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Tracking Progression from Prediabetes to Diabetes with Big Data Analytics

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Akansh Khurana, CEO & Co-Founder of THB India, talks about how predictive analytics can be employed in prediabetes to track, control and make health decisions



The burden of prediabetes in India

There are close to 8 crores people living with prediabetes in India, and most of them don't know about it, as it can remain undetected for many years.

Prediabetes is an intermediate stage between non-diabetes and diabetes, where blood glucose levels are higher than normal but not high enough to be diagnosed as Type 2 diabetes. The transition from prediabetes to diabetes can be rapid or take several years depending upon the metabolic health of a person; however, not everyone with prediabetes goes on to develop type 2 diabetes.

Prediabetes to diabetes progression

THB India conducted a retrospective cohort analysis to determine how many patients progress from prediabetes (HbA1c% less than 6.4%) to diabetes (HbA1c% more than 6.5%). The diagnostic data of ~43,000 de-identified patient records were analyzed to compare patients' latest glucose profile to their first HbA1c test result.

Progression rate was defined as the percentage of patients that converted from prediabetes to diabetes in 2 years duration. We also compared how metabolic comorbidities ¾ dyslipidemia, hyperuricemia, and hypothyroidism related to the progression rates. The findings were as follows:

- ~19% of people progressed from prediabetes to diabetes within 2 years.
- Progression rate was found to be highest in the age group of 31 to 45 years (24.4%), followed by 19 to 30 years (19.4%), 46 to 60 years (18.7%), and 60+ years (17%).
- Progression rate was found to be higher in people with more comorbidities: For patients with one comorbidity, progression rate was 18.6%; for two comorbidities, it was 20.2%, and for three comorbidities, it was 27.9%.

What leads to rapid progression?

Research shows that the Indian population is hyperinsulinemic and more prone to insulin resistance. Indians get diabetes 5-10 years earlier as compared to the western population. Published research also suggests that Indians progress faster through the prediabetes stage as compared to other ethnic groups.

The risk factors of prediabetes are the same as that for type 2 diabetes: overweight/obesity, dyslipidemia, hypertension, family history, hormone disorders, diet and lifestyle (smoking, alcohol, physical activity).

Prediabetes can only be detected through screening, as there are no/silent symptoms at this stage. Therefore, not only people above the age of 45 years but also those in the age group of 31 to 45 years and below 30 years need to be careful, especially if they have risk factor/s.

Comorbidities increase the risk of progression from prediabetes to diabetes. Hypothyroidism leads to metabolic abnormalities, and studies show that it may lead to increased blood glucose and HbA1C levels. Published literature also indicates that hyperuricemia makes insulin resistance worse, and people with high uric acid are more likely to get diabetes. Likewise, dyslipidemia is also a common finding in prediabetics and patients with insulin resistance.

The results from THB's Real-World Evidence (RWE) based analysis highlight the importance of regular blood glucose testing and keeping blood sugar levels under control. Many people don't realize that they may be headed towards diabetes as they never get their blood glucose tested.

The future of diabetes prevention and treatment

Once prediabetes progresses to diabetes, it leads to serious complications and becomes much harder to control. Screening and awareness campaigns hence become a priority for those at risk or affected.

THB India, leading clinical intelligence company, is currently working on algorithm-based risk assessment tools that can identify those at high risk of diabetes progression. These patients, who are positive for risk factors, can then be advised and guided towards lifestyle management strategies and prevention methods through personalized engagements.

Integrating these risk assessment tools with clinical decisions support (CDS) systems enable doctors to make data-driven decisions at point of care. Doctors can also optimize the treatment by identifying in real-time which treatment options are working in favor of their patients and where the gaps are to be addressed.

For instance, doctors can identify treatment interventions that can prevent progression to diabetes, short and long-term effects/side effects of the current treatment. Doctors can also identify signs and similarities in different patient groups (similar comorbidities or similar risk factors), and construct related treatment regimens accordingly.

With more robust data, predictive analytics can be utilized for other chronic disorders as well. Implementation of big data analytics in healthcare represents a paradigm shift in how we approach healthcare and how decisions are made. It will ultimately lead to optimized care, reduced disease burden, and improved population health outcomes.