



Diabetes Distress in Adult CGM Users with Type 1 Diabetes

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Background

- Diabetes distress, a negative emotional experience from having diabetes, has been associated with higher HbA1c.^{1,2}
- Continuous glucose monitoring (CGM) has been associated with lower HbA1c, but its association with diabetes distress is unclear.
- Some research has found CGM users report lower diabetes distress,³ while other research has found no difference in distress or even greater distress.^{4,5}

In a sample of CGM users, we aimed to:

1. Describe emotional burden and regimen-related distress
2. Explore the overlap between the DDS-2⁶ to emotional and regimen-related distress subscales

Methods

- Participants ($N = 244$) were recruited from the T1D Exchange Registry - a longitudinal online study for people with type 1 diabetes (T1D) - for a brief online survey.
- Eligible participants were adults (aged 18+ years) with T1D who used a Dexcom CGM and met eligibility criteria.
- Data were analyzed using descriptive statistics (mean, standard deviation [SD], and correlation).

Demographics

		Mean	SD
Age (years)		40.8	14.5
		Frequency	Percentage
Gender	Female	191	78.3%
	Genderqueer/Not exclusively male or female	4	1.6%
Race	White	231	94.7%
	Black or African-American	11	4.5%
	Other	8	3.2%
Ethnicity	Not Hispanic or Latino	237	97.1%

Note: Participants could choose more than one race ('select all that apply'). Other racial identities included Asian = 3 (1.2%), American Indian/Alaskan Native = 3 (1.2%), Native Hawaiian/Other Pacific Islander = 1 (0.4%), or Other = 1 (0.4%).

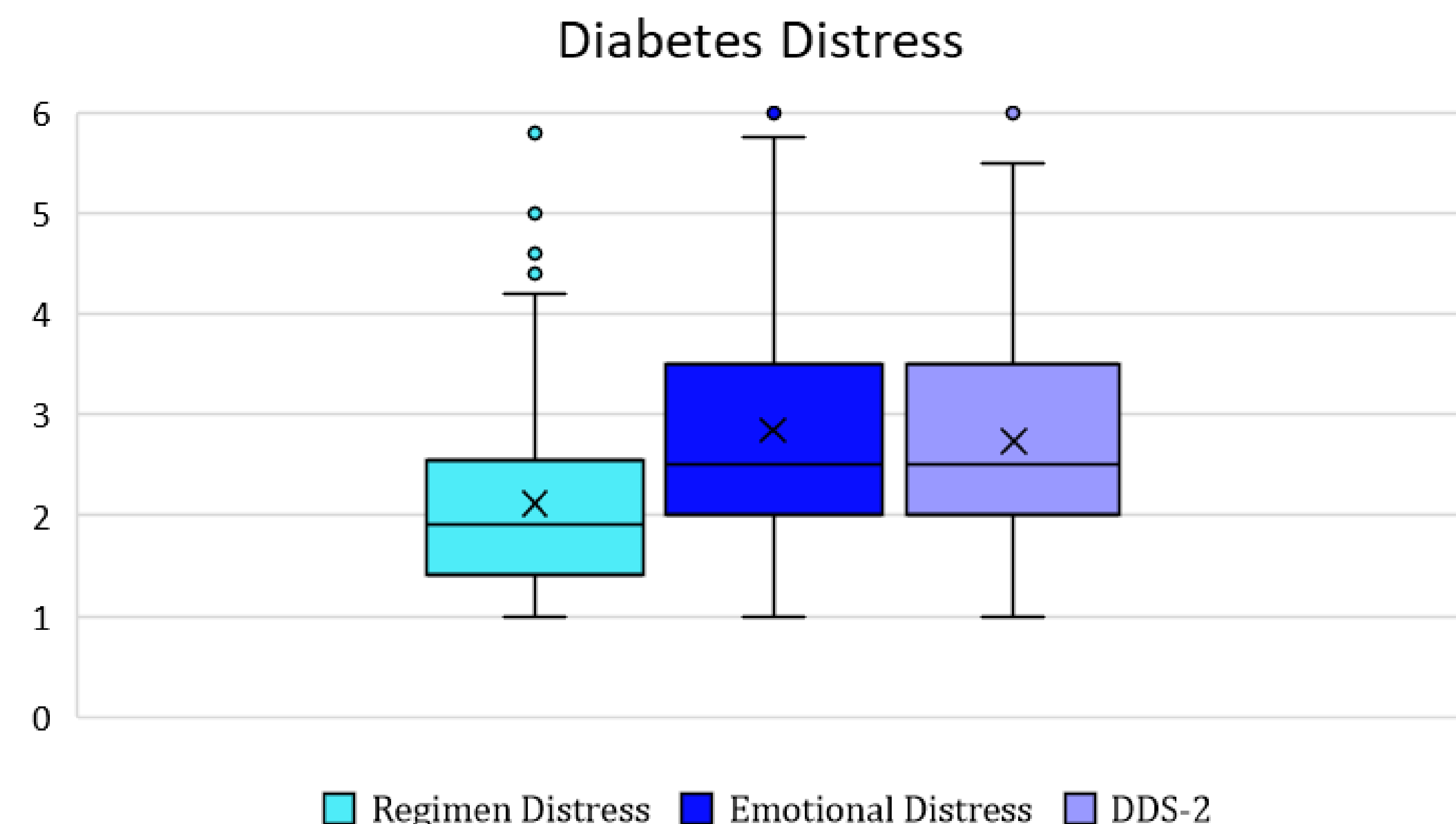
Results

Diabetes Related History		
	Mean	SD
HbA1c (mg/dL)	6.6	1.0
SHEs in past 12 months	0.9	3.7
DKA in past 12 months	0.2	0.8
Length of CGM Use		
	Frequency	Percentage
3 months to less than 1 year	28	11.5%
1 year to less than 3 years	65	26.6%
3 years to less than 5 years	72	29.5%
5 or more years	79	32.4%

- The DDS-2 was strongly correlated with emotional burden ($r = 0.88$) and regimen distress ($r=0.85$).
- Younger participants experienced higher distress and those with higher HbA1c also reported higher distress.

Measure	Pearson's Correlations		
	Regimen Distress	Emotional Distress	DDS Screener
Regimen Distress	--	0.70	0.85
Emotion Distress	0.70	--	0.88
Age (years)	-0.31	-0.34	-0.36
HbA1c (mg/dL)	0.35	0.13	0.23

Note: All correlations had a $p < 0.001$ except for HbA1c and Emotional Distress which was ns ($p=0.05$). Four of the five items from the Emotional-Burden subscale of the DDS-17 were included. One item ("Feeling that diabetes is taking up too much of my mental and physical energy every day") was missing for all participants. Internal consistency of the remaining items (Cronbach's $\alpha = 0.87$) was consistent with prior research.²



- Distress scores ranged from 2.1 to 2.8 on average, indicating moderate distress (moderate > 2) in our sample.

Key Findings

1. CGM users with T1D experienced moderate diabetes distress.
2. People who were younger and those with higher HbA1c also reported greater distress.
3. The DDS-2 appears to have sufficient overlap with the emotional burden and the regimen distress subscales of the DDS-17.

Limitations & Conclusions

Limitations

- Participants in the T1D Exchange Registry are not representative of the general population of people with T1D and there may be differences in diabetes distress in more diverse and representative samples.
- Replication of findings using the full DDS-17 subscales may be warranted.

Conclusions

- Despite the use of technology, CGM users still experience diabetes distress.
- Diabetes educators should continue to assess diabetes distress despite use of technology.
- The DDS-2 may sufficiently capture diabetes distress in research studies where participant burden is high.

References

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1. Hessler, D. M., Fisher, L., Polonsky, W. H., Masharani, U., Strycker, L. A., Peters, A. L., ... Bowyer, V. (2017). Diabetes distress is linked with worsening diabetes management over time in adults with type 1 diabetes. *Diabetic Medicine*, 34(9), 1228–1234. doi:10.1111/dme.13381
2. Polonsky, W. H., Fisher, L., Earles, J., Dudl, R. J., Lees, J., Mullan, J., & Jackson, R. A. (2005). Assessing psychosocial distress in diabetes: development of the diabetes distress scale. *Diabetes Care*, 28(3), 626–631. doi:10.2337/diacare.28.3.626
3. Polonsky, W. H., Hessler, D., Ruedy, K. J., & Beck, R. W. (2017). The impact of continuous glucose monitoring on markers of quality of life in adults with type 1 diabetes: further findings from the DIAMOND randomized clinical trial. *Diabetes Care*, 40(6), 736–741. doi:10.2337/dc17-0133
4. Huhn, F., Lange, K., Jördening, M., & Ernst, G. (2022). Real-world use of continuous glucose monitoring (CGM) systems among adolescents and young adults with type 1 diabetes: reduced burden, but little interest in data analysis. *Journal of Diabetes Science and Technology*, 19322968221081216. doi:10.1177/19322968221081216
5. Messer, L. H., Cook, P. F., Tanenbaum, M. L., Hanes, S., Driscoll, K. A., & Hood, K. K. (2019). CGM benefits and burdens: two brief measures of continuous glucose monitoring. *Journal of diabetes science and technology*, 13(6), 1135–1141. doi:10.1177/1932296819832909
6. Fisher, L., Glasgow, R. E., Mullan, J. T., Skaff, M. M., & Polonsky, W. H. (2008). Development of a brief diabetes distress screening instrument. *The Annals of Family Medicine*, 6(3), 246–252. doi:10.1370/afm.842