

## ATTAINMENT OF TREATMENT TARGETS AMONG TYPE 2 DIABETIC PATIENTS FIRST ATTENDING A TERTIARY CARE SETTING IN SUBURBAN KERALA

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### ABSTRACT

#### BACKGROUND

Type 2 diabetes is growing in epidemic proportions worldwide, particularly in Asian subcontinent and especially in India. The disease takes a toll on the health system of a country, especially the developing nations.

#### AIMS AND OBJECTIVES

To study the attainment of metabolic and anthropometric goals of individuals with type 2 diabetes attending a tertiary care centre.

#### MATERIALS AND METHODS

i) Informed consents were obtained. ii) The study subjects were subjected to a detailed clinical, anthropometrical and biochemical evaluation at baseline by a dedicated diabetologist. iii) These data were collected using a structured questionnaire and were analysed using EPI INFO (Ver 3.4.1).

#### RESULTS

A total of 350 cases were studied. Overall, 76.3% of patients could not achieve ADA A1c goal and 36.3% had very poor glycaemic control as evidenced by A1c >9%.

#### CONCLUSIONS

Despite the increasing awareness of type 2 diabetes both among attending physicians and patients, attainment of treatment targets still is a challenge even at a tertiary care setting. The lifestyle and dietary habits may be a main contributing factor for this situation. More focus needs to be given to nutritional aspects and physical exercise in not only in patients with type 2 diabetes mellitus, but also in apparently healthy individuals of the productive age group so that the disease can be delayed if not prevented.

#### KEYWORDS

Type 2 diabetes mellitus, Obesity, Hyperlipidaemia.

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**INTRODUCTION:** The prevalence of Type 2 diabetes is rising dramatically around the globe, and it threatens to overwhelm the health systems of many developing countries and the economies of all nations. An estimated 387 million people, corresponding to 9% of the world's adult population, have diabetes as on 2014. 70% of the current cases of diabetes occur in underdeveloped and developing countries. With an estimated 62 million people living with diabetes, India is second only to China which is the new diabetic capital of the World.<sup>1</sup> The ACE/AACE consensus and ADA/EASD guidelines concur that intervention in T2DM should be early, intensive and uncompromisingly focused on maintaining glycaemic levels as close as possible to the nondiabetic range (A1C <6.0%).<sup>2</sup>

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Glycated haemoglobin (HbA1c i. e. the weighted average of both fasting and postprandial glucose variations during a 2- to 3-month period) is an important indicator and the primary target for glycaemic control because there is a clear association between a slightly elevated A1c level and subsequent diabetes-related complications. Many landmark studies like DCCT & UKPDS proved beyond doubt that good glycaemic control along with tight control of modifiable risk factors effectively prevents the progression of diabetic end-organ diseases. The results of DCCT showed unequivocally that intensive therapy effectively delays the onset and slows the progression of diabetic retinopathy, diabetic nephropathy, and diabetic neuropathy in patients with type 2 diabetes. Importantly, in the DCCT, there was not a 'glycaemic threshold;' but importantly there was a continuous relationship between glycaemic exposure and risk of complications.<sup>3,4,5,6</sup> But how far we could achieve these targets among patients in rural and suburban areas where there are no dedicated diabetic centres available is debatable. Many studies conducted across the globe

reported suboptimal metabolic control of varying proportions.<sup>7,8,9,10</sup>

In primary care setup, diabetic patients are treated by general physicians who are compelled to see about 100–150 patients daily over a time span of 3–4 hours. Obviously, they don't get sufficient time for a comprehensive care delivery, leave alone the counselling part that they need almost every visit. This study examined the attainment of treatment targets among type 2 diabetes patients attending a tertiary diabetes care centre for the first time.

**METHODS:**

**Study Design:** Cross-sectional, hospital based observational study.

**Study Subjects:** A total of 350 consecutive patients getting treated in primary or secondary care settings and who attended a tertiary diabetes centre for the first time formed the study population.

**Data Collection:** The study subjects were subjected to a detailed clinical, anthropometrical and biochemical evaluation at baseline by a dedicated diabetologist. Glycaemic control was assessed by venous fasting plasma glucose (FPG), postprandial plasma glucose (PPPG) and glycated haemoglobin (HbA1c) estimation at the central laboratory of the hospital using standard techniques. Fasting lipid profile, blood pressure, height, weight and waist circumference were measured and recorded. These data were collected using a structured questionnaire and were analysed using EPI INFO (Ver. 3.4.1), a database and statistics software for health care professionals, developed by Centre for Disease Control(CDC), Atlanta. Metabolic targets were defined based on American Diabetes Association (ADA) guidelines and anthropometric targets according to recommendation for Asians.<sup>11,12</sup>

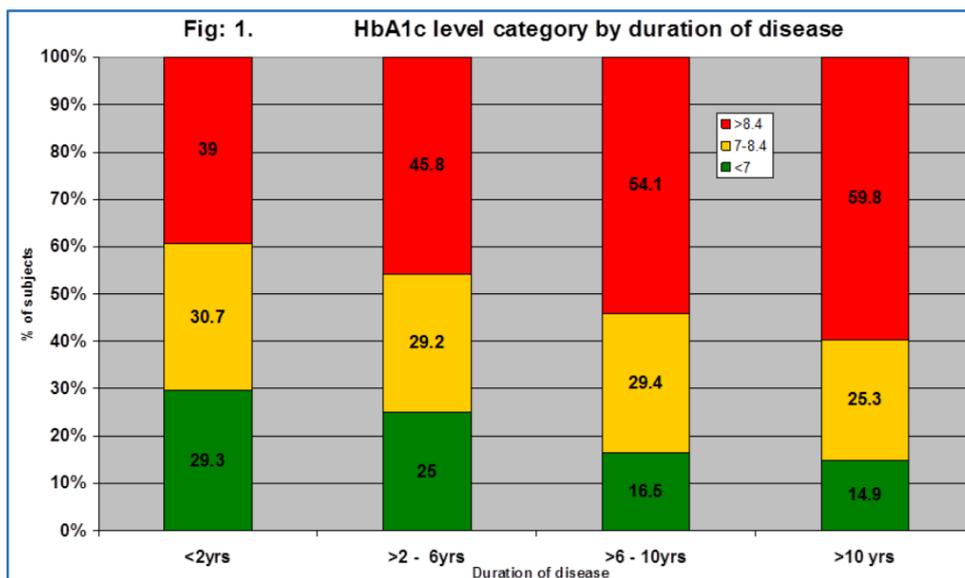
**RESULTS: Patients:** Total of 350 patients were enrolled for this study. Among them, 242(69%) were males and

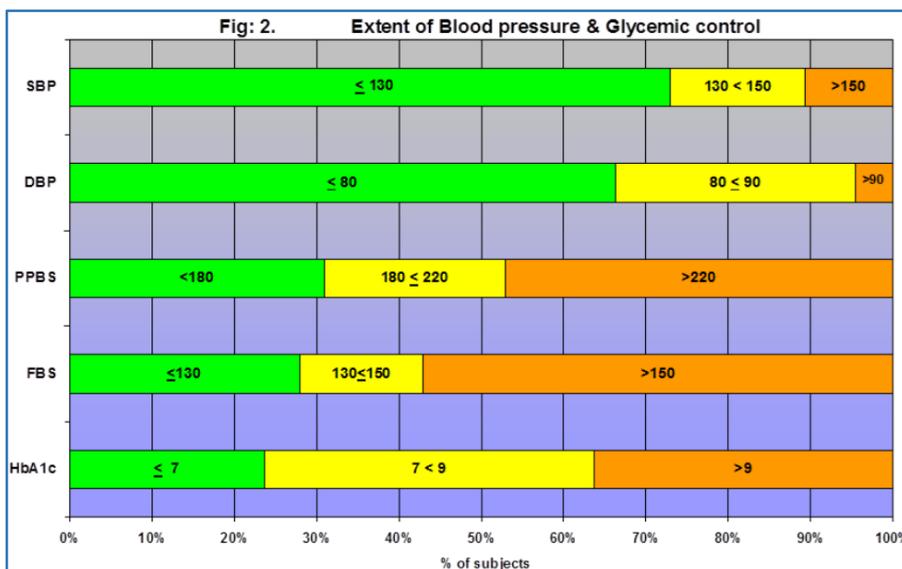
108(31%) were females. The baseline general characteristics of the study population among both sexes is shown in Table 1. There was no significant difference found between male and female patients in any of the variable studied.

Demographic and metabolic profile			
Variable	Male N=242	Female N=108	Total N=350
Age	50±11	51±10	50±11
Duration	8.2±7	7.1±5	7.9±7
BMI	24±4	25.6±4	24.5±4
Waist	91±9	92±10	91±9
SBP	129±19	129±19	129±19
DBP	81.3±7	81.3±7	81.3±7
FPG	175±68	172±56	174±64
PPPG	234±87	220±80	230±85
HbA1c	8.6±2	8.4±2	8.6±2
TC	205±45	222±44	210±45
LDL	130±39	146±40	135±40
HDL	46±8	51±7	48±9
TGL	156±96	130±60	148±88

**Table 1**

As far as the glycaemic control is concerned, even among the new diabetics (duration of disease <1 year), only 1 out of 4 patients could achieve A1c <7%. Glycaemic control worsened as duration of diabetes increased and among patients having diabetes for more than 10 years, 85% have suboptimal glycaemic control (Fig. 1). Overall 76.3% of patients could not achieve ADA A1c goal and 36.3% had very poor glycaemic control as evidenced by A1c >9%. More patients did not have targeted fasting blood sugar than postprandial blood sugar target (Fig. 2).





Mean systolic blood pressure (SBP) was 129+19 mmHg and mean diastolic blood pressure (DBP) was 81.3+7 mmHg. There was no significant gender difference noted. More than two-third of the patients (73%) had recommended SBP of <130 mm of Hg while only 66.3% had DBP <80 mm of Hg. (Fig. 2).

LDL abnormality was the most prevalent dyslipidaemia detected in this population and only 20% of patients had LDL <100 mg/dL and it was still worse in females (14%). Target HDL levels were seen among 71% of males (HDL >45 mg/dL) and 58% of females (HDL >50 mg/dL). Proportion of patients with recommended treatment goal for total cholesterol (<200 mg/dL) and triglycerides (<150 mg/dL) were 41% and 78% respectively.

The proportion of patients with normal BMI (18–23) was 34.8%. Overweight/obesity was more prevalent among females (75%) compared to males (58%). Central obesity as evidenced by increased waist circumference (>80 cm in females and >90 in males) was evident in 93% of females compared to 56% in males (Fig. 3 & 4). Two-thirds of women (77%) and less than half (42%) of men were detected with Metabolic Syndrome as per IDF criteria.<sup>13</sup> Males had better anthropometric profile.

**DISCUSSION:** The study conducted is an earnest, scientific and exhaustive attempt to evaluate the various parameters, the variation of which culminates in the end organ diseases in DM. Internationally accepted methods were used and the values compared with the standards recommended by ADA. Even though it may be argued that the number studied—350—is miniscule compared to the wide prevalence of DM in Kerala, it can be stated authentically that the selected subjects represented a wide cross section of people with DM and importantly the subjects attending a tertiary care centre for the first had varying duration of DM and helped the study to be illustrative of all the parameters observed. It provides an insight into remarkably wide variation between recommended guidelines and reality in attaining various metabolic and anthropometric goals among Type 2 DM in our study. It should be emphasised in no uncertain manner that the overall clinical targets were suboptimal and the most important observation that should be stressed is the fact that not a single subject in our study met all treatment goals as per ADA guidelines. This important observation alone is sufficient to state that the modality of treatment and management followed in the management of DM is absolutely inadequate and the patient education about the disease is at a premium. The study is a lucid indication of the need to reorient DM care towards control of modifiable cardiovascular factors. Fasting hyperglycaemia was seen to be much higher than post prandial hyperglycaemia. The prevalence of hyperlipidaemia and obesity were also found to be very high. Obesity and hyperlipidaemia were found to be higher among females possibly due to lack of physical

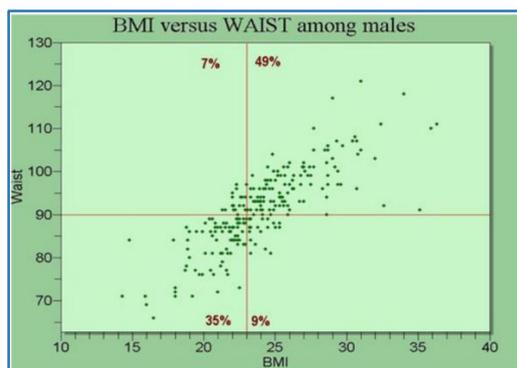


Fig. 3

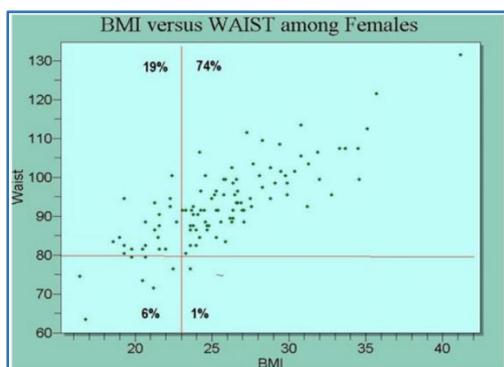


Fig. 4

exercise probably due to cultural practice and increased incidence of saturated fat consumption. Strangely, the BP variation among males and females appeared to be similar. By adopting multi-pronged efficacious treatment strategies and methods, it may be possible to enhance control of risk factors and thereby reduce longterm complication and death in diabetics. It is clearly elucidated by the study that primary and secondary care of DM patients should be diversified to attain desired goals in preventing DM complications. The wide prevalence of DM makes the need for dedicated diabetic care even at primary and secondary level imperative. The difficulty in attaining treatment targets even in state of the art centres<sup>14</sup> of treatment is obvious considering that many of the DM patients are way off the desired targets. It is also evident from the study that longer the duration, larger is the deviation from target values and is due to prolonged uncontrolled hyperglycaemia leading to abnormal parameters and a vicious circle ensues. The argument that the findings are due to severity of DM can be accepted, but with reservation, because it is clear that the findings are a reflection of the entire DM population and their dismal levels of control. Community based evaluation in various areas are needed to find the prevalence of complications and abnormal variations. If only the physician is aware of the recommended targets will he be able to apply it to his patients which will help in percolating the information to patients and make them aware of the need to have strict metabolic control for prevention of end organ complications in DM.

**CONCLUSIONS:** Despite the increasing awareness of type 2 diabetes both among attending physicians and patients, attainment of treatment targets still is a challenge even at a tertiary care setting. The lifestyle and dietary habits may be a main contributing factor for this situation. More focus needs to be given to nutritional aspects and physical exercise in not only in patients with type 2 diabetes mellitus, but also in apparently healthy individuals of the productive age group so that the disease can be delayed if not prevented.

**REFERENCES:**

1. IDF Diabetes Atlas. International Diabetes Federation 2014;6<sup>th</sup> edn.
2. Global Burden of Type 2 DM. Indian Diabetes Federation, Diabetes Atlas 2010;4<sup>th</sup> edn.
3. Rodbard HW, Jellinger PS, Davidson JA, et al. Statement by an American Association of Clinical Endocrinologists/ American College of Endocrinology Consensus Panel on type 2 diabetes mellitus: An algorithm of glycaemic control. *Endocrine Practice* 2009;15(6):540-559.
4. Lachin J, Genuth S, Nathan D, et al. The diabetes control and complications trial/epidemiology of diabetes interventions and complications. Research Group, *N Engl J Med* 2000 Feb 10;342(6):381-389.
5. UK Prospective Diabetes Study Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 1998;352(9131):837-853.
6. The diabetic control and complication trial research group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl Med* 1993;329(14):977-986.
7. Irene M Stratton, Amanda I Adler, H Andrew W Neil, et al. Association of glycemia with micro and macrovascular complications of type 2 diabetes: prospective observational study. *BMJ* 2000;321(7258):405-412.
8. Comaschi M, Coscelli C, Cucinotta D, et al, Cardiovascular risk factors and metabolic control in type 2 diabetic subjects attending outpatient clinics in Italy: the SFIDA (survey of risk factors in Italian diabetic subjects by AMD) study. *Nutr Metab Cardiovasc Dis* 2005;15(3):204-211.
9. Mafauzy M. Diabetes control and complications in public hospitals in Malaysia. *Med J Malaysia* 2006;61(4):477-483.
10. Eid M, Mafauzy M, Faridah AR. Non-achievement of clinical targets in patients with type 2 diabetes mellitus. *Med J Malaysia* 2004;59(2):177-184.
11. Butler C, Peters J, Stott N. Glycated haemoglobin and metabolic control of diabetes mellitus: external versus locally established clinical targets for primary care. *BMJ* 1995;310(6982):784-788.
12. Snehalatha C, Viswanathan V, Ramachandran A, et al. Cutoff values for normal anthropometric variables in Asian Indian adults. *J Immi gr Health* 2005;7:117-126.
13. WHO (world Health Organization) expert consultation. Appropriate BMI for Asian population and its implications for policy and intervention strategies, *Lancet* 2004;363(9403):157-163.
14. Albert KG Zimmet P, Shaw J, et al. IDF epidemiology task force consensus group. The metabolic syndrome: a new world wide distribution. *Lancet* 2005;366:1059-1062.