

Drivers of and barriers to optimal basal insulin (BI) titration: results of a quantitative survey

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INTRODUCTION

- Basal insulin (BI) therapy is an integral component of the management strategy for patients with type 2 diabetes (T2DM) uncontrolled on oral therapies,¹ and dose titration and treatment intensification are required to ensure optimal treatment effect.²
- However, a recent study has demonstrated that there is a significant delay in treatment intensification in people with T2DM with poor glycemic control,³ and a large proportion of patients with T2DM who use insulin do not achieve the recommended HbA_{1c} target (HbA_{1c} <7.0 %).⁴
- A number of barriers are thought to exist that prevent optimal BI use, from both a patient and physician perspective, including fear of hypoglycemia and fear of weight gain.²
- As poor glycemic control is strongly associated with long-term diabetes-related complications,⁵ it is important to understand the barriers to optimal insulin intensification in patients with T2DM.

OBJECTIVE

A survey of people with T2DM and healthcare professionals (HCPs) responsible for BI initiation and titration, and/or diabetes education was conducted in the USA, France, and Germany. The survey aimed to evaluate the drivers of and barriers to optimal BI titration, from an HCP and patient perspective, with a view to better understand decisions regarding BI titration and better define the potential links to poor glycemic control.

METHODS

- Survey design:** Online survey of HCPs and patients with T2DM.
- Participants:** Participants were recruited by email from existing worldwide panels, which are managed by a supplier that specializes in providing access to patients and HCPs for online surveys.
 - HCPs included primary care practitioners (PCPs; USA and Germany), nurses (France) and nurse practitioners (NPs; USA), certified diabetes educators (CDEs; USA and France), and endocrinologists/diabetologists (France and Germany).
 - All HCPs included in the survey were responsible for BI initiation and titration recommendations (PCPs, endocrinologists/diabetologists, NPs) or education on BI titration (nurses and CDEs). All of the HCPs surveyed were experienced in managing patients with T2DM, treating ≥20 patients per month.
 - Patients were ≥18 years old with T2DM and had been on BI for 6–36 months.
 - Patients who had discontinued BI within the past 12 months were also eligible. It was expected that 30 patients in each country who had discontinued BI would be included in the patient sample.
 - Patients received between \$1 and \$20 as compensation for their participation in the survey (depending on the country and recruiter).
- Ethics:** All participants provided written, informed consent.
- Assessment:** The survey consisted of an online questionnaire requiring approximately 45 minutes to complete. The questions evaluated both attitudinal and behavioral variables, and were validated in English, French, and German.
- Data analysis and statistics:** Differences in patient characteristics across countries were assessed using t-tests with a Bonferroni adjustment to correct for multiple country comparisons. Descriptive statistics were used to assess survey responses; each percentage was calculated based on the number of responders to the respective questionnaire item.

RESULTS

- Survey population:** The survey was undertaken by 386 eligible HCPs and 318 eligible patients. HCP and patient characteristics are presented in **Table 1**.
 - Of the 318 patients with T2DM who undertook the survey, there was a significantly higher percentage of current BI users (and conversely, a lower percentage of discontinued BI users) among those surveyed in France compared with the USA. There was also a significantly lower proportion of male participants in France compared with Germany. Patients in the USA had a significantly longer duration of T2DM than those surveyed in Germany (**Table 1**). No other between-country differences were statistically significant.
 - Overall, 75 patients (24%) had discontinued BI within the previous 12 months and 243 (76%) were current BI users.

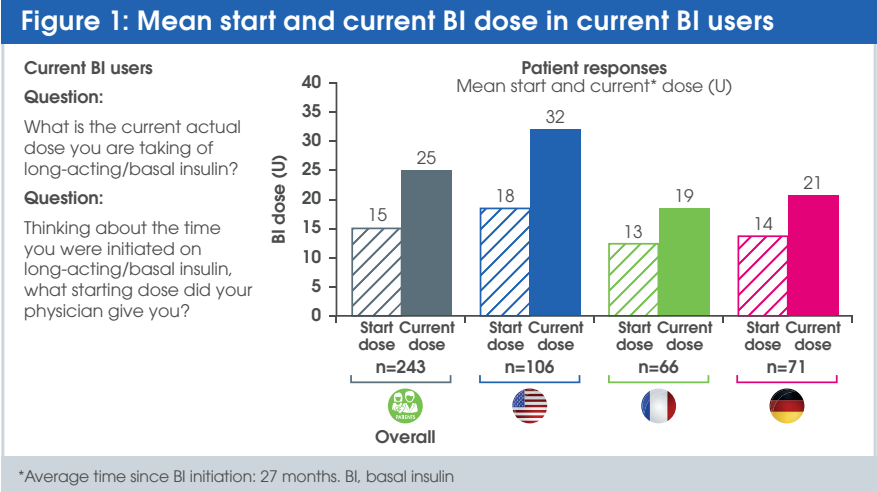
Table 1: HCP and patient characteristics				
	USA	France	Germany	Total
HCP specialties				
PCP, n (%)	115 (66)	–	75 (71)	190 (49)
Endo/Diabeto, n (%)	–	75 (71)	31 (29)	106 (27)
NP, n (%)	30 (17)	–	–	30 (8)
Nurse/CDE, n (%)	–	30 (29)	–	30 (8)
CDE, n (%)	30 (17)	–	–	30 (8)
Patient characteristics				
Current BI user, n (%)	106 (70) ¹	66 (87) ¹	71 (79)	243 (76)
Self-titrating, n (%)	43 (41)	30 (45)	22 (31)	95 (39)
HCP-managed titration, n (%)	63 (59)	36 (55)	49 (69)	148 (61)
Discontinued BI user, n (%)	46 (30) ¹	10 (13) ¹	19 (21)	75 (24)
Age, mean (SD)	55.3 (14.2)	46.4 (13.9)	53.1 (13.2)	52.5 (14.2)
Male, n (%)	102 (67)	40 (53) ⁴	67 (74) ⁴	209 (66)
Duration of T2DM, years, mean (SD)	11.4 (10.4) ⁵	7.0 (6.2)	8.4 (5.8) ⁵	9.5 (8.6)

¹Percentage expressed as percent of current BI users in the corresponding country; ²France vs USA, p<0.01; ³France vs Germany, p<0.01; ⁴USA vs Germany, p<0.05; BI, basal insulin; CDE, certified diabetes educator; Diabeto, diabetologist; Endo, endocrinologist; HCP, healthcare professional; NP, nurse practitioner; PCP, primary care practitioner; SD, standard deviation; T2DM, type 2 diabetes

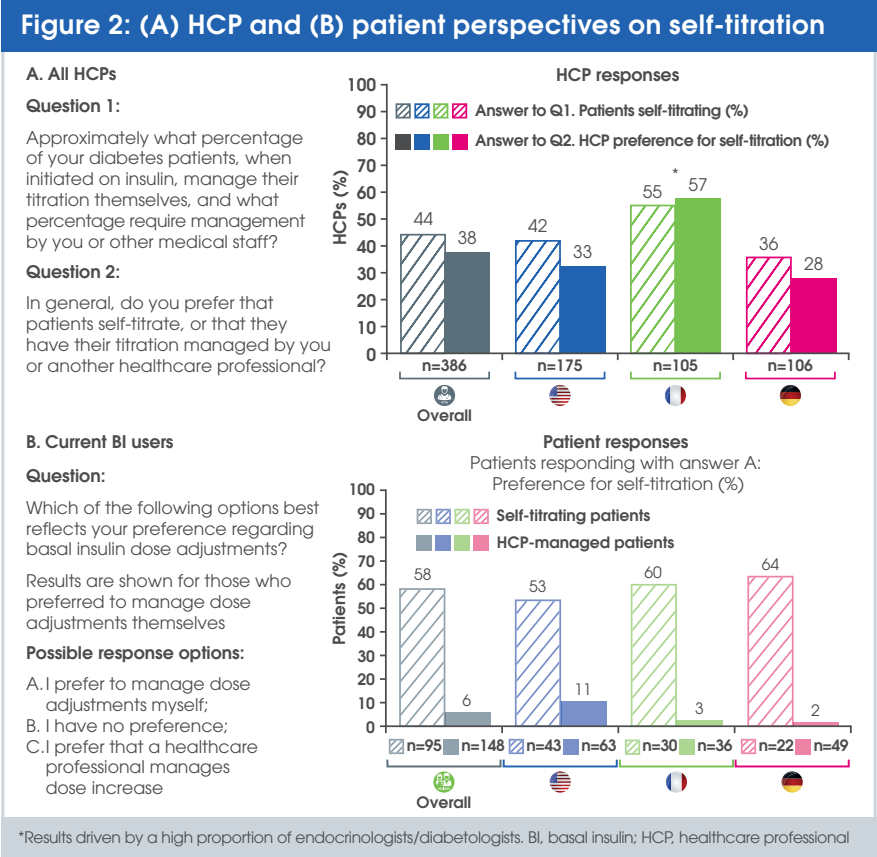
- Glycemic control targets:** Fasting self-monitored plasma glucose (SMPG) targets, as outlined in country-specific guidelines, were not used by all HCPs; PCPs in the USA and Germany, and endocrinologists/diabetologists in Germany, generally preferred higher fasting SMPG targets than recommended by these guidelines (**Table 2**).
 - When asked if they had reached their HbA_{1c} target (possible answers: yes, no (based on patient recall)), 41–56% of patients answered ‘no’; similarly, when asked if they had reached their pre-breakfast SMPG target (potential answers: yes, no (based on patient recall)), 30–41% answered ‘no’ (**Table 2**).
- Insulin dose:** The mean start and current dose in current BI users enrolled in the survey are reported in **Figure 1**.
 - Of the current BI users who reported not reaching their HbA_{1c} target (n=118), 59% (n=70) had a BI dose increase of <10 U since BI initiation.

Table 2: (A) HCP and (B) patient perspectives on glycemic control targets				
A	USA ¹	France ²	Germany ³	
Guideline-recommended fasting SMPG target, mg/dL (mmol/L)	80–130 (4.4–7.2)	<120–130 (<6.7–7.2)	100–125 (5.6–6.9)	
HCP responses	PCP N=104 NP N=27 CDE N=25	Endo/ Diabeto N=67 Nurse/ CDE N=27	PCP N=68 Endo/ Diabeto N=29	
Mean HCP-recommended fasting SMPG target, mg/dL (mmol/L)	135 (7.5) 124 (6.9)	N/A 111 (6.2)	145 (8.1) 142 (7.9)	
B	USA	France	Germany	
Patient responses (current BI users)	N=106	N=66	N=71	
Patient has not reached pre-breakfast SMPG target ⁴ , n (%)	32 (30)	23 (35)	29 (41)	
HbA _{1c} target provided by HCP, %, mean (SD)	6.4 (1.1) ⁵	6.2 (2.3) ¹	6.5 (1.4) ¹	
Patient has not reached HbA _{1c} target ⁴ , n (%)	59 (56)	30 (45)	29 (41)	

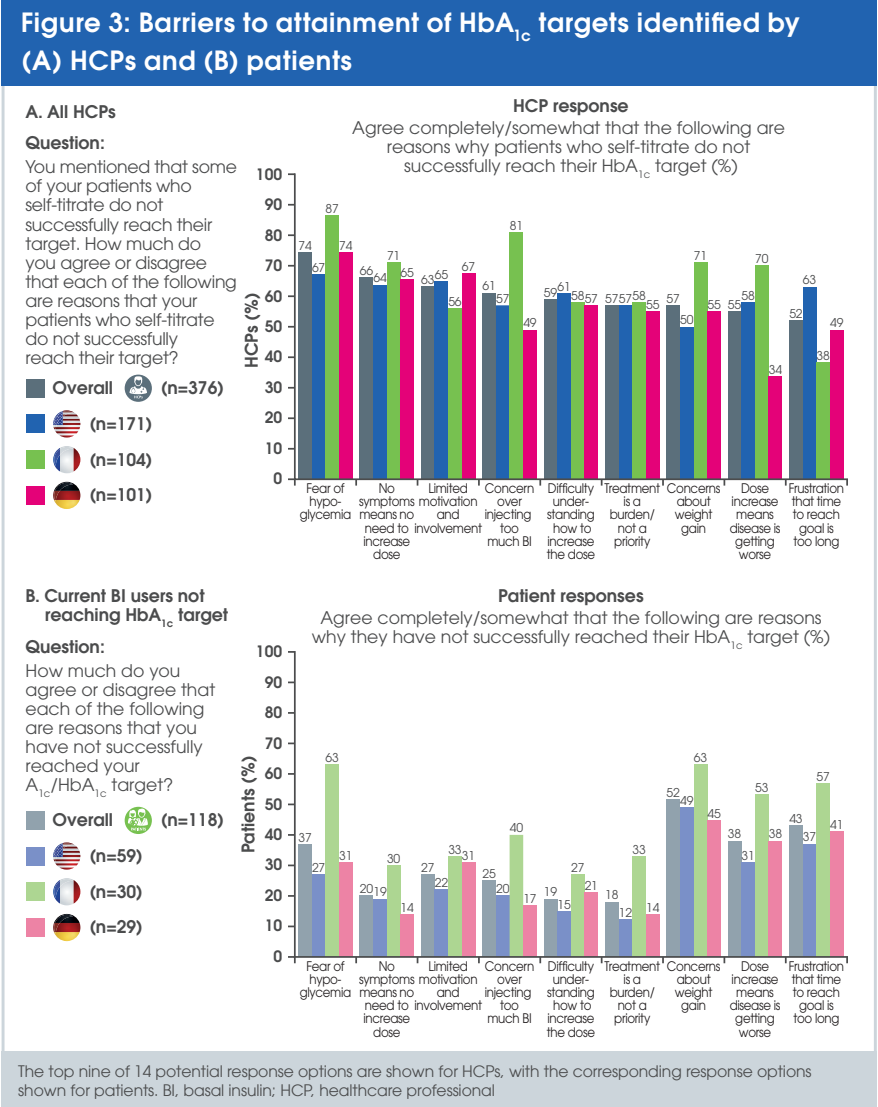
¹Average time since BI initiation: 27 months. ²USA, n=74; France, n=32; Germany, n=37. BI, basal insulin; CDE, certified diabetes educator; Diabeto, diabetologist; Endo, endocrinologist; HCP, healthcare professional; NP, nurse practitioner; PCP, primary care practitioner; SD, standard deviation; SMPG, self-monitored plasma glucose



- Preference for self-titration:** HCPs indicated that, on average, 44% of their patients managed their own BI titration; 38% of HCPs expressed a preference for their patients to self-titrate (**Figure 2A**).
 - Just over half (58%) of self-titrating current BI users expressed a preference towards self-titration, while a minority (6%) of current BI users whose titration is HCP-managed expressed a preference towards self-titration (**Figure 2B**).
 - In France, a higher percentage of patients were self-titrating, and a higher percentage of HCPs preferred patients to self-titrate, compared with Germany and the USA. This could potentially have been driven by the high proportion of endocrinologists/diabetologists within the HCP category in France.



- Potential barriers to attainment of HbA_{1c} targets:** HCPs perceived the main barriers to target attainment in self-titrating patients to be fear of hypoglycemia (74%), patient’s hesitancy to increase the dose in the absence of symptoms (66%), and low patient involvement/motivation (63%) (**Figure 3A**).
 - Current BI users highlighted a number of reasons that, in their opinion, contributed to them not reaching their HbA_{1c} target, including concerns over weight gain (52%), perception that dose increase meant worsening of disease (38%), and fear of hypoglycemia (37%) (**Figure 3B**).
 - Frustration over time to reach goal was a common factor identified by patients that contributed to not reaching their HbA_{1c} target (43%). However, the majority of HCPs (88%) preferred that patients reached their goal safely, even if it was a slow approach to titration.



SUMMARY

- In this online survey of HCPs and patients with T2DM on BI:
- HCPs largely preferred a slow approach to titration to ensure that patients reached their goals safely, as evidenced by certain HCPs preferring higher fasting SMPG targets than recommended by guidelines.
 - A substantial percentage of patients had not reached their HbA_{1c} target; however, the majority of these patients had a dose increase of <10 U since BI initiation.
 - Just over half of self-titrating patients expressed a preference for self-titration, whereas only a minority of patients on HCP-managed titration indicated that they would prefer to self-titrate.
 - Less than half of HCPs expressed a preference towards self-titration.
 - In France, a higher percentage of patients were self-titrating, and a higher percentage of HCPs preferred patients to self-titrate, compared with Germany and the USA. This could potentially have been driven by the high proportion of endocrinologists/diabetologists within the HCP category in France.
 - There was a disconnect between patient-perceived barriers (most commonly concerns about weight gain and frustration about time taken to reach goal) and HCP-perceived barriers (most commonly fear of hypoglycemia, and the belief that no symptoms means no need to increase dose) to optimal titration.

CONCLUSION

- HCPs generally preferred a gradual and safe approach to titration, even if it takes longer for patients to achieve their glycemic target. However, patients not at target were frustrated about the time taken to reach target and were less concerned about hypoglycemia than HCPs.
- Just over half of self-titrating patients expressed a preference towards self-titration, but only 38% of HCPs indicated that they would prefer patients to self-titrate.
- Encouraging patients to self-titrate, providing education on the titration process, and providing support to increase patient confidence (particularly for patients on HCP-managed titration who would prefer to self-titrate) may help in optimizing the process of dose titration and intensification, from both a patient and HCP perspective.