Original Article: Study of Prvalence of Diabetes Mellitus in Tertiary Centre of Sagar

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Abstract:
Introduction: *To study the prevalence of diabetes mellitus in urban population of sagar.*
Methods; *A total of 1000 individuals who came for regular check up in Bundelkhand Medical college sagar were screened for Fasting capillary blood glucose was determined using a glucose meter . The subjects were instructed to keep an overnight fast after which fasting glucose was determined..*
Results: *The present study had been carried out in Department of Medicine Bundelkhand Medical College and hospital It was found that the total prevalence of IFG was 22.9% with males showing a higher percentage compared to females.*
Discussion; *This study provides the first representative population based estimates of Impaired Fasting Glucose (IFG) in the urban population of sagar..*
Keywords: *informed consent , Impaired fasting glucose , diabetes Mellitus , urban population, Random blood Sugar, Body Mass Index.*

I.   Introduction

Diabetes Mellitus refers to a group of common disorders that share the phenotype of hyperglycemia[1,2].The worldwide prevalence of Diabetes Mellitus has risen dramatically over the past two decades, from an estimated 30 million cases in 1985 to 382 million in 2013. Based on current trends, the International Diabetic Federation projects that 592 million individuals will have diabetes by the year 2035[3].Prevalence of Type 2 Diabetes Mellitus is rising much more rapidly than Type 1 Diabetes Mellitus presumably because of rising incidence of obesity and reduced physical activity. India leads the world with largest number of diabetics thus earning the dubious distinction of being termed as diabetic capital of the world. The incidence of Type 2 DM is rising sharply in India and International Diabetes Federation has projected an estimate of at least 70 million individuals having Diabetes Mellitus by 2025.The rising incidence is presumably due to increasing incidence of obesity and decreasing level of physical activity and transition from rural to urban setup and changing dietary habits[1,3,4,5].

With this background, this study was undertaken to find out the prevalence of IFG in central India. Considering the potential reversibility of this condition, early detection is very important for timely intervention so that the subjects may be reverted back to a euglycaemic state.

II.   Aims And Objectives

* The primary objective of the study is to determine the prevalence of IFG in urban areas of Sagar and to compare it with its prevalence in studies done in other areas previously.
* To correlate the occurrence of IFG with target organ damage.

III.   Material And Methods

The study was conducted in Department of Medicine of Bundelkhand Medical College Sagar.   The study was done in sagar from AUGUST 2015 to AUGUST2016.It was a cross sectional community based survey of either sex individuals between age of 18-65 years. The study covered urban areas of Sagar. Written informed consent was taken from respondents after ensuring that the subject understood and accepted his/her role in the study. A total of 1000 individuals who came for regular check up were screened. Fasting capillary blood glucose was determined using a glucose meter (Accusure Soul one touch glucometer). The subjects were instructed to keep an overnight fast after which fasting glucose was determined. Capillary blood glucose was adopted in favour of venous plasma glucose estimations, as it was neither practical nor feasible to collect, handle and store such a large volume of samples in an epidemiological study of this magnitude.Fasting total cholesterol and total triglyceride was determined by collected fasting venous blood sample.BMI was measured for each Patients.
Data was entered and compiled using a computer and statistical analysis was done by applying SPSS.

Inclusion Criteria
All apparently healthy individuals between age 18-65 years.

Exclusion Criteria
Previously diagnosed cases of DM
•   Previously diagnosed cases of hypertension
•   Previously diagnosed cases of hypertriglyceridemia
•   Known cases of CKD
•   Known cases of CLD
•   Known cases of TB and Bronchial Asthma
•   Known cases of other Chronic inflammatory diseases

Spectrum of Glucose Homeostasis

	NORMAL	IMPAIRED	DM
FPG	<100mg/dl	101-125mg/dl	>126mg/dl
2HOUR-PG	<140mg/dl	140-199mg/dl	>200mg/dl
HbA1c	<5.6%	5.7-6.4%	≥6.5%

A random plasma glucose level >200mg/dl accompanied by classical symptoms of DM (polyuria, polydypsia, weight loss) is also sufficient for diagnosis of DM.

IV.   Results

The present study has been carried out in Department of Medicine Bundelkhand Medical College and hospital It was found that the total prevalence of IFG was 22.9% with males showing a higher percentage compared to females. Subjects with raised BMI had more incidence of IFG compared to subjects having normal BMI. Age wise prevalence was calculated by dividing the study population into 3 age groups i.e 18-29 years, 30-49 years and 50-65 years. Prevalence of IFG in 18-29 group in males was 23.2% and in females was 12.83%Prevalence of IFG in 30-49 group in males was 24.94% and in females was 17.05% Prevalence of IFG in 50-65 yrs age group was 32.83% in males and 50% in females.The findings are consistent with the fact that increasing age is one of the most important risk factors for impaired glucose homeostasis or insulin resistance state.Prevalence of IFG in males (n=609) was found to be 26.27% and prevalence of IFG in females (n=391) was found to be 17.65% showing a higher prevalence in males compared to females, which is in accordance with scientific data.Significant association $p<0.0001$ and chi square value 52.01 was seen between raised BMI and IFG.

V.   Discussion

The present study provides the first representative population based estimates of Impaired Fasting Glucose (IFG) in the urban population of sagar. Our data has been compared with the data concluded from ICMR INDIAB Phase I(RM Anjana et al)[1] study, a pan-India study across three states and one UT, the National Urban Diabetes Survey(A Ramachandran et al)[2], conducted across six major urban populations of the country, The ADEPS study[5] conducted across urban central Kerala. We had also sought a comparison with the studies conducted in the, the NHANES (Karve et al)[4], Iran (Estheghamati et al)[6] and Australia(Dustan et al)[3]. The present study also built upon the data concluded by a study of IFG in Central India by Sahai et al Some of the studies have worked on IGT and its attributes considering IFG has only recently been accorded status a predictor for diabetes. Although both IGT and IFG differ in their pathophysiology and nature of insulin resistance, both remain equally practical as predictors for developing Type2DM. Various epidemiological studies conducted in India up to 2015 have shown varied prevalence of diabetes and IFG/IGT in the Indian population. With use of 2015 ADA criteria, this study has shown a prevalence of 22.9% of IFG in the present study population. This was significantly higher than the data reported by the ICMR-INDIAB study which stated the overall prevalence of

pre-diabetes in Tamil Nadu, Maharashtra, Jharkhand and Chandigarh at 8.3%, 12.8%, 8.1% and 14.6%, respectively. The prevalence obtained was also higher compared to the ADEPS data[5] from Kerala, which reported that 7% subjects had IFG. The NUDS study[2] had studied IGT and their reported prevalence was 16.8% in Chennai, 14.9% in Bengaluru, 29.8% in Hyderabad, 10 % Kolkata, 10.8% in Mumbai and 8.6% in New Delhi. Sahai et al had reported a high prevalence rate of IFG in their study conducted in Gwalior, although being a hospital based study. The higher prevalence in our study can be explained by the recent rapid urbanization of the city, inviting with it the associated dietary and lifestyle risks.

VI.   Conclusion

The present study was done in city of Sagar. A total of 1000 individuals were screened. The prevalence of IFG in 1000 individuals screened was found to be 22.9%.Subjects having IFG showed higher levels of cholesterol and triglycerides but statistical association cannot be applied as cholesterol and triglyceride levels of euglycaemic population was not done due to the overwhelmingly large sample size. One cannot overemphasize on early diagnosis and detection of these complications along with impaired glucose homeostasis state is going to have profound effect by instituting appropriate interventions at the right time thus avoiding the mental, physical and financial burden associated with it.

Acknowledgment

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Table – 01 Table Representing Normal Bmi And Glycaemic Status - Age Wise Distribution

Gender	Age Group	18-29 Yrs	30-49 Yrs	50-65 Yrs	TOTAL
	IFG	8	29	5	42
Male	Euglycaemic	54	154	19	227
	TOTAL	62	183	24	269
	IFG	7	14	4	25
Female	Euglycaemic	58	146	5	209
	TOTAL	65	160	9	234

Table – 02 Table Representing Raised Bmi And Glycaemic Status - Age Wise Distribution

Gender	Age Group	18-29 yrs	30-49 yrs	50-65 yrs	TOTAL
	IFG	22	79	17	118
MALE	Euglycaemic	45	151	26	222
	TOTAL	67	230	43	340
	IFG	6	31	7	44
FEMALE	Euglycaemic	32	75	6	113
	Total	38	106	13	157

Table no. 3 relation between family history of dm and glycaemic levels

Family History (Dm)	Ifg	Euglycaemic	Total	%
Present	171	171	342	50.00
Absent	58	600	658	8.81
Total	229	771	1000	

Chi square value is 216.19

P value is <0.0001

Table-4 Relation Between Triglycerdies And Ifg

Gender	Tg. >150	Tg. <150	Total	%
Ifg Males	123	37	160	78.13%
Ifg Females	51	18	69	73.91%
Total	174	55	229	

It has been observed that , there appears to be a linear co-relation between triglyceride level and glycaemic level, but as in our study triglyceride level was done only in those who had impaired fasting glucose and not in whole population so significant co-relation of the study could not be obtained.

Table-5 Percentage Of Subject Having Ifg And Normal Blood Glucose Level Age Wise Distribution In Either Gender

Gender	Age Group	18-29 yrs	30-49 yrs	50-65 yrs
Male	IFG	23.25 %	24.94%	32.83 %
	Euglycaemic	76.75 %	75.06%	67.17%
Female	IFG	12.38 %	17.05%	50 %
	Euglycaemic	87.62 %	82.95%	50 %

- The percentage of subjects with IFG increased with age

Table-6 Relation Between Cholesterol And Ifg

Gender	CHO.>200	CHO.<200	TOTAL	%
IFG Males	103	57	160	64.35 %
IFG Females	39	30	69	56.52%
TOTAL	142	86	229	