A prescription survey in diabetes assessing metformin use in a tertiary care hospital in Eastern India

Sir,
Approximately 197 million people worldwide have diabetes mellitus, most commonly because of obesity and the

associated metabolic syndrome. This number is expected to increase to 420 million by 2025.[1] India sadly is emerging as a world leader in diabetes prevalence and currently has 40.9 million patients – a number that is expected to rise to 69.9 million by 2025.[2]

The mechanisms by which metformin exerts its antihyperglycemic effects on type 2 diabetes are still not entirely clear; however, its major action in patients with diabetes is to decrease hepatic glucose output, primarily by decreasing gluconeogenesis, but it may also, as a lesser effect, increase glucose uptake by skeletal muscles. The changes are more prominent in diabetic than non-diabetic individuals showing that metformin has enhanced action in the hyperglycemic state.[3]

We undertook this cross-sectional study to determine the status of metformin use among endocrinologists in a tertiary care hospital set-up of Eastern India for diabetes management. We randomly selected prescriptions from the patients suffering from diabetes mellitus as the primary complaint over a period of 3 months. The prescriptions for diabetes patients of either sex with age less than 90 years were included in the study.

A total of 380 prescriptions were selected. The mean age of the patients was 47.25 years (SD 12.17 years). It was noted that the fasting blood glucose (FBG) level was unavailable in 139 patients. Of the remaining 241 patients, 47 patients had a fasting blood sugar level less than 100 mg/dl, i.e. normal. Diagnosis was more often than not based on postprandial blood sugar (PPBS) in these cases. Based on the FBG, 26 (of 241 patients) and based on PPBS, 93 (of 349 patients) were deemed to be prediabetic (FPG 100–125 mg/dl and PPBS 140–199 mg/dl).

In the studied 380 prescriptions, a total of 680 drugs were prescribed at a rate of 1.79 antidiabetic agents per prescription.

Metformin was prescribed in 304 prescriptions. It was the highest prescribed antidiabetic drug among hospital prescriptions (80% prescriptions). The reasons for not prescribing metformin included pregnancy, intolerance and lack of compliance, and lifestyle modifications. While some patients were intolerant to metformin manifesting as gastrointestinal intolerance, there were others who complained of difficulty in swallowing the large metformin tablets.

There were 200 prescriptions that contained a single antidiabetic agent. Of these most comprised of insulin alone. However, metformin ranked as the second common drug prescribed as monotherapy in diabetes making up 52% of all prescriptions. In two-drug combination therapy, the most common component of drug was metformin. It was a common accompaniment in 92 out of 113 cases. Glimepiride was chosen most frequently along with metformin (38.94%) cases followed by a thiazolidinediones (22.12%), and insulin (10.62%).

The most common three-drug combinations used included metformin, glimepiride, and a thiazolidinedione in 59.23% cases. The second most common three-drug combination included insulin, metformin, and a thiazolidinedione in 25.24%. These two combinations comprised the bulk of the three-drug combinations in 84.47% and metformin formed a part of all these prescriptions.

Of all the prescriptions, only 11 cases were prescribed four antidiabetic drugs. These included a combination of metformin, glimepiride, insulin, and a thiazolidinedione.

Figure 1 shows the drug therapy inclusive of metformin based on an assessment of PPBS. It shows that a substantial number of patients who were diabetic and prediabetic were prescribed regimens that included metformin.
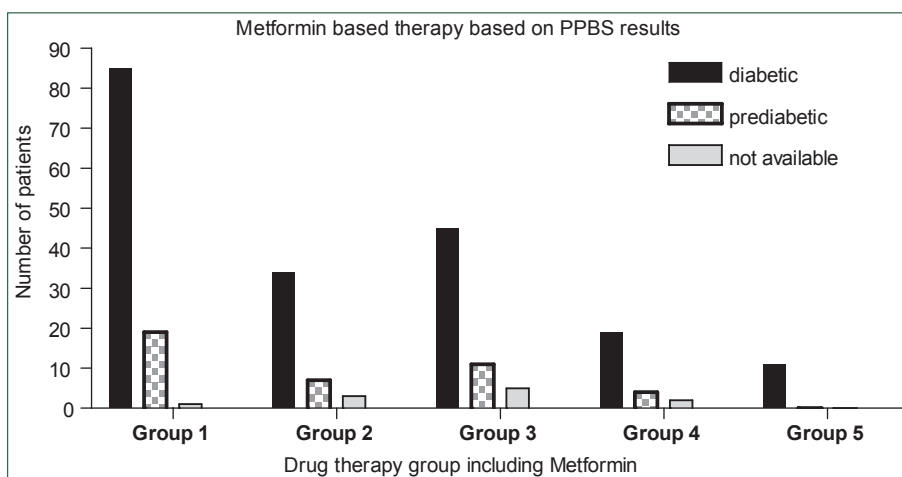

Figure 1: The drug therapy based on assessment of postprandial blood sugar (PPBS). Group 1: metformin alone; Group 2: metformin + glimepiride; Group 3: metformin + glimepiride + a thiazolidinedione; Group 4: metformin + a thiazolidinedione; Group 5: metformin + glimepiride + insulin + thiazolidinedione.
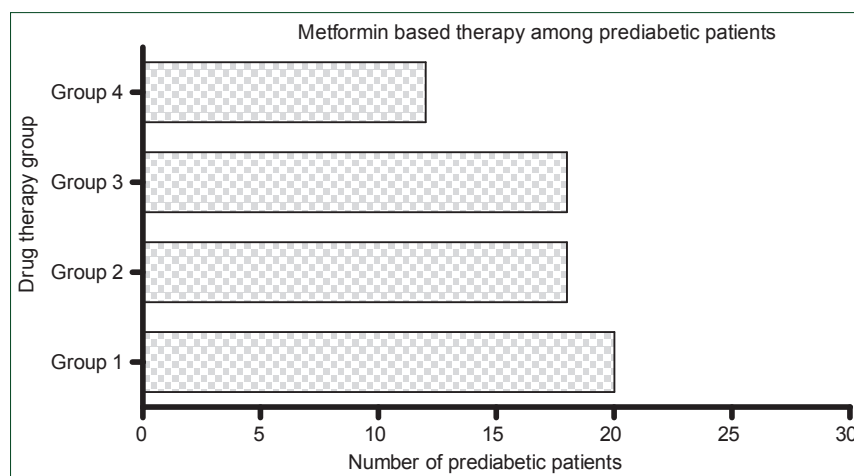
Figure 2: The pattern of metformin-based regimens used among prediabetic patients. Group 1: metformin alone; Group 2: metformin + glimepiride; Group 3: metformin + glimepiride + a thiazolidinedione; Group 4: metformin + a thiazolidinedione.

Among the 380 prescriptions, 149 were of recent onset (0–2 months). In this group, the prediabetic patients known as a category of increased risk were prescribed mostly calorie restrictions and exercise. However, in those patients who received medications metformin was the commonest agent. Figure 2 shows the pattern of metformin-based regimens used among prediabetic patients.

To the best of our knowledge, there have been no known prescription surveys that explored the extent of use of metformin in diabetes management. We found that metformin was commonly prescribed as monotherapy and also the commonest additive to two, three, and even four drug based regimens.

Prediabetes or impaired glucose tolerance is the precursor of diabetes. Around 70% of the people with pre-diabetes go on to develop type 2 diabetes. The risk for cardiovascular disease likely starts in the prediabetes stage. Subjects with impaired fasting glucose or IFG have been demonstrated to have an increased risk for macrovascular disease, in a variety of population-based studies.[4] Meta-analysis of randomized controlled trials shows metformin to improve weight, lipid profiles and insulin resistance, and reduce new-onset diabetes by 40% in patients at risk of diabetes.[5] In our study, we noted a substantial percentage of prediabetics was treated with metformin when drug therapy was initiated. In general, most prediabetics were prescribed lifestyle modifications in our study. A latest literature review also showed that high dose of regular metformin in prediabetics could be beneficial in preventing onset of diabetes. The NNT (number needed to treat) from this meta-analysis was 7–14 for treatment over 3 years.[6]

We conclude that metformin is and ought to be the cornerstone of therapy in these cases.

Manab Nandy, Ananya Mandal[1], Samar Banerjee[2], Krishnangshu Ray[3]

Department of Pharmacology, National Medical College and Hospital, [1]Department of Pharmacology, Nil Ratan Sircar Medical College and Hospital, [2]Department of General Medicine, Vivekananda Institute of Medical Sciences and Ramakrishna Mission Seva Pratisthan, [3]School of Tropical Medicine, Kolkata, West Bengal, India

Address for correspondence:
Ananya Mandal, 41B, Dr. G.S. Bose Road, Kolkata 700 039, West Bengal, India. E-mail: drananyamandal@gmail.com

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