

Problem of Impaired Fasting Blood Glucose in Hypertensive Patients

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Abstract

Introduction: Diabetes is one of the Challenging epidemic diseases of the Medical History. Impaired fasting glucose (IFG), also known as pre-diabetic state of hyperglycemia which refers to a condition in which the fasting blood glucose level is consistently elevated above than normal levels, however, it is not as high enough to be diagnosed as diabetes mellitus. **Objective:** To see the frequency of Impaired fasting glucose (IFG) in hypertensive patients. **Study design:** This is a descriptive cross-sectional study. **Study setting and duration:** This study was conducted in an Out Patient Diabetic Clinic at Hyderabad city, duration of study was six months after approval from Ethical Review Committee of College of Family Physicians of Pakistan. **Methodology:** One hundred fifty five (155) patients of either sex with diagnosed HTN included in this study. Fasting blood sample drawn through a finger prick to measure glucose level via glucometer and whole blood 02cc was drawn through vein and sent to laboratory to glucose estimation by serum. Blood glucose level found between 100 to 125 mg/dl was considered as impaired fasting glucose (IFG). **Results:** Frequency of Impaired fasting glucose (IFG) in hypertensive patients observed in 75(48.4%) cases. **Conclusion:** Impaired fasting glucose (IFG) or pre-diabetes is now refers to a disease, associated with HTN, cardiovascular risk & different metabolic disorders. Screening of hypertensive patients with fasting glucose via a glucometer is one way of diagnosis and prevention of diabetes. It is very simple cost saving approach & convenient way of diagnosis.

Keywords: Impaired fasting glucose (IFG) and hypertension (HTN)

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I. Introduction

In this Century Diabetes Mellitus is one of the Challenging epidemic diseases of the Medical History. Impaired fasting glucose (IFG), also known as pre-diabetic state of hyperglycemia which refers to a condition in which the fasting blood glucose level is consistently elevated above than normal levels, however, it is not as high enough to be diagnosed as diabetes mellitus.^{1,2} This pre-diabetic state is associated with insulin resistance and increased risk of cardiovascular pathology, although of lesser risk than impaired glucose tolerance (IGT).³ IFG can progress to type 2 diabetes mellitus if lifestyle changes are not made. It's prevalence is rising more rapidly in developing countries.⁴ There is a 50% risk over 10 years of progressing to overt diabetes mellitus.⁵ Impaired fasting glucose is now considered as a disease.⁶ Incidence of newly diagnosed disturbed glucose metabolic status is common among hypertensive patients.⁷ Fasting blood sugar test should be used as a routine investigation in all hypertensive patients.

Hypertension (HTN) is widely prevalent disease all over the world, as 1 in every 3 adults over age 45 years suffer from HTN.⁸ According to World Health Organization, 1 in 8 deaths is due to HTN. Diabetes mellitus (DM) will be a leading cause of morbidity and mortality for the foreseeable future.⁹ Overall, 18% adults in Pakistan suffer from high blood pressure (21.5% in urban areas, 16.2% in rural areas).¹⁰

On the other side DM is a leading cause of cardiovascular disease, end stage renal disease, stroke, non-traumatic lower extremity amputation and adult blindness. DM affects around 382 million individuals around the world and the number is projected to rise to 592 million by the year 2035.¹¹

The Prevalence of DM is rising rapidly in Pakistan, according to 2nd National diabetic Survey of Pakistan (NDSP 2016-2017) it was estimated that the Prevalence of Diabetes in People more than 20 Years of age is 28 percent. More over by the year 2035, this number is expected to rise more, making the Pakistan 8th amongst the list.¹²

Further the peoples who are in pre-diabetic state will develop diabetes in the coming year, if they do not adopt affective preventive measures and life style changes. Six out of top ten countries with highest risk to develop DM are in Asia. In developed countries, 7th main cause of death is DM and there is a proof suggesting that its prevalence is escalating in an epidemic way in several un-industrialized countries.^{9,10,13} Large numbers of individuals who also meet the current criteria for DM are asymptomatic and unaware that they have a disorder.

American diabetes association (ADA) recommends screening of all the individuals with age more than 45 years and even screen individuals at earlier age, if they have the risk factors for DM like hypertension. In DM, blood pressure control is poor so hypertensive patient requires more aggressive treatment to control hypertension as well as to prevent from complications. DM and HTN both are also risk factor for Coronary Artery Disease (CAD). Blood pressure also bears a linear relationship with cardiovascular risk, so it exhibits more than 2-4 folds increase risk for coronary artery disease.¹⁴

CAD and DM are the top most causes of mortality in US and worldwide. DM is common among adults but now in the growing environment it is found more frequent in children and adolescents.^{9,15} Death rate of CAD is decline every year, half of them due to improve risk factor. There is limited data available in our setup for hypertensive patient with DM, so this study will help us to detect frequency of impaired fasting glucose in hypertensive patients and thus we can prevent people from DM and CAD, by early detection of risk and early intervention¹⁶.

II. Material And Methods

Study Setting: This Descriptive Cross-sectional study was conducted in an Out Patient Diabetic Clinic at Hyderabad City.

Sample Size: The calculation of sample size is by using the open EPI sample size calculator with 8.7% prevalence of impaired fasting glucose in hypertensive patients, obtained from the study incidence of IFG in hypertensive subjects^{17,18} at 5% margin of error and 95% Confidence Interval. One hundred fifty five (155) patients of either sex with diagnosed HTN included in this study.

Sampling Technique: Non Probability Convenience Sampling

Inclusion criteria

1. Those participants who were diagnosed cases of Hypertension
2. Both male and female were included in this study.
3. Age above 30 years

Exclusion criteria

1. Known type 2 diabetic patients
2. Those who are not willing to participate in study.
3. Those who are below 30 years of age.

Data Collection Procedure: The known Hypertensive patients visiting Out Patient Diabetic Clinic with proper follow up were included in this study who fulfilled inclusion criteria. After taking written consent the information were gathered on the pre-designed questionnaire and blood sample was drawn for laboratory investigation. Fasting blood sample drawn through a finger prick to measure glucose level via glucometer and whole blood 02cc was drawn through vein and sent to laboratory to glucose estimation by serum. Blood glucose level found between 100 to 125 mg/dl was considered as impaired fasting glucose (IFG).

Data Analysis Procedure: The data was analyzed in version 24.0 of the Statistical Package for Social Sciences (SPSS). For categorical variables, frequency and percentage were calculated. The data was formulated through Graphs and Charts.

III. Results

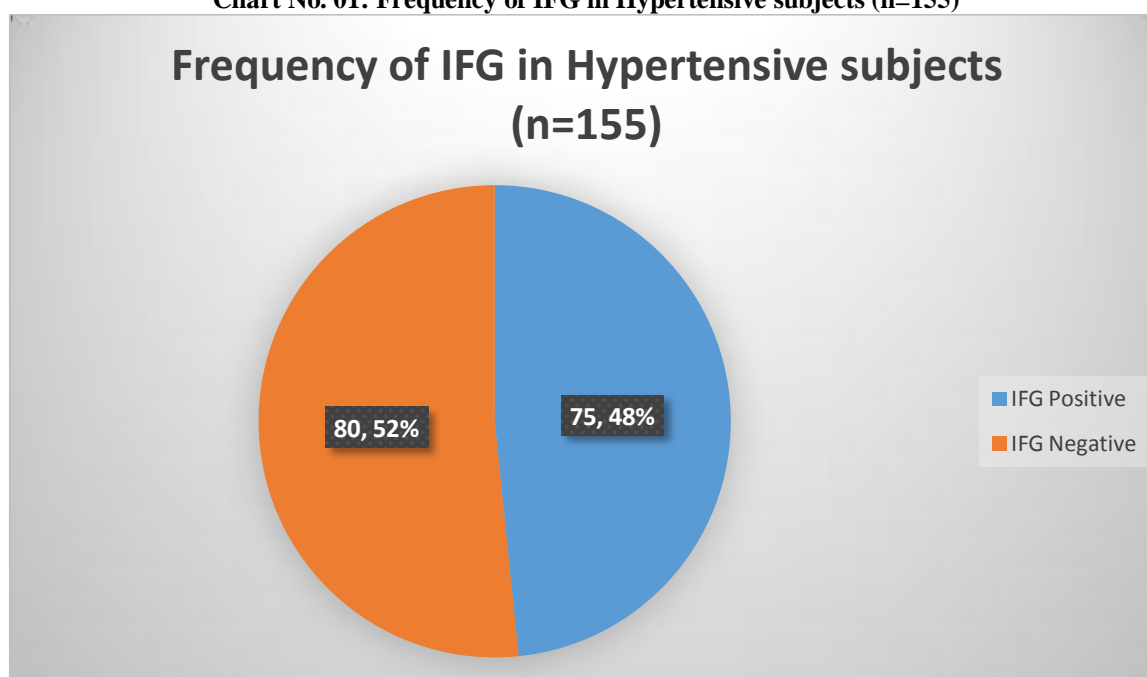
A total of one hundred fifty five (155) hypertensive patients were studied. Age varied from 31-50 years and mean age of the patients was 43 ± 6.58 years.

Table No. 01: Demographic distribution of Participants (n=155)

Demographic distribution of Participants				
Variable	Intervals	Frequency	Percentage	p-value
Age of Participants	31 to 35 years	25	16.1 %	p=0.13
	36 to 40 years	35	22.5 %	
	41 to 45 years	55	35.5 %	
	46 to 50 years	40	25.8 %	
Gender of Participants	Male	41	26.5 %	p=0.249
	Female	114	73.5 %	

Above table No. 01 shows Age varied from 30-50 years and mean age of the patients was 43 ± 6.58 years, which was divided in to four class intervals results are shown above. Out of these 155 hypertensive patients, 114 (73.5%) were female and 41 (26.5%) were male. There was no significant difference between male and female ($p=0.249$)

Chart No. 01: Frequency of IFG in Hypertensive subjects (n=155)



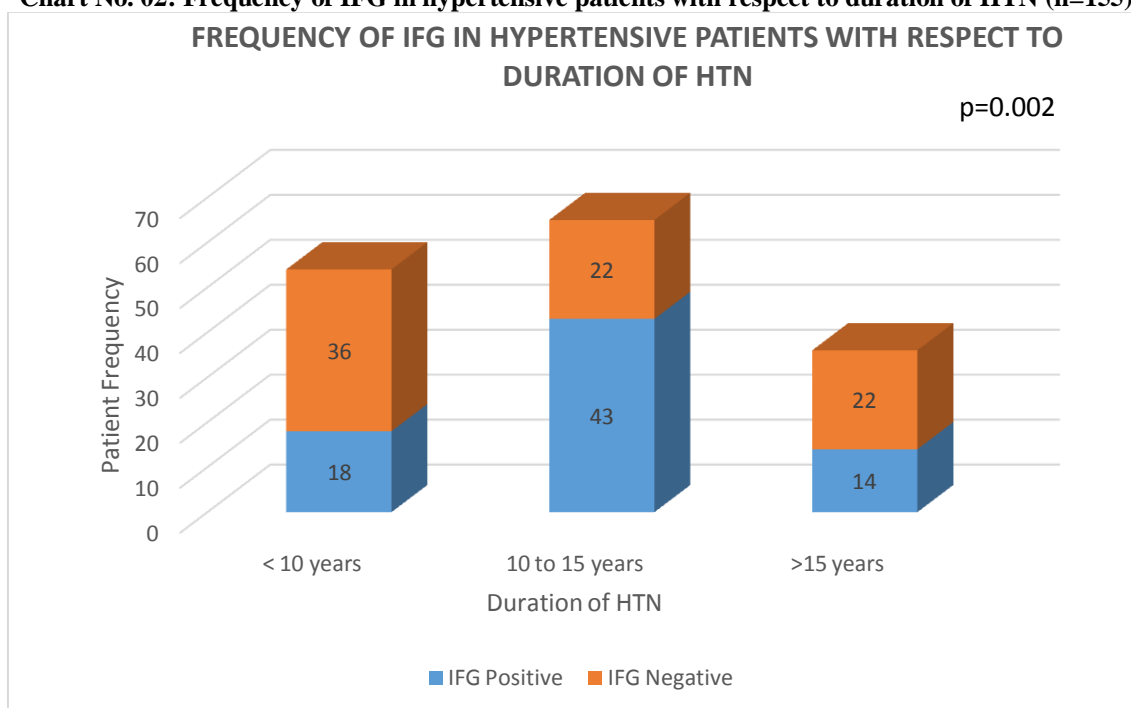
A total of one fifty five (155) hypertensive patients were studied, out of these 75(48.4%) individuals were found to have IFG positive and 80 (51.6%) patients were negative for IFG.

Table No. 02: IFG in Hypertensive patients with respect to Symptoms

IFG in Hypertensive patients with respect to Symptoms			
Symptoms	IFG Positive (n= 75)	IFG Negative (n=80)	Total
Controlled	45	55	100
Uncontrolled	30	25	55

Out of these 155 hypertensive patients, controlled hypertension was observed in 100 (64.5%) cases and uncontrolled hypertension was observed in 55 (35.5%) cases.

Chart No. 02: Frequency of IFG in hypertensive patients with respect to duration of HTN (n=155)



Frequency of IFG was not significant between different age groups and among genders ($p=0.25$). Rate of IFG positive cases were significantly high in those patients in which duration of hypertension was 11 to 15 years with statistically significant value of ($p=0.002$). Duration of hypertension of 54 (34.8%) patients were below or equal to 10 years, 65(41.9%) patients were tolerated from 11 to 15 years and 36(23.2%) patients were above 15 years. The average duration of hypertension was 12.53 ± 8.69 years

IV. Discussion

Now a day's HTN is well thought-out amongst one of the major health problem of mankind, mainly seen in association with obesity and T2D diabetes. Results of different conducted studies in the world have revealed that the frequency of HTN vary from 10% to 30% amongst population of 40-55 years¹⁹. In the US, and increased 2001 to 2009 the median prevalence of total hypertension was estimated at 37.6% (range 26.5 % to 54.4 %) in men and 40.1% (range 28.5% to 57.9%) in women. Results of different studies among Bangladeshi adult population discovered that one in four (24.4%) adults had HTN.^{20,21} This was also close data from our study as well.

The National Health Survey of Pakistan conducted in 2016-17 estimated that hypertension affects 18% of adults and 33% of adults above 45 years old. In another report, it was shown that 18% of people in Pakistan suffer from hypertension with every third person over the age of 40 becoming increasingly vulnerable to a wide range of diseases. It was also mentioned that only 50% of the people with hypertension were diagnosed and that only half of those diagnosed were ever treated.²²

A total of one fifty five (155) hypertensive patients were studied, out of these 75(48.4%) individuals were found to have IFG positive and 80 (51.6%) patients were negative for IFG. This is concluded in a study conducted by Mishra et al in India and it identified the frequency of IFG with isolated systolic hypertensive patients were 80% and patients with both systolic and diastolic HTN were 60%. Results of study held in the well-known University of US identified 43% had IFG & 11.6% had NIDDM.²³

The age-adjusted prevalence of T2DM in Oman varied from 10.4% to 21.1%, while the highest prevalence of impaired fasting glucose was found in males (35.1%). In comparison to men, higher incidence rates of T2DM were found in women (2.7 cases compared to 2.3 cases per 1,000 person-years, respectively). No significant trends were observed for the prevalence or incidence of T2DM in both genders. Undiagnosed T2DM was more common in men (range: 33–68%) than women (range: 27–53%). In our study male female ratio was 8:19.²⁴

Saudi Arabia is a community thrilled by sudden social and economic changes, leading to a sharp increase in the prevalence of abnormal glucose metabolism. Age-specific diabetes and impaired fasting glucose prevalence is the focus of this study with the expected risk factors. The prevalence of diabetes was 25.4% with 40.3% being unaware of their disease, while impaired fasting glucose (IFG) affected 25.5% of the total sample.

IFG to diabetes ratio was one in this study, decreasing with age and increasing with body weight. Age ≥ 45 years, hypertension, history of gestational diabetes mellitus (GDM), and high triglycerides are the strongest risk factors in diabetic patients, while history of GDM, dyslipidemia, obesity, and high triglycerides are the most significant risk factors in IFG participants²⁵.

Aim of our study is to look for the trend in Pakistan concerning the frequency of IFG in hypertensive subjects. Although the data of the present cross sectional study is acquire from a selected clinic population, it is observe that the results are consistent with the current trends reported in the literature. The outcome of our current analysis is equivalent to other Asian study b/c in our population generally higher prevalence of HTN & T2DM. Earlier age of onset of T2DM, increasing duration of the disease, smoking, presence of obesity & poor glycemic control, +ve family history, deranged lipid profile & antihypertensive drugs (beta blockers & diuretics) have been identified as associated risk factors in various studies.²⁶

V. Conclusion

Hence, the consequences of the findings are Impaired fasting glucose (IFG) or pre-diabetes is now refers to a disease, associated with HTN, cardiovascular risk & different metabolic disorders. Screening of hypertensive subjects with frequency of impaired fasting glucose via glucometer, by this we can prevent people from DM and CAD, by early detection of risk and early intervention. It is very simple cost saving approach & convenient way of diagnosis.

Conflict of interest: In our study there was no Conflict if Interest

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