income, obesity and low exercise were associated with the high prevalence of diabetes mellitus.

### CONCLUSION:

The overall diabetes mellitus prevalence in the Lahore population is 10.87% and 12.15% for IGT (impaired glucose tolerance). In our analysis, the diabetes mellitus prevalence was comparable to that obtained from the four other Pakistan provinces and compared with other populations in developing countries. The Type II diabetes prevalence is becoming one of the fastest growing public health problems in Pakistan, so assessing the prevalence of diabetes will be useful in future national planning and service delivery.

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