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Management Perspectives in Hyperglycemia in Type 1 Diabetes During Pregnancy: Insights from Indian Healthcare Providers

ABSTRACT

Objective: This study aims to explore the perspectives, practices, and challenges faced by healthcare professionals (HCPs) in India in managing type 1 diabetes (T1D) during pregnancy, focusing on preconception care, glucose control, and adherence to clinical guidelines.

Materials and methods: To collect anonymous data, a Google form was circulated among health care professionals managing diabetes, from December 2023 to February 2024. A handful of questions were enlisted regarding the nature of care and treatment provided by the HCP during the pregnancy in T1D, and the results were analyzed accordingly.

Results: A total of 543 HCPs, comprising of diabetologist, primary care physicians, gynecologists, and endocrinologists, filled out the questionnaire. Among all HCPs, diabetologists (33.03%) comprised the largest group. The responses underscore the importance of tight glucose control before pregnancy, with the majority recommending a glycated hemoglobin (HbA1c) range of < 6.5% to minimize risks during pregnancy. The dataset reflects adherence to various guidelines, including the Research Society for the Study of Diabetes in India (RSSDI) 31.55%, the International Society for Pediatric and Adolescent Diabetes (ISPAD) 33.95%, and the American Diabetes Association (ADA) 34.50%, indicating a diverse yet standardized approach to managing T1D in pregnancy. A significant majority offer preconception counselling services, underlining the critical role of early intervention and planning in the management of T1D pregnancies.

Conclusions: The dataset highlights the importance of preconception counselling, patient education, and personalized care for pregnant woman with T1D. Promoting adherence to unified guidelines can help reduce care disparities and ensure better outcomes. (Clin Diabetol 2025; 14, 1: 12–17)

Keywords: T1D, diabetes in pregnancy, Indian healthcare, glycemic control

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Introduction

Globally, the prevalence of type 1 diabetes (T1D) is estimated at 9.5 million cases as of 2021, with incidence rates varying significantly across regions. While precise data are limited in India, studies suggest a prevalence of approximately 0.3 per 1000 population, translating to over 800,000 individuals living with T1D [1]. India is also known as the diabetes capital of the world, with the highest rate of diabetes cases worldwide. 31.7 million people in India were estimated to have diabetes in 2000; by 2030, that number is expected to increase to 79.4 million [2]. Among the different forms of diabetes, T1D poses a substantial clinical problem. The autoimmune reaction that causes T1D leads to the destruction of the pancreatic -cells responsible for making insulin; hence, achieving euglycemia requires lifelong insulin replacement treatment. Globally, T1D usually manifests at an earlier age, and it affects women with T1D more severely when they are fertile. Every year, T1D complicates between 0.2% and 0.5% of births in the US [3].

T1D poses significant risks during pregnancy, requiring specialized care to optimize both maternal and fetal outcomes. Women with T1D face increased risks of serious pregnancy complications like pre-eclampsia, a serious pregnancy complication characterized by high blood pressure and signs of damage to other organ systems; higher glucose levels also lead to excessive fetal growth (macrosomia), increasing the chances of cesarean delivery or birth trauma, which can result in preterm delivery. Women with T1D are also at risk of stillbirth, congenital abnormalities, and neonatal morbidity [4, 5]. Out of the 131.4 million live births among women aged 20 to 49 years worldwide, 21.3 million (16.2%) are affected by hyperglycemia during pregnancy, and 6.2% of these people have a history of diabetes, including T1D [1].

Pregnancy-related T1D management requires particular care to optimize outcomes for both the mother and the fetus. Effective management requires multidisciplinary care, which includes personalized insulin therapy, continuous glucose monitoring, and preconception counselling. Achieving optimal glycemic control is essential to significantly reduce the probability of adverse outcomes. It has been shown that lowering the HbA1c level before conception lowers the chance of congenital malformations and other complications [6, 7].

There are many different ways to manage T1D during pregnancy due to India's diverse healthcare system and easy access to specialized care. Although endocrinologists, diabetologists, and gynecologists treat most T1D pregnancies in urban regions, primary care physician often manage these patients. The lack of uniform reference systems and multidisciplinary teams places the responsibility for patient care on individual clinicians, leading to a variety of practices and outcomes [8].

Strict glycemic management during pregnancy has become easier to maintain thanks to technological advancements like insulin pumps and continuous glucose monitoring (CGMs). Together with comprehensive patient education and support, these strategies are critical for treating the problems associated with gestational T1D [9]. However, there are disparities in care that are exacerbated by the uneven availability of this technology across India.

The survey seeks to address gaps in the consistency of care provided by different health care professionals (HCP), highlighting disparities that could be reduced through standardized practices to improve outcomes in women and their newborns.

Materials and methods

Study design and population

The online observational survey was conducted from December 2023 to February 2024 and included diabetologists (33%), endocrinologists (28%), primary care physicians (29%), and gynecologists (10%).

Questionnaire development

The survey was developed by collective input from the authors, and the questionnaires were evaluated by senior team members. The questions focused on several key areas, such as preconception care, glycemic management, follow-up practices, adherence to guidelines, patient education, and challenges and barriers. These questions were developed based on existing guidelines from the International Society for Pediatric and Adolescent Diabetes (ISPAD), the American Diabetes Association (ADA), and the Research Society for the Study of Diabetes in India (RSSDI), to ensure the relevance and accuracy of the data collected. The closed-ended questionnaire had multiple-choice and yes/no questions. For example, one question asked about the preconception HbA1c of pregnant women with T1D and provided options of < 6.6%, 6.6–7.5%, or 7.6–8.5%. Another question asked whether the HCPs provided preconception counselling to T1D females at their center. This ensured that the questionnaire covered the most relevant and pressing issues in managing T1D during pregnancy.

Data collection and analysis

The survey was distributed digitally through professional networks, email lists, and social media platforms specifically aimed at healthcare professionals responsible for diabetes management in India. The Google Forms platform provided convenient accessibility and

Table 1. Responses Recorded from the Healthcare Providers on the Management of T1D with Pregnancy

Questionnaire	Percentage (%)
HbA1c (before pregnancy)	
< 6.6	50
6.6–7.5	30
7.5–8.5	20
Guideline followed	
ADA	34.5
ISPAD	33.9
RSSDI	31.5
Preconception counselling	
Yes	80
No	20
Counselling provided by	
Endocrinologists, gynecologists, and diabetologists	40.1
Self	40.2
Primary care physicians	19.3
Appointment scheduled on	
Phone	59.7
Social media	40.2
Follow-up	
Weekly	29.8
Fortnight	30
Monthly	40
Diet plan given	
Yes	59.9
No	40
Carb counting session	
Yes	70
No	30
Prescribed with	
Any form of exercise	25
Healthy eating	24.7
Yoga	25.4
Regular check-ups	24.7

ADA — American Diabetes Association; HbA1c — glycated hemoglobin; ISPAD — International Society for Pediatric and Adolescent Diabetes; RSSDI — Research Society for the Study of Diabetes in India; T1D — type 1 diabetes

facilitated the collection of responses while maintaining anonymity. The participants were provided with information regarding the objective of the study and were guaranteed confidentiality. Completion of the survey implied consent.

The data collected from Google Forms was transferred to Microsoft Excel for the purpose of data cleansing and first analysis. Descriptive statistics were employed to provide a summary of the responses, which included frequency distributions and percentages for categorical variables.

Ethical considerations

The survey was done following ethical guidelines for research involving human participants. While official ethical approval was not necessary because of the anonymous and voluntary nature of the survey, participants were informed about the study's goals, and their agreement was indicated by their decision to participate. No personally identifiable information was gathered.

Limitations

The study's utilization of self-reported data may introduce bias because participants' responses could be impacted by their personal viewpoints and experiences. Furthermore, the convenience sampling strategy may not accurately depict the overall population of HCP managing T1D during pregnancy in India. The sample size, although substantial, may not fully represent rural healthcare providers where access to advanced technologies might be limited.

Results

A total of 543 HCPs participated in the survey, offering valuable insights into the management of T1D during pregnancy. The baseline characteristics reveal that most of the respondents were diabetologists, followed by primary care physicians and gynecologists, each with varying levels of experience (Tab. 1). The dataset reflects a broad range of specialties involved in T1D care, including a significant representation from diabetologists, highlighting their expertise in diabetes management. Primary care physicians also play a critical role, focusing on general health, while gynecologists emphasize their involvement in managing T1D during pregnancy, specifically addressing pregnancy and childbirth concerns. Collaborative efforts between primary care physician and diabetologists were also evident in providing comprehensive care for these patients.

The dataset showcases a wide range of experience levels, with practitioners spanning from 0–3 years to more than 30 years of practice. This diverse experience base ensures a well-rounded perspective on treatment approaches, with a slight emphasis on more experienced practitioners, indicating a depth of knowledge essential for managing the complexities of T1D in pregnancy. Regarding pre-pregnancy care, most of the respondents recommended an HbA1c level of < 6.5% prior to pregnancy, underscoring the critical need for tight glucose control to minimize risks and improve pregnancy outcomes.

In terms of clinical practices, respondents adhered to a variety of guidelines, such as RSSDI, ISPAD, and ADA, reflecting a standardized approach to managing T1D during pregnancy, with an even distribution of adherence to these professional standards. A significant majority of the respondents provided preconception counselling, emphasizing the importance of early intervention and careful planning before pregnancy. The survey also highlighted that medical professionals were the primary providers of this counselling, reinforcing their direct involvement in preparing patients for pregnancy.

The modes of appointment scheduling varied, incorporating both traditional and digital channels, reflecting the growing trend of integrating technology into healthcare practices. Follow-up frequencies ranged from weekly to monthly, indicating tailored approaches to monitoring patients based on individual needs. This variety also underscores the need for regular monitoring throughout pregnancy to manage T1D effectively.

Education about carb ratios and correction factors was prevalent, with most practitioners offering this as part of their patient care, which reflects the importance of patient self-management. Furthermore, individualized diet plans were commonly provided, underscoring the personalized approach to nutritional management for T1D patients during pregnancy. A wide range of lifestyle changes, such as pregnancy yoga, exercise, healthy eating, and regular check-ups, were recommended, demonstrating a holistic approach to supporting the health of pregnant individuals with T1D.

In summary, the survey sheds light on the diverse practices and preferences of clinicians treating T1D during pregnancy, highlighting the importance of a multidisciplinary approach that involves endocrinology, internal medicine, and gynecology. The findings suggest that managing T1D in pregnancy can be done in a thorough, individualized manner, with a strong focus on education, preconception counselling, and personalized treatment plans. Additionally, the use of technology in scheduling appointments reflects modern patient engagement practices, further enhancing the quality of care.

Discussion

The dataset provides a complete perspective on the medical specializations that are engaged in the management of T1D during pregnancy. The prevalence of diabetologists in the dataset highlights their crucial role in delivering specialist care for T1D, especially during the critical period of pregnancy. The inclusion of primary care physicians and gynecologists signifies a comprehensive approach to healthcare, guaranteeing that all facets of the patient's welfare are attended to. The cooperative partnership between primary care physicians and diabetologists demonstrates a shift towards interdisciplinary treatment, which is crucial for effective management of intricate cases of T1D during pregnancy [10, 11].

The survey results indicate that a higher proportion of females diagnosed with T1D receive treatment from diabetologists and primary care physicians, ranking second in terms of medical care providers. This study survey was conducted by metropolitan primary care physicians with extensive knowledge of the most recent guidelines due to their strong connections. However, it is important to note that the situation may vary in rural areas. The study revealed that over 70% of the HCPs had less than 20 years of experience, with a higher participation rate from younger, technologically adept professionals. The data about years of practice indicate a wide variety of experience among the practitioners, with a substantial number of individuals having more than 10 years of experience. This suggests that experienced professionals have a considerable impact in this field.

More than 50% of HCPs selected an HbA1C target of less than 6.5% for preconception [12, 13]. This indicates that a significant number of participating clinicians possess up-to-date knowledge. The dataset suggests that patients with T1D can expect to receive care from a well-rounded team of healthcare providers, with a collaborative approach to holistic care. This variety in specialties and levels of experience is likely to enhance the overall management of T1D during pregnancy, making it more comprehensive and effective.

The survey emphasizes the need for preconception counselling and demonstrates a proactive approach to managing T1D, where taking action early on is crucial [14]. The allocation of counselling duties demonstrates an equitable strategy, with a virtually equal proportion of primary care physicians engaging in self-counselling and seeking guidance from their colleagues, highlighting the significance of individualized care.

Appointment scheduling modes exhibit a combination of conventional and digital approaches, with phone calls being the most common, although a significant proportion also employ social media. This demonstrates the adjustment of healthcare services to contemporary communication methods. The diverse frequencies of follow-up indicate that the care provided is tailored to the individual needs of each patient, with check-ins occurring on a weekly to monthly basis.

Emphasizing the importance of patient education is crucial for successful self-management of T1D, particularly when teaching about carb ratios and correction variables. The inclination towards expert nutritional guidance is reinforced by the fact that the majority of HCPs offer tailored diet plans.

Ultimately, the suggested lifestyle modifications, including engaging in pregnancy yoga, maintaining a balanced diet, and attending frequent check-ups, propose a comprehensive strategy for treating T1D during pregnancy. The holistic approach that encompasses all facets of a patient's life, with the goal of achieving the best possible health results, is seen in the allocation of reactions to different types of exercises and lifestyle modifications.

The study has several strengths, including a large sample size of 543 HCPs, ensuring broad representation and reliable findings. The inclusion of diverse participants, such as diabetologists, endocrinologists, primary care physicians, and gynecologists, provides a comprehensive view of T1D management during pregnancy. The study also focuses on key aspects of care, such as preconception counselling, glucose control, and patient education, while integrating modern practices like digital scheduling. It highlights varying adherence to global clinical guidelines, emphasizing the need for standardized practices. Additionally, the study advocates for a holistic, patient-centered approach, incorporating lifestyle modifications.

However, there are some weaknesses. The reliance on self-reported data may introduce biases, and the sampling method, based on digital distribution, could over represent urban healthcare providers, limiting the inclusion of rural perspectives. The survey's digital nature also means it may not fully capture the challenges faced in rural areas with limited access to technology. Furthermore, the study has certain limitations and does not explore into specific challenges that HCPs face, such as resource constraints or patient adherence issues. The cross-sectional design limits the ability to track trends or causal relationships, and there are no direct data on patient outcomes.

In conclusion, when managing T1D during pregnancy, a multidisciplinary, collaborative approach is essential for improving outcomes. Strengthening preconception counselling, promoting tight glycemic control, and increasing access to technology, especially in rural areas, can significantly enhance care. Standardizing care practices and continuing patient education will help bridge gaps in treatment and ensure more consistent, effective management across diverse healthcare settings.

Article information

Data availability statement

The data associated with this paper are available on special requests.

Author contribution

HS, MG conceptualized the research idea and prepared the Google Forms. All co-authors contributed to data collection. The original draft was written by HS, MG, MS, and RG. AD and MS contributed to the data analysis. The draft was edited by MS and HS. All senior co-authors, BS, AS, and RS reviewed the work.

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Conflict of interest

The authors declare no conflict of interest.

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