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# RSSDI Diabetes Update 2020

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CHAPTER 4

# Changing Landscape of Pediatric Diabetes in India

*Banshi Saboo, Mahira Saiyed*

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## INTRODUCTION

Type 1 diabetes mellitus (T1DM) is a condition where pancreatic beta cells do not produce enough insulin and, hence, there is a requirement for exogenous insulin. It is autoimmune or idiopathic in nature. According to the International Diabetes Federation (IDF) Atlas 2019, the prevalence of T1DM in age group of 0–14 years is 95.6 thousands, making India the topmost country with the highest prevalence.[1] With sudden transitions, the pediatric diabetes is not just confirmed to T1DM only. It has expanded to young onset diabetes; fibrocalculous pancreatic diabetes (FCPD), the prevalence of this is high in southern India, neonatal diabetes, and monogenic diabetes.[2]

## CHALLENGES OF PEDIATRIC DIABETES IN INDIA

There are several challenges for a children living with T1DM in India from every direction—patients, doctors, and healthcare systems perspective. The first is acceptance of the disease and initiation of insulin therapy.[3] It is difficult to assure families of children with T1DM to administrate insulin and not the oral agents.[4,5] The other factors include socioeconomic conditions, lack of appropriate facilities for diabetes care, inadequate health system, poor monitoring, and follow-up for children residing in rural remote areas. In addition, affordability is the issue as the treatment cost is lifelong and expensive. From various epidemiological studies, it seems T1DM is more prevalent in underprivileged children. For such communities, the disease is an added burden and eventually a child with such condition becomes a burden too. The other major challenge that healthcare professionals face is imparting education to least educated. As the power to perceive knowledge is low and prevalence of negligence is high. They end up committing mistakes that create hindrance in achieving targeted glycemic control.

## TREATMENT GOALS FOR PEDIATRIC DIABETES IN INDIA

The treatment goals are simple, regular administration of insulin, regular self-glucose monitoring, adequate diet, and exercise. Yet it is difficult to achieve for a school-going children and for the working parents to keep a constant eye on every pillar of diabetes care. This can lead to complication especially diabetic ketoacidosis which happens when blood glucose levels are too high for too long and often due to negligence of child and a parent. This sums up to increase the treatment cost of the disease. The condition is seemed more common if the insulin doses and meals are skipped.

The treatment is the insulin replacement and administration of insulin in the body. Previously, due to discovery by Banting and Best the crude extracts from animal pancreas was used and regular insulin (soluble insulin) were used for treating the condition. The regular insulin was injected through large glass syringes that required boiling for sterilization. Several side effects were seen due to this impure preparation and fluctuations of blood glucose levels. Later to improve the convenience the protamine zinc insulin was given that lowered the

glucose levels up to 36 hours. However, it was associated with inconsistency in timing. In 1950s, Sanger's discovery of human insulin replaced animal insulin that absorbed more rapidly. Fixed combination insulin [neutral protamine hagedorn (NPH)] and regular insulin were more widely used.

With advancements in treatment the insulin that mimics the exact human physiology were successfully launched to lower the glucose with safety. In today's era such analogs have gained popularity and are considered gold standard of treatment for individuals with pediatric diabetes. Insulin pumps have been introduced later to lessen the burden of pricking as with syringe and insulin pen. The ultra-fast acting and long-acting insulin are the latest approaches to achieve faster onset of action. The monitoring system has come a long way with simple glucometer monitoring was used in 1980s which is still practiced efficiently. The technology has given continuous glucose monitoring and flash glucose monitoring when a constant eye can be kept into the blood glucose levels of the body. Various simple and complex mobile applications have revolutionized the treatment and have connected a patient directly to a doctor on the virtual platform. For children with T1DM this telemedicine has proved beneficial where dose adjustment can be done promptly to control hyperglycemia and hypoglycemia. Most importantly, it gives patients' satisfaction. The disease divides the patients according to the social economic strata and, hence, advancement can prove helpful to those belonging to upper strata. For others, the affordability is still a burning issue for underprivileged T1DM patients.

Obliviously with improvement of treatment, the cost of the disease has also increased. For the low middle-income country like India, affordability is still an issue as the cost of illness is out of pocket of an ill. Thus, regular insulin and intermediate insulin are still widely used in India. As they are available for free of cost either through various programs or through government. In addition, the Indian health system works from diverse angles where they provide regular and intermediate acting insulin but those insulin are not sufficient to achieve glycemic targets. Moreover, insulin treatment is much individualized to each T1DM patients and regular insulin may be affordable but might not be enough to control hyperglycemia.[6,7]

The other crucial aspect is diagnosis of the disease at primary level. As this is the first point of contact for many patients residing at remote areas and are later referred to diabetologists, especially when the condition deteriorates. Hence, awareness of the disease at local point of contact should be emphasized to avoid complications and initiate insulin as soon as possible. Moreover, collaborative efforts of pediatrician and endocrinologist in treating this condition can prove beneficial to the patient.

## CONCLUSION

Advances in treatment are a boon, but still for many glycemic goals are not yet achieved. And the gaps in treatment and care of T1DM still persist. And to fill these gaps healthcare practitioners should give their best especially to improve lives of children with T1DM. As structured diabetes care team is their guide that gives the scope for improvement in this population. Living with T1DM is not easy and achievement of glycemic goals requires the patients and families to undertake self-care behavior with relentless vigilance. On the healthcare system perspective, India needs a robust healthcare system that can reach and benefit the poorest of the poor.

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# RSSDI Diabetes Update 2020

### *Key Features*

- The current edition of RSSDI Diabetes Update 2020 comprises a wide range of topics extending from the basic anatomy and physiology of the islet, alterations in cell biology and functioning, and etiology and the text has been segregated into sections with related subtopics in each section to make it well organized and reader-friendly.
- Epidemiology, pathogenesis, molecular mechanisms, entire spectrum of clinical aspects, controversies as well as research methodologies have been very well covered.
- Divided into 19 sections having 102 chapters the book will enhance knowledge and has the potential to provide ideas for innovation and new research in the field.
- The title includes chapters and updated guidelines with vast knowledge and skill base in the field of Diabetology.
- Simple language and presentation enable this update to serve as a handy reference guide to not only diabetes physicians and endocrinologists, but also primary care practitioners, postgraduate students, and internists.
- Flow diagrams, tables, and figures have been incorporated for better understanding and for practical use while understanding the topic.

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