

# Early Referral to Specialist Center for Diabetes is Warranted

RR Joshi\*, R Menaka\*, TK Sabeer\*, KG Suresh\*, A Naveen\*, A Bhattacharyya\*\*

## ABSTRACT

**Background:** Type 2 diabetes mellitus is reaching epidemic proportions in our country. With increasing number of people with diabetes, the numbers of complications are also on the rise. It becomes imperative to intervene at the right time to decrease the associated morbidity and mortality. **Objective:** To study the diabetes profile of the people referred or presented to our specialist clinic at Manipal Hospital, Bangalore. **Materials and methods:** Consecutive 334 people referred to us for the first time, in the last one year, were enrolled for the study. Data was collected from our departmental computerized database. **Results:** In this cohort, 57% were overweight and 41% were hypertensive. HbA<sub>1c</sub> was <7% in 39% while 13% had HbA<sub>1c</sub> of >10%; 8% had retinopathy; 33% had nephropathy in the form of microalbuminuria while 4% had a creatinine value of >1.6 mg/dl; 6% people had coronary artery disease. Only 12% of patients had all the fractions of lipids in the target range and 31% had all the fractions out of target range. In total, 69% were on OHA, 21% received combination of insulin and OHA while only 3% received only insulin. **Conclusion:** Our study revealed that majority were poorly controlled with respect to glycemic profile, lipid profile and weight. Many had already developed micro and macrovascular complications. Insulin use was infrequent. We conclude that early referral to specialist is required for aggressive management.

**Key words:** Glycosylated hemoglobin, microvascular, macrovascular, neuropathy, nephropathy, creatinine, insulin, oral hypoglycemic agents, coronary artery disease, microalbuminuria

## Introduction

Type 2 diabetes mellitus (T2DM) with its attendant acute and long-term complications, and the myriad of associated disorders is a major health hazard. The incidence of T2DM is increasing very rapidly in India. Recently, WHO reported that over 19% of the world's diabetic population resides in India.<sup>1</sup> India has the dubious distinction of being home to the largest number of people with diabetes in any one country. The problem has now reached pandemic proportions.

T2DM is associated with many complications and it becomes necessary to look at diabetes from this perspective rather than only from the perspective of good glycemic control. The complications are proportional to the control of T2DM; so we need to be aggressive in controlling T2DM. In patients with T2DM, previous prospective studies have shown an association between the degree of hyperglycemia and increased risk of microvascular complications, sensory neuropathy, myocardial infarction, stroke, macrovascular mortality and all cause mortality.<sup>2</sup> Whilst the high rates of prevalence of complications is disturbing, the picture is gloomier as many of these patients already show the presence of complications at the time of diagnosis of diabetes. What is of considerable interest is that these complications can be prevented by early and aggressive control diabetes. We present our data of the diabetic profile of the patients who were referred or presented to us for the first time.

\*Registrar

\*\*Consultant

Dept. of Diabetes and Endocrinology  
Manipal Hospital, Bangalore

**Address for correspondence**

Dr A Bhattacharyya

Manipal Hospital, 98, Rustom Bagh

Airport Road, Bangalore - 560 017

E-mail: arpan@diabetesendocrinology.in

Source: *The Asian Journal of Diabetology* 2008;10(4): 34-37.

**Materials and methods**

Manipal Hospital is situated in the city of Bangalore in South India with a bed strength of 800. This is a tertiary referral hospital with all clinical specialties. We have designated specialists in the Department of Diabetes and Endocrinology in our hospital. The laboratory of our hospital is ISO certified and has all latest equipments for accurate determination of biochemical variables. We have introduced a special package called “diabetes health check” at an affordable cost through our health check department. All patients who are coming to us for the first time or the old patients who are due for their annual diabetic check are offered the package.

The patients initially undergo clinical assessment by us followed by a complete laboratory work up which includes FBG, PPBG, lipid profile, BUN, creatinine, uric acid, HbA<sub>1c</sub>, CBC, serum calcium and phosphorous. A resting ECG is taken. Urine routine examination and examination for microalbuminuria are performed. As a part of this package the patients then meet our in-house ophthalmologist for retinopathy screening followed by diet counseling and dental check up. A day later they would be seen by us along with the reports for diabetic counseling and suggestion. The data would be stored and analyzed by computer based software. For this particular study, we included consecutive 334 people referred to us for the first time, in the last one year. The data of these people was systematically analyzed using standard statistical methods.

**Results**

We have analyzed 334 consecutive patients for this study. This comprised of 222 (66%) males and 112 (34%) females. Mean age was 52 ± 10 years. The maximum burden i.e. 129 (39%) was seen in 50-59 age groups. Mean FBG was 167 ± 56 and mean PPBG was 250 ± 77. HbA<sub>1c</sub> measurement tells us about the average diabetic control over the last three months. According to ADA criteria, one should target HbA<sub>1c</sub> value of <7% to prevent the long-term complications diabetes. We saw that 39% of patients in our cohort had achieved this target. As many as 48% had HbA<sub>1c</sub> between seven and nine while 13% had HbA<sub>1c</sub> of >10%; (Fig. 1). We measured body mass index (BMI) by dividing weight in kilograms by the square of the height in meters. A BMI of >25 was taken as overweight. There were about 57% people who fell in the overweight category (Fig. 2). The blood pressure was measured by us in the OPD. We took 130/80 mmHg as the target blood pressure as per the

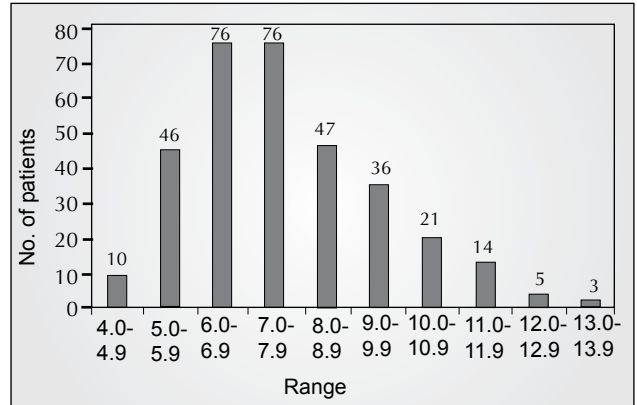


Figure 1. HbA<sub>1c</sub>

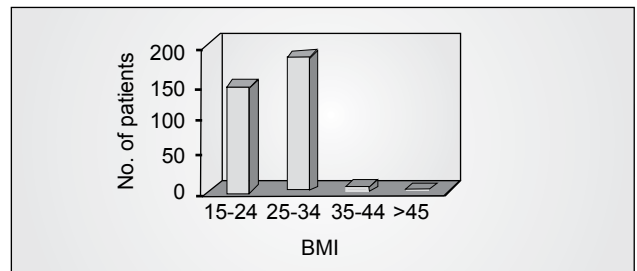


Figure 2. BMI characteristics

standard guidelines. A good 41% had blood pressure above 130/80 mmHg.

These poor control measurements were reflected in the higher incidences of the complications. Microalbuminuria was measured in a spot sample and patients having urinary albumin between 30-300 µg/mg of creatinine were taken as having microalbuminuria. Microalbuminuria was seen in 33% of the patients. A further 4% had a creatinine value of >1.6 mg/dl. Another microvascular complication i.e. retinopathy was found in 8%. Coronary artery disease was diagnosed based on history or changes in the resting ECG. Six percent of the cohort had abnormalities. We took total cholesterol <160 mg/dl, LDL cholesterol of <100 mg/dl, triglycerides (TGs) <150 mg/dl, HDL cholesterol of >40 mg/dl in women and 35 mg/dl in men as targets as far as lipid management is considered. Only 12% of patients had all the fractions of lipids in the target range and 31% had all the fractions out of target range. We saw that 66% had their LDL above 100 mg/dl while 44% had their TGs >150 mg/dl. In as many as 35% of the female patients, HDL >40 mg/dl was seen while 14% of males showed HDL of <35 mg/dl. (Fig. 3). Sixty-nine percent patients were on OHAs, 21% received combination of insulin and OHA but 3% received only insulin.

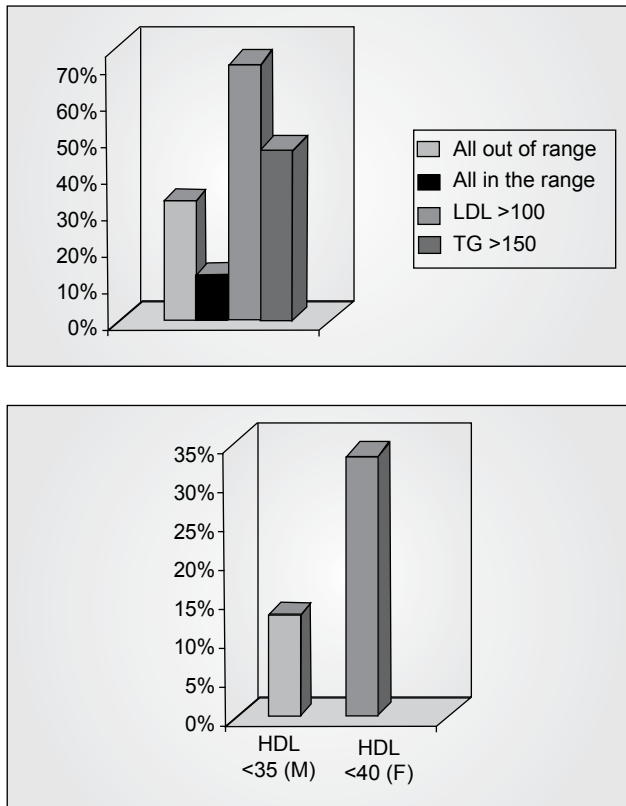


Figure 3. Lipid profile

### Discussion

T2DM is associated with many microvascular and macrovascular complications like retinopathy, neuropathy, nephropathy, coronary artery disease, cerebrovascular and peripheral vascular disease. It is a major cause of kidney disease, vision loss and amputation in most countries where its prevalence exceeds 5%.<sup>3</sup> All the major complications of T2DM are either present at the time of diagnosis or appear shortly after the diagnosis without aggressive treatment. UKPDS have conclusively shown that HBA<sub>1C</sub> of <7% brings about significant reductions in complications.<sup>4</sup> However in our cohort of 334 patients, hardly 39% had achieved this target. Obesity is one of the important contributors to insulin resistance and worsening of glycemic control. A total of 57% of our patients were overweight. The associated high blood pressure contributes to both cardiovascular and renal complications of T2DM. Tighter blood pressure control helps to prevent or to postpone the development of these complications.<sup>5</sup> The target blood pressure in people with diabetes is 130/80 mmHg as per JNC VII recommendation. However, we found as many as 41% to be above this target. This reflected on the other complications like nephropathy which was seen

in 33% and coronary artery disease in 6%. Coronary artery disease was diagnosed based on history and/or changes in resting ECG. Here we did not do TMT or echo which could have unearthed some more patients.

Microalbuminuria is an early sign of incipient renal disease and a marker of its progression. Furthermore, it is a key indicator of the need for intensification of the treatment of T2DM and blood pressure.<sup>6</sup> It is also a powerful predictor of CVS and atherosclerotic risk and prognostic marker in the development of ESRD and mortality.<sup>7,8</sup> It has been also shown that there is no J-shaped curve or lower level of HBA<sub>1C</sub> below which risk of nephropathy began to increase again.<sup>9,10</sup> Therefore, one has to intensively manage T2DM especially in the stage of microalbuminuria so that it does not progress to overt of nephropathy. Our cohort had as many as 33% nephropathy and 4% had creatinine of >1.6 mg/dl. Retinopathy was seen in 8%. However, we could not explain lesser incidence of retinopathy in comparison to nephropathy.

Lipids are other important metabolic parameters that need to be looked at in the management of T2DM. Low HDL, high TGs found typically in association with T2DM are associated with increased risk of CHD. This associated with high LDL further increases the risk of CHD.<sup>11</sup> Hence, all lipid fractions should be in the target range. However, we saw that only 12% of our cohort had all fractions under target while as many as 31% had all of them out of range. In 44% patients, TGs were >150 mg/dl, 66% patients had LDL >100 mg/dl, while HDL was <40 mg/dl in 35% of the female patients and <35 mg/dl in 14% of the males. Patients using oral therapy seldom achieve and maintain the recommended <7% HBA<sub>1C</sub> goal<sup>12,13</sup> for glycemic control and are exposed to increasing risks of diabetic complications as control worsens over time.<sup>14,15</sup> A recently reported substudy of the UKPDS confirmed that early addition of insulin to oral therapy can safely keep HBA<sub>1C</sub> close to 7% in the first six years of diagnosis.<sup>16</sup> However, only 3% of our study population had received only insulin while another 21% received combination of insulin and oral hypoglycemic agents. But as high as 69% study population received only oral hypoglycemic agents.

Thus in our study we found that despite compelling evidence which shows benefits of good glycemic, lipid, blood pressure control and weight maintenance, many of our patients had poor control with respect to all of them leading to development of complications in many of them. Also insulin was sparingly used in

this cohort despite evidence that show the benefits of early insulin initiation in many. We conclude that early referral to specialist is required to aggressively manage the different aspects of T2DM. We plan to review the data again to see how many come back for repeat annual check and what is the impact of our specialist counseling advice. We conclude that with increasing burden of diabetes in our country we need diabetes specialists (physicians who have special expertise and training in diabetes management) to reduce the burden of this pandemic in the country.

### Acknowledgement

We are grateful to Ms. Hema, our Statistician, for helping us to compile the data.

### References

1. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004;27(5): 1047-53.
2. Klein R. Hyperglycemia and microvascular and macrovascular disease in diabetes. *Diabetes Care* 1995;18(2):258-68.
3. Balkau B, Shipley M, Jarrett RJ, Pyörälä K, Pyörälä M, Forhan A, et al. High blood glucose concentration is a risk factor for mortality in middle-aged nondiabetic men. 20-year follow-up in the Whitehall Study, the Paris Prospective Study, and the Helsinki Policemen Study. *Diabetes Care* 1998;21(3):360-7.
4. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). UK Prospective Diabetes Study (UKPDS) Group. *Lancet* 1998;352(9131): 837-53.
5. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. UK Prospective Diabetes Study Group. *BMJ* 1998;317(7160):703-13.
6. Pandey A, Mann M. Proteomics to study genes and genomes. *Nature* 2000;405(6788):837-46.
7. Gosling P. Microalbuminuria: a marker of systemic disease. *Br J Hosp Med* 1995;54(6):285-90.
8. MacLeod JM, Lutale J, Marshall SM. Albumin excretion and vascular deaths in NIDDM. *Diabetologia* 1995;38(5):610-6.
9. The absence of a glycemic threshold for the development of long-term complications: the perspective of the Diabetes Control and Complications Trial. *Diabetes* 1996;45(10):1289-98.
10. Stratton IM, Adler AI, Neil HA, Matthews DR, Manley SE, Cull CA, et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ* 2000;321(7258):405-12.
11. Manninen V, Tenkanen L, Koskinen P, Huttunen JK, Mänttari M, Heinonen OP, et al. Joint effects of serum triglyceride and LDL cholesterol and HDL cholesterol concentrations on coronary heart disease risk in the Helsinki Heart Study. Implications for treatment. *Circulation* 1992;85(1):37-45.
12. Harris MI, Eastman RC, Cowie CC, Flegal KM, Eberhardt MS. Racial and ethnic differences in glycemic control of adults with type 2 diabetes. *Diabetes Care* 1999;22(3):403-8.
13. Turner RC, Cull CA, Frighi V, Holman RR. Glycemic control with diet, sulfonylurea, metformin, or insulin in patients with type 2 diabetes mellitus: progressive requirement for multiple therapies (UKPDS 49). UK Prospective Diabetes Study (UKPDS) Group. *JAMA* 1999;281(21):2005-12.
14. U.K. prospective diabetes study 16. Overview of 6 years' therapy of type II diabetes: a progressive disease. U.K. Prospective Diabetes Study Group. *Diabetes* 1995;44(11):1249-58.
15. Klein R, Klein BE, Moss SE. Relation of glycemic control to diabetic microvascular complications in diabetes mellitus. *Ann Intern Med* 1996;124(1 Pt 2): 90-6.
16. Wright A, Burden AC, Paisey RB, Cull CA, Holman RR; U.K. Prospective Diabetes Study Group. Sulfonylurea inadequacy: efficacy of addition of insulin over 6 years in patients with type 2 diabetes in the U.K. Prospective Diabetes Study (UKPDS 57). *Diabetes Care* 2002;25(2):330-6.

## Suture Removal

The timing of suture removal varies with the anatomic site.

- Neck: 3-4 days
- Face and scalp: 5 days
- Eyelids: 3 days
- Trunk and upper extremities: 7 days
- Lower extremities: 8-10 days

*Selbst SM, Attia MW. In: Textbook of Pediatric Emergency Medicine, 5th edition, Fleisher GR, Ludwig S (Eds.), Lippincott Williams & Wilkins, Philadelphia 2006:1571.*