Editorial

The Opportunities to 'Beat Diabetes'

The theme of the 2016 World Health Day was 'Beat diabetes'.[1] As per the WHO global report on diabetes (2016), the number of adults living with diabetes has almost quadrupled since 1980 to 422 million.[2] India is no exception and is one of the epicentres of the diabetes mellitus pandemic. The 2015 update of the International Diabetes Federation (IDF) Atlas (*www.diabetesatlas.org/resources/2015–atlas.htm*) estimates around 69.2 million people in India to be affected by diabetes. In a study of 24 335 individuals from four Asian countries (China, Japan, India and Singapore), Indians were found to have the highest prevalence of diabetes mellitus. The peak prevalence of the disease was reached approximately 10 years earlier in Indians compared with Chinese and Japanese peers.[3]

According to the Indian Council of Medical Research–INdia DIABetes (ICMR–INDIAB) study, which was done in urban and rural populations across the country, the 'take-off point' for increased prevalence of type 2 diabetes mellitus (T2DM) among Asian Indians is 25–34 years, clearly a decade or two earlier than that in western populations.[4] A similar trend has been shown by the latest figures from the CARRS (The Centre for Cardiometabolic Risk Reduction in South Asia) study, with data from metropolitan Chennai and Delhi.[5]

The change from a traditional cereal-based diet to a refined diet and decreasing physical activity are some of the reasons for the rapid increase in the prevalence of diabetes over the past two decades. Phase 1 of the ICMR–INDIAB study showed that a large percentage of people (54.4%) in India were inactive with fewer than 10% engaging in recreational physical activity.[6]

TARGET POPULATIONS

The two major potential groups to prevent this epidemic are overweight/obese individuals and women with gestational diabetes mellitus, during pregnancy and postpartum.

Overweight and obesity

Overweight and obesity is an important risk factor for diabetes. As many as 13% of women (15–49-year age group) are overweight or obese (10% overweight and 3% obese) according to the National Family Health Survey in 2005–06 (NFHS-3). The percentage overweight or obese is somewhat lower for men 15–49 years of age (9%) than for women (13%) in the same age group. Men are also less likely to be obese (1%) than women (3%).[7] Based on phase 1 of the ICMR–INDIAB (ICMR–INDIAB-3) study done in three states and one Union Territory, the data extrapolated for whole of India estimates 288 million people to be either overweight or obese (body mass index [BMI] $\geq$23 kg/m^2).[8] At any BMI, Asian Indians have a higher magnitude of adiposity, abdominal obesity and a lower muscle mass than white Caucasians. Due to this phenotype, Asian Indians develop insulin resistance, the metabolic syndrome and T2DM even at a normal BMI. A recent study found urban south Asians to be 5 to 9-times more likely to exhibit dysglycaemia and dyslipidaemia in the 'healthy' BMI range compared with any other US race/ethnic group.[9]

Data on childhood obesity are scarce, but reports show an upward trend. The prevalence of combined overweight/obesity has increased from 15.9% before 2001 to 16.3% during 2001–05, 17.4% during 2006–10, and reaching 19.3% in studies reported after 2010.[10] Overweight/obesity is associated with insulin resistance and subclinical inflammation. This has fuelled the growth of not only T2DM, but has also contributed to the decrease in age of onset of diabetes. The increase in the number of young persons with diabetes, who belong to the economically productive age group, increases medical

expenses, both personal as well as of the healthcare system, and adversely impacts the nation's economy.[11]

Gestational diabetes mellitus (GDM)

The prevalence of GDM in India itself has increased by more than 5-fold in the past two decades. Hyperglycaemia of pregnancy not only affects maternal and foetal health in short term, but also sows the seeds of future non-communicable disease. Children born to mothers with GDM are more prone to develop metabolic complications in future, and so are the mothers themselves. This creates a vicious cycle of metabolic diseases, which unnecessarily adds to the burden of lifestyle-related diseases.[12]

FOCUSED STRATEGIES

With increasing understanding of a 'life course' impact on disease causation, it becomes imperative to adopt prevention strategies from early in life.

Overweight and obesity during childhood

These are major drivers of the diabetes epidemic. Overweight and obesity, in turn, are due to poor lifestyle habits (diet and exercise). Dietary practices and involvement in leisure time physical activity in a child is greatly influenced by the knowledge, interest and behaviours of parents themselves. Therefore, creating awareness among parents is important to facilitate adoption of healthy habits in a child.[13] These can be reinforced in schools with a focus on health-oriented activities, including regular health classes and activities such as debates, skits, role plays, etc. The healthy lifestyle will not only reduce overweight/obesity but will also decrease the incidence of metabolic dysfunction such as T2DM in youth and adults, and its complications.[14–16] This is likely to decrease other metabolic diseases as well such as hypertension, dyslipidaemia, polycystic ovarian syndrome, etc., which will lower the burden of cardiovascular disease as well.[16]

Gestational diabetes mellitus

Pre-pregnancy BMI is an independent risk factor for GDM. A woman with normal weight, who follows a healthy lifestyle, greatly reduces her risk for GDM and its complications. This in turn positively influences the epigenome, subsequently decreasing the chances of metabolic diseases in the offspring.[17] An important aspect of prevention is the detection of GDM. Universal screening for GDM at 24–28 weeks with standardized criteria in pregnancy is imperative. Once hyperglycaemia during pregnancy is detected, management can reduce complications for the mother and foetus. Adverse effects of hyperglycaemia on *in utero* programming can be reduced providing an opportunity to reduce the load of metabolic diseases in the subsequent generation.[18]

After pregnancy, these women themselves stand at high risk of diabetes and cardiovascular diseases. Therefore, even after delivery, periodic screening for diabetes/prediabetes and metabolic diseases such as obesity/hypertension and dyslipidaemia is needed.[19] Lifestyle modification should be reinforced and desired support by the family and healthcare system should be provided to overcome the challenges of child care.

Strategies for other groups

Apart from the two focus groups we have mentioned, there exist other opportunities to decrease the burden of diabetes and its complications.[20] These can be viewed in terms of the natural history of T2DM.

T2DM is preceded by 10–12 years of insulin resistance, followed by prediabetes.[20,21] Diabetes often remains undiagnosed for 4–7 years in many patients, before becoming clinically manifest.[21] Complications set in after a period of uncontrolled glycaemia. So, there are multiple windows of opportunity.

- *Primordial prevention*: Insulin resistance can be prevented/alleviated by adoption of a healthy lifestyle.
- *Primary prevention*: High-risk individuals before 30 years of age, e.g. overweight/obese individuals, can be screened for hyperglycaemia. Screening should be routine after 30 years of age, as also recommended by the national programme.[22]
- *Secondary prevention*: Early diagnosis of diabetes and optimal management provides an opportunity for reducing the complication rates of diabetes.
- *Tertiary prevention*: Early detection of prevalent complications can further decrease the brunt of complications of diabetes, such as detecting neuropathy and avoiding diabetic foot.

SUMMARY

All these efforts can succeed only by involving multiple stakeholders. Individuals need to be made aware of a healthy lifestyle, importance of periodic screening and need for treatment and follow-up compliance if they already have diabetes and other comorbid conditions. Similarly, it is the duty of the healthcare system to provide the necessary facilities for successful accomplishment of these aims. Besides healthcare professionals and government, non-governmental organizations, schools and celebrities can be harnessed to 'Beat diabetes'.

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