

Editorial

Lessons Learnt from the ICMR–INDIAB Study

At the time of Independence, India's life expectancy was around 35 years, which has now 'doubled' to 70 years.¹ The lower life expectancy in the past was primarily due to high rates of infant and childhood mortality. The major causes of death in India at that time and up to the 1970s were due to communicable diseases (CDs). Over the years, slowly, while the prevalence of CDs has started declining, the relative contribution of non-communicable diseases (NCDs) such as diabetes, hypertension, cardiovascular disease and cancers has increased dramatically. Today, NCDs are estimated to contribute around 70% of the overall mortality in India.

In 1972, a multicentre study was conducted by the Indian Council of Medical Research (ICMR) spearheaded by Professor M.M.S. Ahuja from the All India Institute of Medical Sciences (AIIMS), New Delhi. In that study, the prevalence of diabetes in urban India was estimated to be 2%–2.5% in the cities that were studied, while the rural prevalence was 0.5%–1.5%.² However, these rates have been increasing steadily, concurrent with increasing obesity rates and unhealthy lifestyle habits. Till around 1991, when India opened up its economy, the rise in NCDs in general, and diabetes in particular, was slow. After the economy opened up, rapid improvement in socio-economic conditions occurred. While there was a decline in undernutrition, there was an increasing prevalence of overnutrition, especially in urban India and this led to huge increases in the prevalence of overweight and obesity.

Largely driven by the increasing obesity rates, the prevalence rates of diabetes soon entered double figures and today in some of the large metropolitan cities such as Delhi and Chennai, the prevalence rates of diabetes in adults >20 years of age are over 25%.³ However, most of the epidemiological studies done earlier had been either from metropolitan cities or second-tier cities, with limited data from rural India.⁴ There was no national study which comprehensively covered the whole country or for that matter, even systematically evaluated the prevalence of NCDs in a state. This led to the Indian Council of Medical Research–India Diabetes Study (ICMR–INDIAB) being taken up in 2008.⁴

The ICMR–INDIAB study is a cross-sectional, community-based survey of adults of both sexes aged ≥ 20 years representative of every state in the country. The methodology of the study was first published in 2011.⁵ The study was carried out in phases and the total people surveyed was 113 043 (urban 33 537; rural 79 506) with an equal split among men and women. The most recent report from this study was published in *Lancet Diabetes Endocrinol*, after completion of data gathering and analysis across all states in mainland India.⁶

What did we learn from the study?

The following are the main findings from the ICMR–INDIAB study (Table I).

1. There is an enormous burden due to all NCDs in India.
2. While urban prevalence is high, rural areas are rapidly catching up especially for prediabetes.
3. The diabetes:prediabetes ratios indicate that while some of the more economically progressive states have started showing plateauing of diabetes, the prevalence in most states in the country is still on the rise.
4. There are huge interstate and regional differences in prevalence of NCDs, e.g. population prevalence of diabetes ranged from 4.8% in Uttar Pradesh to 26.4% in Goa.

Earlier studies such as the state-level Global Burden of Disease (GBD)⁷ study and the National Family Health Survey-5 (NFHS-5) have also reported on diabetes rates.⁸

TABLE I. ICMR–INDIAB study findings

Non-communicable diseases (NCDs)	National prevalence (%)	Estimated number of people in India, in millions (burden)	State with highest prevalence (%)	State with lowest prevalence (%)
Diabetes	11.4	101	Goa (26.4)	Uttar Pradesh (4.8)
Prediabetes	15.3	136	Sikkim (31.3)	Mizoram (6.8)
Hypertension	35.5	315	Punjab (51.8)	Meghalaya (24.3)
Generalized obesity	28.6	254	Puducherry (53.3)	Jharkhand (11.6)
Abdominal obesity	39.5	351	Puducherry (61.2)	Jharkhand (18.4)
Hypercholesterolaemia	24.0	213	Kerala (50.3)	Jharkhand (4.6)

However, the GBD study combined existing data and modelling to come up with a composite assessment/projection. The NFHS had an age cap (50/55 years in women and men) and largely depended on self-report and random capillary blood glucose with fasting blood glucose available in <5% samples. Hence, the reliability and credibility of INDIAB study as far as epidemiology and prevalence rates of diabetes are concerned surpasses both those studies.

Interestingly, the INDIAB study showed that most states that had higher prevalence of diabetes showed lower prevalence of prediabetes, suggesting that the epidemic may be beginning to plateau off in these states. However, this is also a warning that the states which currently have lower prevalence of diabetes, but high prevalence of prediabetes can expect to see large increases in prevalence of diabetes in these states in the years to come. This is worrisome, because this includes states such as Uttar Pradesh which have a large population (in 2023, it is estimated to be 235.6 million). Hence, even a small increase in prevalence rates in these states can lead to huge increases in numbers of people with diabetes.

Table I also shows the huge burden due to other metabolic NCDs in India. The prevalence of hypertension was 35.5% with an estimated 315 million people having hypertension in India. The high prevalence of generalized obesity (28.6%) and abdominal obesity (39.5%) suggest the likelihood of further increases in the rates of diabetes in India. The high prevalence of hypercholesterolaemia points to the potential cardiovascular disease risk in India.

However, on a positive note, the ICMR–INDIAB study also presents a golden window of opportunity for prevention of NCDs with respect to the large number of people with prediabetes (136 million). This suggests that if lifestyle modifications can be encouraged in those with prediabetes, e.g. eating healthy diets (with more of green leafy vegetables and fruits and increasing the protein content of the diet while decreasing the percentage of carbohydrates), along with increase in physical activity and weight reduction if obese, this can help, not only in the prevention of diabetes,^{9,10} but can also possibly promote its reversal to the normal glucose tolerance stage. Reduction in salt intake can also help to stabilize or reduce the rates of hypertension. Finally, following healthy lifestyle and avoiding junk/processed foods which are high in calories, sugar, carbohydrate, fat and salt can also help to reduce the burgeoning obesity rates. The INDIAB study showed that already 50% of the adult population of some states have abdominal obesity. Unless this is corrected, further increases in diabetes rates can be expected.

What about those who already have diabetes?

By following the *ABCD* mantra, complications of diabetes can be prevented. *ABCD* refers to keeping the

A: A1c <7%;

B: Blood pressure <140/90 mmHg or lower;

C: Cholesterol and low-density lipoprotein (LDL) cholesterol within normal limits; and

D: Discipline (includes healthy diets, increasing physical activity and regular checkup in addition to avoiding tobacco and excess alcohol use). An earlier ICMR–INDIAB publication showed that the combined ABC control is achieved only in <7% of those who have self-reported diabetes.¹¹

The government has recently revamped its earlier National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) to the

National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD).¹² Under the Ayushman Bharat (Comprehensive Primary Health Care) Scheme, 150 000 health and wellness centres are being set up in all parts of the country.¹³ This could greatly help in the prevention and control of diabetes and hypertension, which are included as two of the major diseases that would be screened and treated at these facilities. Along with this, massive awareness programmes to inform the public about the importance of healthy eating, avoidance or reduction in obesity and increasing physical activity have to be done, if the rising prevalence of NCDs in India has to be stemmed. Other newer factors such as air pollution, pesticides, etc. are emerging risk factors for NCDs, which describe attention in future studies.

In conclusion, while the ICMR–INDIAB study shows that the numbers of people with metabolic NCDs is huge, it also presents an opportunity for prevention and control of NCDs. A multisectoral approach involving the government, non-governmental agencies, the community at large as well as the individual would be needed to slow down or stop the rising tide of NCDs. The time to act is NOW!

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VISWANATHAN MOHAN
RANJIT MOHAN ANJANA
Department of Diabetology
Madras Diabetes Research Foundation and
Dr Mohan's Diabetes Specialties Centre
Chennai, Tamil Nadu, India
drmohans@diabetes.ind.in

NIKHIL TANDON
Department of Endocrinology and Metabolism
All India Institute of Medical Sciences
New Delhi, India

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