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ORIGINAL ARTICLE

Current insulinization trends in India

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Abstract

Background Hyperglycemia-associated micro- and macro-vascular complications remain the leading cause of premature morbidity and mortality among the diabetic population worldwide. Poor glycemic control due to clinical inertia towards insulin treatment is a major cause behind the development of diabetic complications. In this paper, we analyze different strategies of insulin treatment initialization and titration practiced in India.

Methods The response of 367 healthcare professionals (HCPs) across the country was recorded based on a survey on demographics, treatment regimens, and patient behavior. For analysis, the responses from HCPs were segregated into six regions, north, south, east, west, and central, covering the entire country.

Results The survey revealed that 59.1% HCPs preferred using three oral anti-diabetic drugs (OADs) before starting insulin therapy while 12.5% initiated insulin as the last option after trying all available OADs. Besides, 61% HCPs across India considered initiating insulin in type 2 diabetes mellitus (T2DM) patients when the patients (i) failed to achieve glycemic targets with current OADs, or (ii) could not tolerate OADs, or (iii) required a more flexible therapy. In T2DM patients, 52.9% HCPs chose basal only insulin during initiation. In comparison, 63.8% HCPs used basal bolus while initiating insulin in type 1 DM (T1DM) patients. Pan-India, 53.4% HCPs preferred analogue premix while 46.6% HCPs opted for human premix. Next, 98.9% HCPs counselled patients about the risk of hypoglycemia upon initiation of insulin.

Conclusion This survey outlines an urgent need of reducing the clinical inertia against insulin initialization in Indian settings.

Keywords Insulinization · Diabetes management · Insulin regimen · Clinical inertia · Hyperglycemia · Oral anti-diabetic drugs

Introduction

Oral hypoglycemic agents remain the first line of treatment among the patients suffering from T2DM. Due to the failure of oral hypoglycemic agents in maintaining satisfactory blood glucose levels, insulin therapy remains the preferred line of treatment in a substantial number of diabetic patients. It is estimated that 4–10% of patients with T2DM rely on insulin in combination with oral hypoglycemic agents [1, 2]. Most diabetic patients (T1 or T2) require insulin therapy at least at one or other point in their life to achieve satisfactory control over hyperglycemia [3].

Initiation and implementation of insulin therapy among diabetic patients remain a challenging task for healthcare providers [4]. For instance, trypanophobia (fear of needles) is a major psychological barrier, while the risk of developing hypoglycemia among patients defying their physician's prescribed dose of insulin per day is another challenge due to

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inconvenient treatment schedules. All these reasons result in clinical inertia towards insulin treatment and subsequently lead to rising numbers struggling with diabetes-related complications such as retinopathy, neuropathy, and nephropathy [5–9].

While there is global consensus on the early initiation of insulin to maintain tight glycemic control and delay the onset of complications [10], it is often seen that substantial proportion of the Indian population with diabetes fails to achieve glycemic targets [11]. A survey by the diabetes-attitudes-wishes-needs (DAWN) program revealed that Indian physicians take a significantly longer time to start insulin treatment post-diagnosis than physicians from other countries. Physicians prefer to delay insulin initiation to achieve higher insulin efficacy as well as to gain patient acceptance and compliance [12].

Consequently, physicians tend to overuse the traditional therapies or oral anti-diabetic drugs (OADs) for diabetes care, either to retain patients or due to a lack of proper information on introducing insulin [13]. In most cases, insulin therapy is taken into consideration when HbA1c levels increase to >9%, and/or in the cases of lipotoxicity and glucotoxicity [14]. In addition, being a vast and diverse country in terms of food and socio-cultural habits, the geographical regions of India present heterogeneity in the distribution of diabetes burden, which also affects the insulin initiation strategies for long-term management of DM patients.

The current study aims to analyze insulin initiation practices prevailing across distinct parts of India with a focus on care, clinical, and behavioral variables.

Materials and methods

A survey was designed to collect the opinion of healthcare professionals from across the country practicing and managing DM. This survey comprised 23 questions encompassing the field of practice of HCPs, area of practice (rural or urban), their reason behind prescribing insulin, and their choice of insulin for initiation and titration. The complete list of questions is provided as a Supplementary Information file (SI 1). The survey was circulated among the HCPs from the Research Society for the Study of Diabetes in India (RSSDI) through an email database and among the HCPs who were non-members but part of local associations and actively involved in managing DM. A total of 367 responses were received. The responses received from the survey were analyzed and studied.

Responses were segregated based on geographical regions—north, south, east, west, and central India to study and distinguish insulin initiation patterns across the country. Analysis of collected data was performed at both the country level and the regional level. The analysis also included responses from retrospective data collection from regular clinical practice from 6 different diabetes care centers.

All variables studied were classified into three categories: (i) care characteristics, (ii) clinical characteristics, and (iii) behavioral characteristics. Care characteristics included information on the field of practice of HCPs, their experience and area of practice (rural or urban), and counselling practices on management techniques and expected risks. Clinical characteristics comprised of the reasons behind prescribing insulin, number of OADs before initiating insulin, most common type of insulin initiated (for both T1DM and T2DM), dosage and monitoring frequency, up-titration of basal insulin, and preference of premix (analogue or human). Behavioral characteristics enlisted factors that HCPs considered before initiating insulin in DM patients including patient incompliance.

Categorical variables were presented as numbers (percentages). Data were expressed as values with a 95% uncertainty interval (UI). All statistical analyses were conducted using Prism software (version 9; GraphPad).

Results

Care characteristics

Table 1 lists region-wise and pan-India responses to care characteristics included in the survey. Among the total of 367 responses received from HCPs across the country, 47.4% were from diabetologists, 33.2% were from physicians, 16.1% were from general physicians, and 3.3% were from endocrinologists. Region-wise, the percentage of diabetologists was highest in all regions except in the central region where the number of physicians was 5.2% more than the number of diabetologists. Endocrinologists constituted the lowest proportion among all HCPs who responded to this survey. 71.4% of practitioners who were treating DM patients country-wide had a clinical experience of more than 10 years. A similar trend resonated with all regions except the central region where 51.3% of practitioners had clinical experience between 5 and 10 years, and 35.9% had more than 10 years of working experience. We also noted that 80.9% of all the HCPs surveyed across India were practicing in urban areas. Further, it should be noted that a significant percentage (98.9%) of the responding physicians indulged in extensive counselling and personal care of their respective patients for a better lifestyle to counter the challenges of DM.

Clinical characteristics

Table 2 represents region-wise and pan-India responses to clinical characteristics included in the survey. According to the analysis, 61% HCPs across India responded that they considered initiating insulin in T2DM patients when the patients

Table 1 Care characteristics. The table provides a segmented analysis of the consulting physician's characteristics actively involved in managing diabetes. The segregated columns in the table have been done based on practicing regions of the healthcare professionals (HCPs) for understanding the demographic trends

Variable	Pan-India (*n*=367)	North (*n*=57)	South (*n*=151)	East (*n*=54)	West (*n*=66)	Central (*n*=39)
Physician specialty, *n* (%)						
Diabetologist	174 (47.4)	28 (49.1)	67 (44.4)	28 (51.85)	35 (53)	16 (41)
Endocrinologist	12 (3.3)	2 (3.5)	3 (2)	2 (3.7)	3 (4.5)	2 (5.1)
General physician	59 (16.1)	12 (21.1)	29 (19.2)	5 (9.26)	10 (15.2)	3 (7.7)
Physician	122 (33.2)	15 (26.3)	52 (34.4)	19 (35.2)	18 (27.3)	18 (46.2)
Number of years in practice of diabetes, *n* (%)						
1–2 years	9 (2.45)	2 (3.5)	4 (2.6)	0 (0)	2 (3)	1 (2.6)
2–5 years	37 (10.08)	4 (7)	13 (8.6)	5 (9.3)	11 (16.7)	4 (10.3)
5–10 years	59 (16.07)	6 (10.6)	21 (13.9)	6 (11.1)	6 (9.1)	20 (51.3)
10 years and above	262 (71.4)	45 (78.9)	113 (74.5)	43 (79.6)	47 (71.2)	14 (35.8)
Area of practice, *n* (%)						
Urban	297 (80.9)	53 (93)	114 (75.5)	41 (75.9)	53 (80.3)	36 (92.3)
Rural	70 (19.1)	4 (7)	37 (24.5)	13 (24.1)	13 (19.7)	3 (7.7)
Counselling patient about risk of hypoglycemia on insulin initiation, *n* (%)						
Yes	363 (98.9)	57 (100)	149 (98.7)	54 (100)	64 (97)	39 (100)
No	4 (1.1)	0 (0)	2 (1.3)	0 (0)	2 (3)	0 (0)
Counselling patient about a diabetic meal plan that matches calories from foods (carbohydrates, proteins, and fats or oils) to individual body activity and insulin levels, *n* (%)						
Yes	356 (97)	55 (96.5)	147 (97.4)	53 (98.1)	62 (93.9)	39 (100)
No	11 (3)	2 (3.5)	4 (2.6)	1 (1.9)	4 (6.1)	0 (0)
Teaching insulin initiation techniques to the patients, *n* (%)						
Insulin advisor/diabetes educator	112 (30.5)	20 (35.1)	40 (26.5)	8 (14.8)	17 (25.8)	27 (69.2)
Me myself	218 (59.4)	34 (59.6)	91 (60.2)	43 (79.6)	39 (59.1)	11 (28.2)
My staff (non-trained)	19 (5.2)	2 (3.5)	10 (6.6)	0 (0)	7 (10.6)	0 (0)
Patient is asked to refer to YouTube	1 (0.3)	0 (0)	1 (0.7)	0 (0)	0 (0)	0 (0)
Pharma colleague	17 (4.6)	1 (1.8)	9 (6)	3 (5.6)	3 (4.5)	1 (2.6)

(i) failed to achieve glycemic targets with current OADs, or (ii) could not tolerate current OADs, or (iii) were in requirement of a more flexible therapy (Fig. 1). In addition, 59.1% of the HCPs surveyed country-wide resorted to using three OADs before initiating insulin therapy while 12.5% preferred to start insulin as the last option after trying all available OADs. In T2DM patients, 52.9% HCPs chose to use basal only as the preferred type of insulin during initiation (Fig. 2b). On the other hand, basal bolus was the choice of 63.8% HCPs while initiating insulin in T1DM patients, as shown in Fig. 2a. The average country-wide preferences in choosing between analogue and human premix insulin were mixed. Pan-India, 53.4% HCPs preferred analogue premix while 46.6% HCPs opted for human premix. In the case of patients with gestational diabetes mellitus (GDM), there are other additional factors that need to be taken into consideration while deciding on initiating insulin therapy. Some of the important considerations include whether (i) the patient has already been on glibencalmide, (ii) the patient has already been on metformin, (iii) the patient has undergone medical nutrition therapy (MNT) and lifestyle modification, or (iv) the patient is yet to begin MNT.

Figure 3a shows the country-wide and region-wise trend of estimating the basal insulin initiation dose among HCPs. The figure demonstrates that 77.9% of the HCPs throughout the country calculated the initiating insulin dosage between 0.1 and 0.2 U/kg/day depending on the degree of hyperglycemia. In the scenario of basal only initiation, 45.8% HCPs resorted to fasting and post-meal method for monitoring blood sugar levels post-initiation, and 29.7% HCPs used daily fasting values as a measure to assess the efficacy of the insulin initiation dose (Fig. 3b). On the contrary, Fig. 3c depicts that only 3% HCPs used daily fasting values as a measure to assess the efficacy of the insulin initiation dose for premix or basal bolus or basal plus or basal + glucagon-like peptide 1 (Basal + GLP1) initiation. Most of the HCPs (47.1%) from the study still preferred the fasting and post-meal method for monitoring blood sugar levels post-initiation. In addition, a sizeable lot of HCPs (22.1%) also preferred to use the 5-point scale method as a measure to assess the efficacy of the insulin initiation dose

Table 2 Clinical characteristics. The table documents physician survey report on the clinical characteristics that are factored in while initiating insulin

Variable	Pan-India (*n*=367)	North (*n*=57)	South (*n*=151)	East (*n*=54)	West (*n*=66)	Central (*n*=39)
Most common indication for initiating insulin in T2DM patients, *n* (%)						
Acute hyperglycemia, DKA/hyperglycemic-hyperosmolar state/lactic acidosis	50 (13.62)	7 (12.3)	24 (15.9)	8 (14.8)	9 (13.6)	2 (5.13)
Patients on steroid therapy	1 (0.27)	0 (0)	0 (0)	0 (0)	1 (1.5)	0 (0)
Indicated for a short period of time in cases of acute illness or surgery, and glucose toxicity	39 (10.63)	4 (7)	21 (13.9)	8 (14.8)	4 (6.1)	2 (5.13)
Pregnancy and lactation	20 (5.45)	2 (3.5)	9 (6)	2 (3.7)	6 (9.1)	1 (2.56)
Patients who fail to achieve glycemic targets with current OADs, or cannot tolerate current OADs, or those who need more flexible therapy	225 (61.58)	41 (71.9)	84 (55.6)	31 (57.4)	42 (63.6)	27 (69.23)
When adequate glycemic control is not obtained, in patients with myocardial infarction, stroke, or decompensated hepatic or renal insufficiency, or those who had major surgery	32 (8.45)	3 (5.3)	13 (8.6)	5 (9.3)	4 (6.1)	7 (17.95)
Number of OADs before initiating insulin therapy, *n* (%)						
Two	55 (15)	5 (8.8)	32 (21.2)	6 (11.1)	6 (9.1)	6 (15.4)
Three	217 (59.1)	36 (63.1)	82 (54.3)	35 (64.8)	40 (60.6)	24 (61.5)
Four	49 (13.4)	11 (19.3)	16 (10.6)	7 (13)	10 (15.15)	5 (12.8)
As a last option after trying all available OADs	46 (12.5)	5 (8.8)	21 (13.9)	6 (11.1)	10 (15.15)	4 (10.3)
Most common type of insulin initiation in T2DM patient, *n* (%)						
Basal only	194 (52.9)	35 (61.4)	66 (43.7)	23 (42.6)	40 (60.6)	30 (76.9)
Premix	123 (33.5)	12 (21.1)	72 (47.8)	20 (37)	17 (25.8)	2 (5.1)
Basal plus	11 (3)	2 (3.5)	4 (2.6)	4 (7.4)	0 (0)	1 (2.6)
Basal bolus	33 (9)	6 (10.5)	7 (4.6)	7 (13)	8 (12.1)	5 (12.8)
Basal + GLP1	6 (1.6)	2 (3.5)	2 (1.3)	0 (0)	1 (1.5)	1 (2.6)
Most common type of insulin initiation in T1DM patient, *n* (%)						
Basal only	16 (4.4)	3 (5.3)	9 (6)	2 (3.7)	1 (1.5)	1 (2.6)
Premix	77 (21)	14 (24.6)	39 (25.8)	12 (22.2)	12 (18.2)	0 (0)
Basal plus	35 (9.5)	2 (3.5)	19 (12.6)	5 (9.3)	8 (12.1)	1 (2.6)
Basal bolus	234 (63.8)	37 (64.9)	82 (54.3)	34 (63)	44 (66.7)	37 (94.9)
Basal + GLP1	5 (1.4)	1 (1.8)	2 (1.3)	1 (1.9)	1 (1.5)	0 (0)
Premix insulin preference, *n* (%)						
Analogue premix	196 (53.4)	33 (57.9)	71 (47)	30 (55.6)	33 (50)	29 (74.4)
Human premix	171 (46.6)	24 (42.1)	80 (53)	24 (44.4)	33 (50)	10 (25.6)
Initiation of insulin therapy in patients with GDM, *n* (%)						
After glibencalmide	6 (1.6)	0 (0)	3 (2)	0 (0)	3 (4.5)	0 (0)
After medical nutrition therapy and lifestyle modification	265 (72.2)	45 (78.9)	105 (69.5)	35 (64.8)	43 (65.2)	37 (94.9)
After metformin	51 (13.9)	6 (10.5)	18 (11.9)	12 (22.2)	15 (22.7)	0 (0)
Before medical nutrition therapy	45 (12.3)	6 (10.5)	25 (16.6)	7 (13)	5 (7.6)	2 (5.1)
Calculating basal insulin initiation dose, *n* (%)						
0.1–0.2 units/kg/day depending on the degree of hyperglycemia	286 (77.9)	43 (75.4)	112 (74.2)	41 (75.9)	56 (84.85)	34 (87.2)
Don't calculate and start at 10 units/day	70 (19.1)	12 (21.1)	34 (22.5)	10 (18.5)	9 (13.64)	5 (12.8)
Less than 8 units/day	11 (3)	2 (3.5)	5 (3.3)	3 (5.6)	1 (1.51)	0 (0)
Frequency of blood sugar monitoring post initiation for initial 2 weeks for basal only therapy, *n* (%)						
5-point scale	32 (8.7)	10 (17.5)	7 (4.6)	6 (11.1)	4 (6.1)	5 (12.8)
7-point scale	7 (1.9)	2 (3.5)	3 (2)	0 (0)	2 (3)	0 (0)
Custom scale	51 (13.9)	9 (15.8)	25 (16.6)	4 (7.4)	12 (18.2)	1 (2.6)
Fasting and post-meal	168 (45.8)	22 (38.6)	68 (45)	26 (48.1)	28 (42.4)	24 (61.5)
Fasting values daily	109 (29.7)	14 (24.6)	48 (31.8)	18 (33.3)	20 (30.3)	9 (23.1)
Frequency of blood sugar monitoring post initiation for initial 2 weeks for premix or basal bolus or basal plus or basal +GLP1 therapy, *n* (%)						
5-point scale	81 (22.1)	15 (26.3)	24 (15.9)	13 (24.1)	12 (18.2)	17 (43.6)
7-point scale	43 (11.7)	9 (15.8)	14 (9.3)	4 (7.4)	11 (16.7)	5 (12.8)

Table 2 (continued)

Variable	Pan-India (*n*=367)	North (*n*=57)	South (*n*=151)	East (*n*=54)	West (*n*=66)	Central (*n*=39)
Custom scale	59 (16.1)	7 (12.3)	27 (17.9)	6 (11.1)	13 (19.7)	6 (15.4)
Fasting and post-meal	173 (47.1)	26 (45.6)	79 (52.3)	29 (53.7)	29 (43.9)	10 (25.6)
Fasting values daily	11 (3)	0 (0)	7 (4.6)	2 (3.7)	1 (1.5)	1 (2.6)
Frequency of titrating the dose of basal insulin in case of basal only therapy after initiation, *n* (%)						
Every 14th day or more	41 (11.2)	1 (1.8)	28 (18.5)	3 (5.6)	5 (7.6)	4 (10.3)
Every 3rd day	208 (56.7)	34 (59.6)	80 (53)	30 (55.6)	37 (56.1)	27 (69.2)
Every week	100 (27.2)	19 (33.3)	39 (25.8)	19 (35.2)	17 (25.8)	6 (15.4)
Everyday	18 (4.9)	3 (5.3)	4 (2.6)	2 (3.7)	7 (10.6)	2 (5.1)
Initiation of insulin in newly diagnosed T2DM patients is a rescue therapy, *n* (%)						
Yes	252 (68.7)	35 (61.4)	98 (64.9)	39 (72.2)	52 (78.8)	28 (71.8)
No	115 (31.3)	22 (38.6)	53 (35.1)	15 (27.8)	14 (21.2)	11 (28.2)

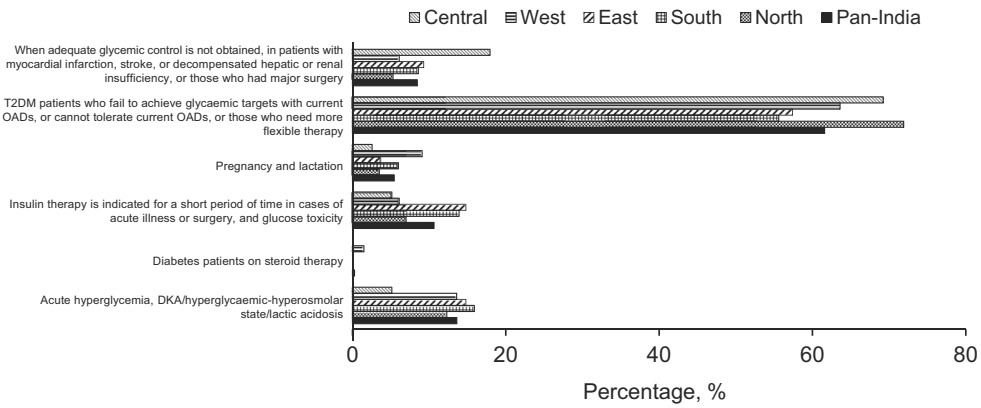

Fig. 1 Indications for initiating insulin in type 2 diabetes mellitus patients

for premix or basal bolus or basal plus or basal + GLP1 initiation. In addition, 56.7% HCPs across the country opted to titrate the dose of basal insulin every third week after initiation in case of basal only therapy. In 68.7% of newly diagnosed cases of T2DM throughout India, initiation of insulin was considered a rescue therapy by HCPs.

Behavioral characteristics

Apart from clinical and care characteristics, the efficacy of insulin initiation to manage glucose levels in T1 and T2DM patients is also dependent on patient acceptability and active compliance to the prescribed regimen. Table 3 lists region-wise and pan-India responses to behavioral characteristics included in the survey. According to the survey, 36.8% of the participating HCPs reported that pan-India, 20–50% of patients refused to adopt insulin therapy. Similar observations were recorded in the region-wise analysis also, where 48.7% of the HCPs in the central region reported a similar trend. Distinctly, 36.8% of HCPs from the northern region and 29.6% of HCPs practicing from the eastern region reported that 50–75% of patients refused to accept insulin therapy.

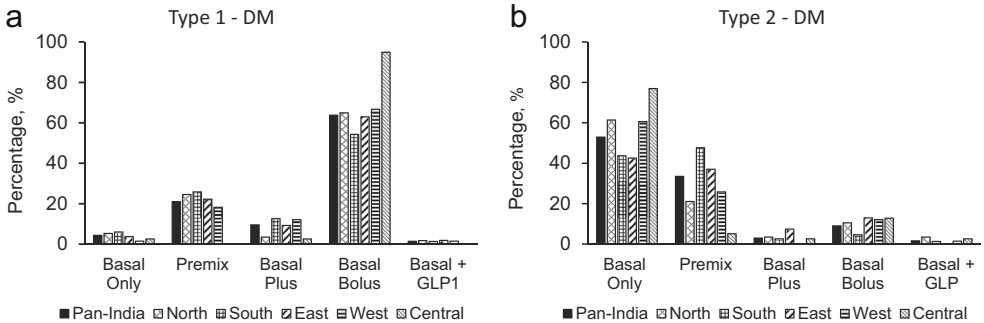

Fig. 2 Comparative analysis between the type of insulin initiated in **a** type 1 and **b** type 2 diabetes mellitus patients

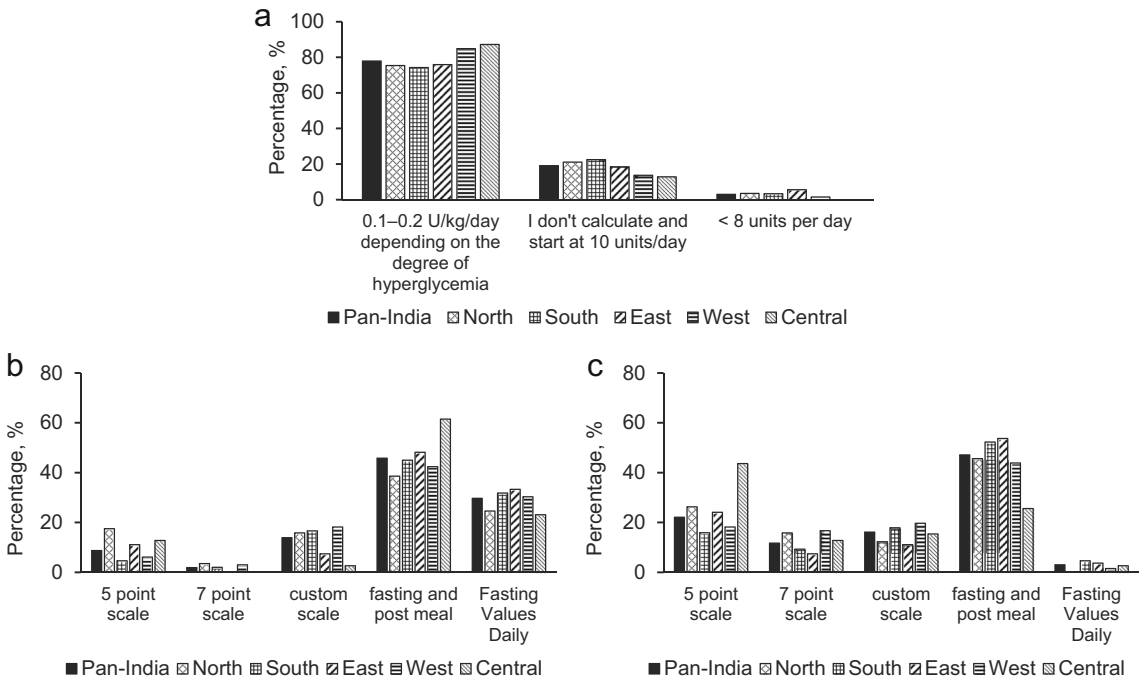

Fig. 3 Country-wide and region-wise analysis of **a** initiation dose of basal insulin, **b** monitoring frequency of blood sugar post initiating basal insulin, and **c** monitoring frequency of blood sugar post initiating premix/basal bolus/basal plus/basal+GLP1 insulin (GLP1, glucagon-like peptide 1)

The study also suggests that 91.6% of HCPs across India conceded to not resorting to insulin initiation to address the psychological fears of patients. Furthermore, 87.5% of the responding practitioners confirmed delaying insulin administration in fear of losing apprehensive/cynical patients. Interestingly, among the responses collected from physicians across India, 76.9% were members of RSSDI and 23.1% were non-members.

Discussion

Significant advancements have occurred in the usage of OADs and several combinations of these OADs are being administered in patients with T2DM to achieve glycemic control through diverse mechanisms of action. However, in most cases, it is observed that these oral hypoglycemic medications fail to provide an optimal glycemic control due to the progressive nature of the disease, necessitating insulin treatment [15]. In this paper, the key factors and concerns that physicians in India consider while initiating insulin therapy in T1 and T2DM patients have been highlighted.

Diabetologists and physicians were the major responders to the survey. Results of the survey indicate that practitioners across the country share a lot of common beliefs about various aspects of insulin initiation practices. For instance, 61.1% of the practitioners agreed that failure to achieve glycemic targets with current OADs or intolerance to current OADs or need for

Table 3 Behavioral characteristics of diabetic patients. The table represents the behavioral data received from practicing physicians who are dealing with patients diagnosed with diabetes derived from the survey report

Variable	Pan-India (*n*=367)	North (*n*=57)	South (*n*=151)	East (*n*=54)	West (*n*=66)	Central (*n*=39)
Delaying insulin initiation due to fear of losing patient, *n* (%)						
Yes	46 (12.5)	4 (7)	19 (12.6)	7 (13)	12 (18.2)	4 (10.3)
No	321 (87.5)	53 (93)	132 (87.4)	47 (87)	54 (81.8)	35 (89.7)
Percentage of patients refusing insulin therapy, *n* (%)						
20–50 %	135 (36.8)	16 (28.1)	60 (39.7)	17 (31.5)	23 (34.8)	19 (48.7)
50–75 %	74 (20.2)	21 (36.8)	24 (15.9)	16 (29.6)	8 (12.1)	5 (12.8)
Less than 20%	119 (32.4)	18 (31.6)	55 (36.4)	14 (25.9)	22 (33.3)	10 (25.6)
More than 75%	39 (10.6)	2 (3.5)	12 (8)	7 (13)	13 (19.7)	5 (12.8)
Using insulin initiation as a tool to fear patients, *n* (%)						
Yes	31 (8.4)	4 (7)	10 (6.6)	2 (3.7)	9 (13.6)	6 (15.4)
No	336 (91.6)	53 (93)	141 (93.4)	52 (96.3)	57 (86.4)	33 (84.6)

a more flexible therapy is the most common indication for initiating insulin in T2DM patients. What is more, 59.6% of HCPs prefer to initiate insulin after three OADs. As per the survey results, 52.4% HCPs consider basal only therapy for insulin initiation in type 2 DM. In cases where HCPs start with premix insulin, 53.2% of them prefer analogue premix insulin. While the American Diabetes Association (ADA) recommends starting basal insulin alone for insulin initiation [16], the International Diabetes Federation (IDF) considers the use of premix insulin apart from basal insulin [17]. In addition, RSSDI and other various regional guidelines recommend basal insulin, premix insulin, or insulin co-formulations for initiating insulin therapy and, thus, are more relevant and allow greater flexibility [18]. Practitioners also prefer biphasic analogue insulins since they can be administered once, twice, or even thrice daily with the benefit of lower risk of hypoglycemia, mealtime flexibility, and better postprandial glycemic (PPG) control compared to biphasic human insulin [19]. Further improvements with premix insulin have led to the development of insulin degludec and insulin aspart (IDegAsp) which offer the benefit of once- or twice-daily dosing with the largest meal(s) of the day.

The survey also revealed that the context of the diverse socio-cultural, economic, and dietary profiles across the country is an important consideration that HCPs consider while deciding on suitable treatment profiles for diabetes management. Another major concern is the reluctance of patients to accept insulin therapy as a measure to control their glycemic levels and further in compliance with the dosing regimen. Despite proper counselling and advising patients about the need for initiating insulin, 36.8% of doctors experienced clinical inertia to initiate insulin therapy in about 20–50% of patients. Furthermore, poor glycemic control is observed in populations with a lack of awareness about their blood glucose levels and those who rely only on diet and exercise regimes for the management of diabetes. Notwithstanding these concerns, 87.5% of the practitioners in the survey responded that they do not delay insulin initiation due to fear of losing patients.

Another factor for concern in the Indian context is the indecision of clinicians to initiate insulinization at the onset of diagnosis. Notably, RSSDI supports insulinization practices throughout India with guidelines on initiating insulin therapy after three oral hypoglycemic agents fail to achieve satisfactory control over blood glucose [18]. Contrary to this, several studies across the globe have shown that in people with newly diagnosed T2DM, early intensive insulin therapy helps in modifying the natural history of diabetes by preserving beta-cell function [20]. The International Diabetes Federation (IDF) global guidelines for diabetes management recommend that insulin therapy should be individualized for every patient according to their glycemic profile, presence of comorbidities, the risk of hypoglycemia, and after failing to achieve glycemic targets with single-, dual-, or triple-oral therapy. Nevertheless, it is a widespread observance across the country that clinicians hold up initiation and intensification of insulin due to cost, fear of adverse effects, and sub-optimal knowledge about insulin treatment.

The findings of this survey also resonate with the outcomes of the DiabCare India study [1]. As per the DiabCare India study, 93.2% of patients with diabetes in India are found to be on OADs while 35.2% are on insulin (with or without OADs). The study also reports that premix insulin is prescribed for most patients followed by prandial insulin (39.4%) and basal bolus insulin (19.4%). As per the Diabetes in Pregnancy Study group India (DIPSI) guidelines, insulin is considered the standard treatment for GDM cases when patients fail to achieve adequate glycemic levels even after 2 weeks of MNT [21]. In the survey also, 72.4% of the responses from HCPs indicated their preference to start insulin therapy after the MNT and lifestyle modification.

A limitation of this survey is that the data were self-reported and may vary from the actual insulin initiation practices of the survey participants. We also admit that the responses given by 367 practitioners are not sufficient to generalize the results in a large country like India. Nevertheless, despite these limitations, the insights gained through this survey on the insulin initiation practices among Indian physicians can aid in outlining frameworks for future research on the use of insulin to optimize long-term glycemic control in diabetic patients.

In conclusion, the results of the survey indicate the issue of clinical inertia and lack of awareness to initiate insulin for the proper and long-term management of diabetes, from both the economic and healthcare perspectives. This calls for urgent attention from policymakers and healthcare professionals on the need to review the existing diabetes care and insulinization initiation practices in India. A key milestone would be spreading awareness among the population to accept insulin as a means to manage their glycemic levels and avoid diabetes-related complications in the long run.

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Declarations

Conflict of interest Dr. Nishtha Manish Singh is also a part of the scientific department at Neovation Consultancy Services Pte. Ltd., Singapore.

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