Awareness of Time in Range – Opportunities for Increased Adoption

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Background and Aims

Previous studies have shown a negative correlation between Time in Range (TIR) and the risk for microvascular complications [1]. Studies on the psychosocial outcomes of people with diabetes suggest that use of TIR can improve their mental health outcomes and daily diabetes management [2-3]. Despite the benefits of the metric, the level of TIR awareness among people with diabetes is unknown. **The aim of this patient survey was to assess the awareness of TIR among people with Type 1 (T1) and Type 2 (T2) diabetes.**

Methods

The sample included 958 adults with diabetes and 44 caregivers of children and/or adults with diabetes from the dQ&A U.S. Patient Panel. Respondents were asked a series of questions related to their awareness of TIR, TIR's value and ease of use, and barriers associated with using TIR. Respondents were categorized by their diabetes type and treatment regimen; T1 (n=201), T2 on MDI/pump (n=195), T2 on basal insulin only (n=195), T2 on SGLT-2/GLP-1 (n=202), T2 on oral meds only (n=103), and T2 no meds (n=106). Responses were collected via an online survey in October 2021. All respondents were compensated for completing the survey ($10 USD). Data was collected using Qualtrics Survey Software, prepared in IBM SPSS, and analyzed in MarketSight. Health and demographic information were collected and are shown below in Table 1.

	Total (n=1,002)	T1 (n=201)	T2 (n=801)
Age in years, mean (SD)	61.9 (14.0)	51.0 (19.5)	64.6 (10.7)
Gender			
- Female	38%	64%	38%
- Male	62%	36%	62%
Household income			
- <$50,000	37%	29%	38%
- $50,000-$100,000	26%	27%	26%
- >$100,000	15%	24%	13%
- Prefer not to answer	22%	19%	22%
Race/Ethnicity			
- White*	82%	84%	82%
- Black or African American*	7%	5%	8%
- Native American*	0%	1%	0%
- Asian or Pacific Islander*	2%	1%	2%
- Hispanic	4%	5%	4%
- Multiracial	3%	1%	3%
- Prefer not to answer	1%	2%	1%
*limited to those selecting only one ethnicity			
CGM usage			
- CGM user	32%	56%	26%
- CGM non-user	68%	44%	74%

Table 1. Baseline demographics of respondents, total and by diabetes type.

Results

Awareness of time in range, by treatment type

- ■ T1 (n=201)
- ■ T2 MDI/pump (n=195)
- ■ T2 basal insulin (n=195)
- ■ T2 SGLT-2/GLP-1 (n=202)
- ■ T2 oral meds (n=103)
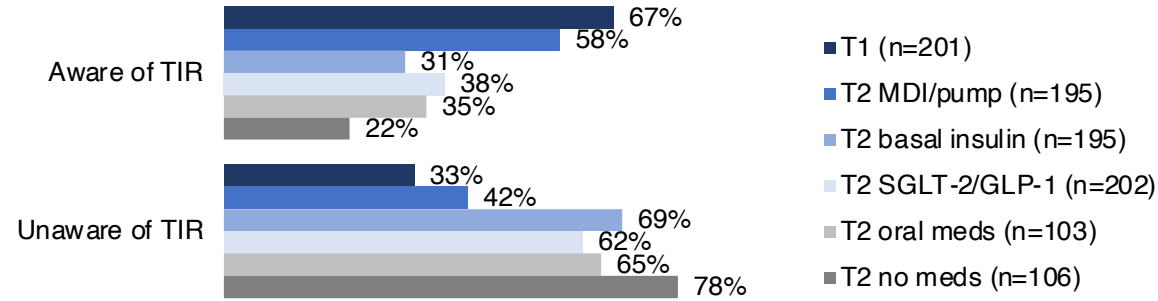- ■ T2 no meds (n=106)

FIGURE 1. Patients' Awareness of TIR, by Diabetes Type and Treatment Regimen. Participants were asked, "How familiar are you with the concept of 'time in range' as it relates to the management of diabetes?" Responses were classified as aware or unaware based on their response. Participants with T1 are more likely to be aware of TIR than those with T2 (Z-test, p<0.05).

Familiarity with the concept of time in range, by CGM usage
% selecting each option

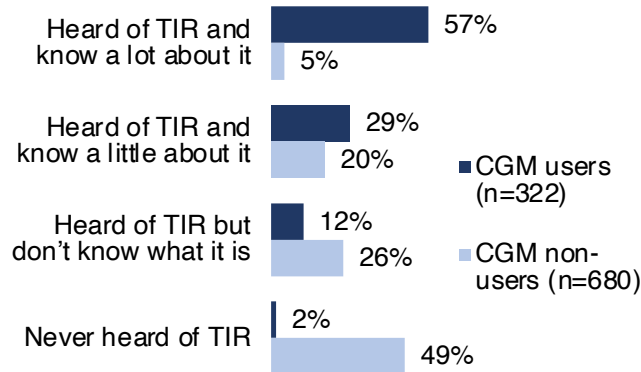- ■ CGM users (n=322)
- ■ CGM non-users (n=680)

FIGURE 2. Patients' Awareness of TIR, by CGM Usage. Participants were asked, "How familiar are you with the concept of 'time in range' as it relates to the management of diabetes?" Responses were classified as aware or unaware based on their response. CGM users are more likely to be aware of TIR than those without a CGM (Z-test, p<0.05).

Perceived helpfulness of TIR with diabetes-related treatment decisions among TIR non-users
% selecting 'somewhat helpful' or 'extremely helpful'
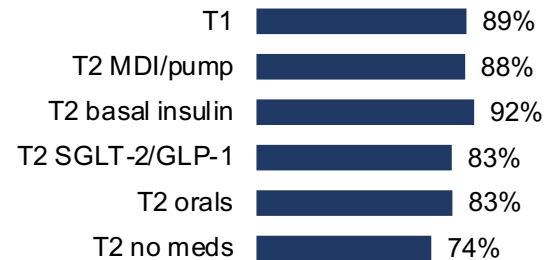

FIGURE 3. TIR Non-Users' Perceived Helpfulness of TIR with Diabetes-Related Treatment Decisions. TIR non-users were asked, "Based on what you know and how you currently make diabetes-related treatment decisions, how helpful would time in range data be to you personally?" Across all patient groups, the majority believed TIR would be somewhat or extremely helpful.

Conclusions

These data highlight a significant lack of TIR awareness among people with T2 and CGM non-users. A large majority (67%) of T1 participants are aware of TIR. While 58% of T2s on MDI/pump therapy are aware of TIR, the majority of T2s on less intensive therapies are unaware of TIR. CGM users are more likely to be aware of TIR and know a lot about it (57%) than CGM non-users (5%). This is likely because CGM data includes TIR metrics and calculating TIR without a CGM is difficult.

The majority of TIR non-users believe that TIR would be helpful with diabetes-related treatment decisions. A large majority (89%) of T1 participants and over 70% of T2 participants who do not use TIR believe that TIR would be a helpful metric to use in diabetes-related treatment decisions. T2s on basal-only insulin therapy was the treatment group where the highest proportion of participants (92%) perceived TIR as helpful. This suggests that many TIR non-users would use the metric if there was improved TIR access and education.

Implications

Opportunities for increased TIR awareness include CGM access and HCP education. While A1C remains a leading diabetes metric, TIR can provide real-time, actionable health data to people with diabetes. Because CGM users are more likely to be aware of TIR, increasing access to CGM devices may improve TIR awareness among people with diabetes, especially within T2 populations. In conjunction with increased CGM access, improved education via HCPs on strategies for leveraging a CGM device to monitor TIR could increase TIR awareness among people with diabetes.

Future research on TIR should focus on the metric's association to macrovascular health complications and psychosocial outcomes.

Sponsored by the Time in Range Coalition

References
1. Beck RW, Bergenstal RM, Riddlesworth TD, et al. Validation of Time in Range as an Outcome Measure for Diabetes Clinical Trials. *Diabetes Care.* 2019 Mar;42(3):400-405. doi: 10.2337/dc18-1444.
2. Runge AS, Kennedy L, Brown AL, et al. Does Time-in-Range Matter? Perspectives From People With Diabetes on the Success of Current Therapies and the Drivers of Improved Outcomes. *Clin Diabetes.* 2018;36(2):112-119. doi:10.2337/cd17-0094.
3. Polonsky WH, Fortmann AL. The influence of time in range on daily mood in adults with type 1 diabetes. *J Diabetes Complications.* 2020;34(12):107746. doi:10.1016/j.jdiacomp.2020.107746.