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Prevalence of Dysglycemia Among Asymptomatic Young Adults in North Kerala

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Abstract

Background: Diabetes is the commonest endocrinopathy world wide. Its prevalence and incidence is high and increasing world over. The knowledge of prevalence of undiagnosed diabetes and prediabetes is lacking and is variably reported from various parts of the world.

Methods: This study looks into the prevalence of diabetes and prediabetes in an urban population attending a tertiary care centre for health check up in the highly literate State of Kerala.

Results: Impaired fasting glucose and type 2 diabetes was seen in 20% of the cases.

Conclusion: The high prevalence of diabetes and prediabetes found in this study raises a red flag on indices of health and press an urgent public health action to prevent and control this epidemic.

Key words: type 2 diabetes, Impaired fasting sugar, Prediabetes, dysglycemia.

Introduction

Diabetes is the commonest endocrinopathy world wide. Its prevalence and incidence is high and increasing world over. The Global burden of Diabetes is sky-rocketing and increasing at an alarming rate and the number may reach 552 million by 2030. In addition to this is the number of prediabetes, the asymptomatic forerunner of Type 2 Diabetes (T2DM). Together they contribute a major public health problem, both because of its association with diabetes incidence and with an inherent increased risk of development of cardiovascular diseases [1,2]. Prediabetes raises the short term absolute risk of T2DM by 3 to 10 fold and it is estimated that up to 70% of them may develop T2DM during their lifetime [3-5]. Long-term data also suggest that lifestyle intervention may decrease the risk of prediabetes progressing to diabetes for as long as 10 years. To prevent one case of diabetes during a 3-year period, 6.9 persons would have to participate in the lifestyle intervention program. As per IDF (International Diabetes Federation), India has an estimated prevalence of 9.1%

T2DM and several thousand undiagnosed cases of T2DM. The information regarding the prevalence of impaired fasting glucose (IFG), impaired glucose tolerance (IGT) are sketchy and scarce except from a few isolated studies like ICMR-INDIAB (Indian council of Medical Research) study which showed 11% prevalence [6]. It would be interesting to note that ICMR-INDIAB study had sampled 15 states in India which unfortunately did not include Kerala. The latest and most commendable study on incidence of diabetes and prediabetes in Kerala done by Vijayakumar et al showed an annual incidence of 2.9% and a cumulative incidence of 24.5 per 1000 patient years [7]. India, with 69.2 million people with T2DM, has 2nd highest number of people living with diabetes mellitus worldwide next only to China [8]. Kerala in India is unique in that the health indicators of Kerala are on par with that of developed countries [9-11]. Paradoxically T2DM is now highly prevalent across all sections of society within Kerala and that implies the existence of Asian paradox in Kerala State. Many observational data are pointing to change in improving economic status of Kerala and adaptation of new food and health habits more so in northern Kerala due to extreme migration of youngsters from each household to middle east seeking job. The above fact plus absence of data on prevalence of dysglycemia in northern Kerala prompted us to look into this matter.

Objective

To study the prevalence of diabetes and prediabetes among asymptomatic young adults attending a tertiary hospital for Health check up.

Design

This is a Hospital based cross-sectional study. Subjects attending for master checkup in this hospital were included in the study. Informed consent was taken from all subjects.

Methodology

History of non communicable illnesses like hypertension, diabetes were obtained by self filled proforma. Biochemical data and demographic details of subjects who attended the hospital for master health checkup were taken for analysis. Subjects with previous known diabetes were preflagged in this study. We retrospectively analyzed the data of 1993 consecutive young adults who had done routine medical checkup in our Hospital. The patients were included in the study after contacting them and taking their consent. The study was approved by institutional ethics committee. Diabetes was diagnosed by the ADA criteria of fasting plasma glucose of ≥ 126 mg%. Fasting is defined as no caloric intake of at least 8 hrs or a 2hr post prandrial plasma glucose of ≥ 200 mg%. Impaired fasting glucose was defined as fasting plasma glucose of ≥ 100 and <126 mg% and impaired glucose tolerance was defined as 2 hr plasma glucose of ≥ 140 mg% and <200 mg%.

A total of 1993 subject data were available for analysis. The baseline characteristics are shown in **Table 1**.

Table 1

	Males	Females
Subjects	1520 (72.10%)	573(27.9%)
Mean age	35 \pm 5.8 years	35.5 \pm 6.5 years
Prediabetes	20%	15.5%
Diabetes	4.6%	2.1%
Dyslipidemia	28%	32%
BMI	26.45 \pm 3.4	28.16 \pm 5.01
Hypertension $\geq 140/90$ mm Hg	16.23 %	12.61%

The study subjects included 1520 males and 473 females in the age group of 19 – 45 years with a mean age of 35.5 \pm 5.8 yrs and 35.5 \pm 6.5 respectively and their age and gender distribution are shown in **Figures 1 and 2**.

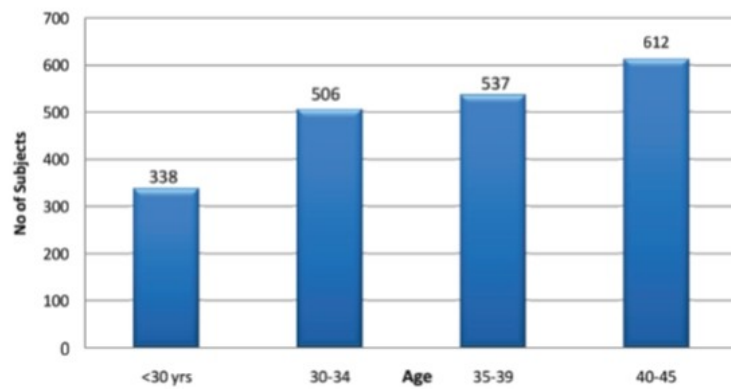


Figure 1: Age distribution of study patients

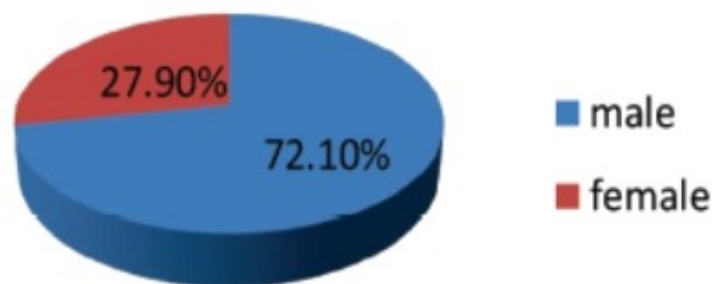


Figure 2: Sex distribution of study patients

72 % of the study subjects were male showing the better health seeking behavior among them in wellness Clinics. Many of these people were working outside the state or outside the country in the past, and they tend to do an annual health checkup more than females due to the health awareness.

Dysglycemia in any form which included IFG, IGT and T2DM was seen in 20% of the cases. Diabetes was detected in 4.6 % of males and 2.1% of females. Age wise distribution of diabetes and pre-diabetes is shown in **Figure 3**. The prevalence of both increases as age advances which is noted in **Figure 3**.

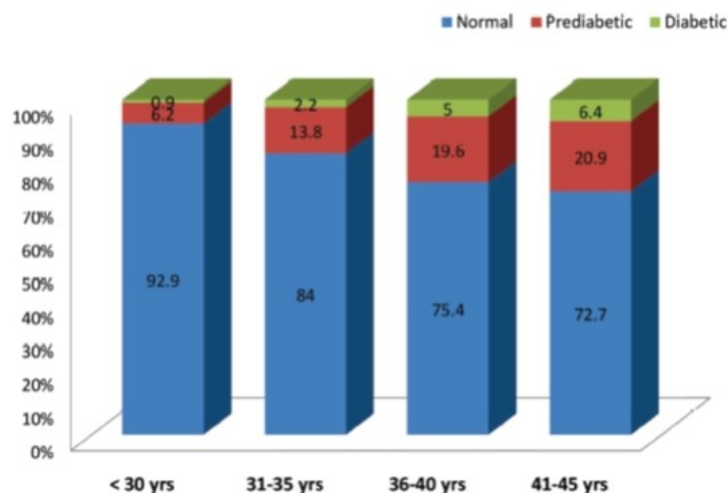


Figure 3: Age wise distribution of prediabetics and diabetics

The pattern of dysglycemia among the study subjects are shown in **Table 2**. The most common form of dysglycemia among pre-diabetics is IFG followed by a combination of IFG and IGT. In this study both prevalence of diabetes and prediabetes increased with age. Undiagnosed diabetes was prevalent

0.9% in below 30 years age and this rose six times to 6.4% in 41-45 years age. The prevalence of prediabetes was 6.2% in below 30 years age and this rose to 20.9% in above 40 years, a three times increase. Vijaya Kumar et al found that nearly 60% of participants with baseline IFG converted to T2DM in 10-year follow-up. It is justifiable to conclude we are losing a window of opportunity since we detect an average 15 % prediabetes (6.2% to 20.9%) across different age groups [7]. Again, this conversion rate (60% or 86.41 per 1000 person years) is much more than the conversion rates from other studies in India. Mohan et al reported that 40.5% of baseline prediabetes participants converted to T2DM within 8 years of follow-up [12].

Table 2: FPG x PPG cross tabulation

	PPG			
	<=140 mg/dl	141 – 199 mg/dl	>=200 mg/dl	
F P G	<=100 mg/dl	1589 (79.7%)	42 (2.1%)	1 (0.05%)
101-125 mg/dl	229 (11.5%)	53 (2.7%)	11 (0.55%)	
>=126 Mg/dl	6 (0.3%)	20 (1%)	42 (2.1%)	
Total			1993	

Conclusion

One in five asymptomatic young adults was detected to have some form of glucose abnormality in this study. Health check up is a useful tool to screen and pick up undetected cases of diabetes IFG and IGT. This large number of asymptomatic IFG and IGT, if detected early offers an golden opportunity for life style intervention and medical nutrition therapy to reverse, prevent or retard from becoming overt diabetic. We recommend a screening of FBS and PPBS to be a routine investigation in all adult subjects attending hospitals like blood pressure recording, documenting a timed blood sugar with each hospital visit can go a long way in detecting undiagnosed dysglycemia till we have community based screening programmes. By screening and risk-stratifying prediabetic individuals, we may be able to develop a strategy to prevent prediabetes from progressing to diabetes. Clinical evidence suggests that we should not accept a prediabetic state but should actually try to convert prediabetes to a normal glucose state.

Limitations

The prevalence in this study cannot be generalized as it is a hospital based study. This study however is a pointer to the serious need of community based screening studies to detect prediabetes and overt diabetes.

References

1. Novoa FJ, Boronat M, Saavedra P, Diaz-Cremades JM, Varillas VF, La Roche F, et al. Differences in cardiovascular risk factors, insulin resistance, and insulin secretion in individuals with normal glucose tolerance and in subjects with impaired glucose regulation: the Telde Study. *Diabetes Care* 2005; 28 : 2388-93.
2. Petersen JL, McGuire DK. Impaired glucose tolerance and impaired fasting glucose - a review of diagnosis, clinical implications and management. *Diabetes Vasc Dis Res* 2005; 2 : 9-15.
3. Garber AJ, Handelsman Y, Einhorn D, et al. Diagnosis and management of prediabetes in the continuum of hyperglycemia: when do the risks of diabetes begin? A consensus statement from the

American College of Endocrinology and the American Association of Clinical Endocrinologists. *Endocr Pract.* 2008;14(7):933-946.

4. Centers for Disease Control and Prevention. 2011 National Diabetes Fact Sheet: Diagnosed and undiagnosed diabetes in the United States, all ages, 2010. 2011; Available at: <http://www.cdc.gov/diabetes/pubs/estimates11>.
5. Nathan DM, Davidson MB, DeFronzo RA, et al. Impaired fasting glucose and impaired glucose tolerance: implications for care. *Diabetes Care.* 2007;30(3):753-759.
6. Ranjith Mohan Anjana, Rajendra Prasad et al. The Indian Council of Medical Research–India Diabetes (ICMR–INDIAB) Study: *J Diabetes Sci Technol.* 2011 Jul; 5(4): 906-914.
7. Vijayakumar G, Manghat S, Vijayakumar R, Simon L, Scaria LM, Vijayakumar A, Sreehari GK, Kutty VR, Rachana A, Jaleel A. *BMC Public Health.* 2019 Jan 31;19(1):140.
8. Sen A. Health: perception versus observation. *BMJ.* 2002;324(7342):860-1.
9. Parayil G. The “Kerala model” of development: development and sustainability in the Third World. *Third World Q.* 1996;17(5):941-57.
10. Kannan KP, Thankappan KR, Ramankutty V, Aravindan KP. Kerala: a unique model of development. *Health Millions.* 1991;17(5):30-3.
11. Brown A. Growth and success in Kerala. *Yale Rev Int Stud.* 2013;4(1):85-95.
12. Mohan V, Deepa M, Anjana RM, Lanthorn H, Deepa R. Incidence of diabetes and pre-diabetes in a selected urban south Indian population (CUPS-19). *J Assoc Physicians India.* 2008;56:152-7.