

Substance Use, Self-Management, and HbA1c among College Students with Type 1 Diabetes

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Background & Objective

- Young adults with Type 1 Diabetes (T1D) struggle with attaining glycemic control and the spike in risk behaviors during college may complicate and compound problems with disease control.
- As such, we sought to quantify substance use (including alcohol) and self-management behaviors, and estimate their impact on glycemic control among college students with T1D.

Methods

Design

- We conducted a comparative effectiveness trial to evaluate the impact of competing versions of a novel educational intervention on alcohol use.
- Participants were recruited via a variety of social media platforms (e.g., College Diabetes Network Facebook) and more traditional avenues (e.g., direct e-mail messaging, newsletter).
- This study uses data from the baseline assessment.

Sample

- We recruited and consented 138 college students (ages 17-25) with T1D from 85 universities/colleges across 30 states, DC, and Canada.
- All participants had been diagnosed with T1D for at least 1 year (mean age at diagnosis was 10.9 years, SD=5.2), could read English, and provide consent.

Measures

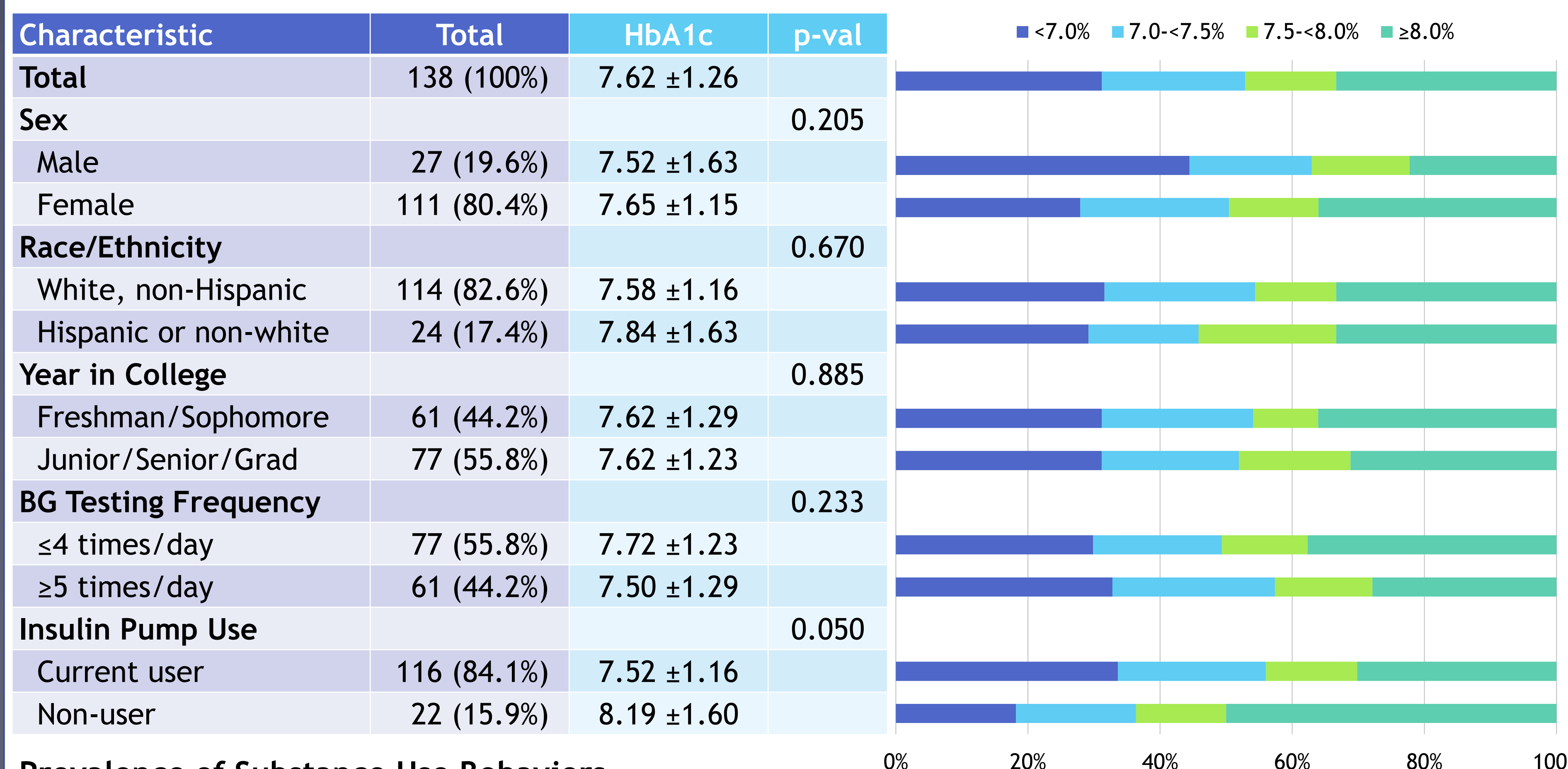
- Participants were asked to self-report sociodemographic characteristics and their:
 - substance use behaviors (e.g., past year alcohol, marijuana, cigarette use),
 - diabetes self-management (e.g., frequency of daily blood glucose testing) and burden,
 - most recent hemoglobin A1c (HbA1c).

Analytic Approach

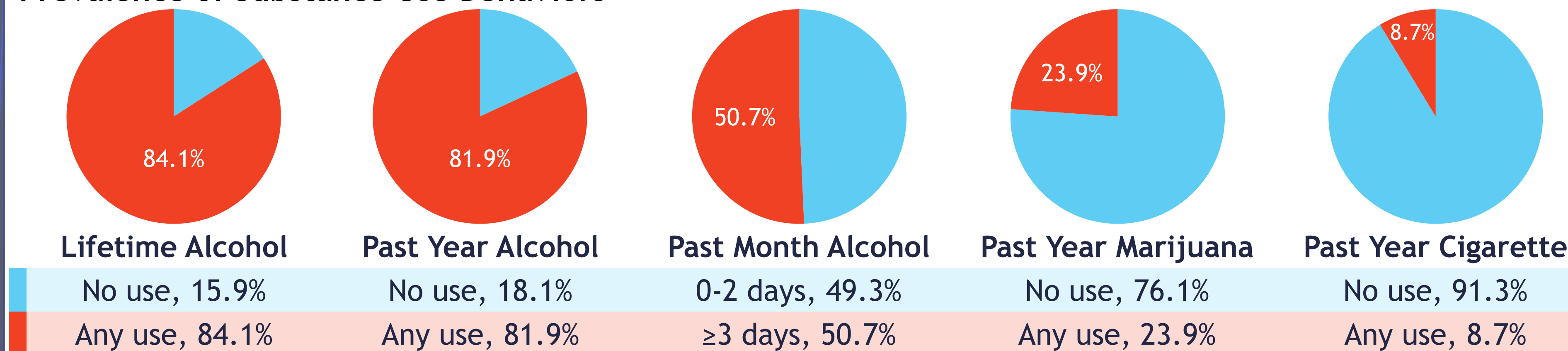
- Data were first analyzed descriptively; associations between demographics and HbA1c were assessed using Wilcoxon tests.
- Multivariable linear and ordinal regression were used to evaluate the impact of various substance use behaviors on HbA1c and HbA1c targets (<7.0%, <7.5%, <8.0%), respectively.
 - Models also adjusted for age, sex, frequency of daily blood glucose testing, pump use, and disease burden (illness cognition questionnaire).

Results

Distribution of and Mean HbA1c by Sample Sociodemographics and Self-Management Behaviors



Prevalence of Substance Use Behaviors



Multivariable Linear and Ordinal Logistic Regression Analyses Predicting HbA1c and Glycemic Targets

Mean HbA1c	Unadjusted	Adjusted	HbA1c Targets	Unadjusted	Adjusted
Past Month Alcohol Use			Past Month Alcohol Use		
≥3 days	0.58 (0.21) **	0.60 (0.19) **	≥3 days	2.53 (1.38-4.67)	2.89 (1.48-5.63)
0-2 days	Reference	Reference	0-2 days	Reference	Reference
Past Year Alcohol Use			Past Year Alcohol Use		
Any	0.15 (0.28)	0.14 (0.26)	Any	1.65 (0.76-3.59)	1.47 (0.63-3.40)
None	Reference	Reference	None	Reference	Reference
Past Year Marijuana Use			Past Year Marijuana Use		
Any	0.51 (0.25) *	0.47 (0.23) *	Any	2.38 (1.21-4.67)	2.44 (1.19-5.02)
None	Reference	Reference	None	Reference	Reference
Past Year Cigarette Use			Past Year Cigarette Use		
Any	0.74 (0.37) *	0.62 (0.35)	Any	3.55 (1.25-10.10)	3.30 (1.04-10.47)
None	Reference	Reference	None	Reference	Reference

Separate models were run for each substance use behavior (included as a predictor either independently or adjusting for covariates). Adjusted models control for age, sex, BG testing (0-2, 3-4, 5-6, 7+ times/day), pump use, and disease burden. For both outcomes, higher indicates worse glycemic control. For linear models, beta (standard error) are shown with *p<0.05 and **p<0.01. For ordinal logistic models, odds ratio (95% confidence interval) are shown.

Conclusions

- Much like their peers, college students with T1D frequently consume alcohol and marijuana.
 - Past year users consumed an average of 13.6 alcoholic drinks in the past month.
- Those with T1D who use more frequently experience significantly higher HbA1c and are significantly less likely to achieve glycemic targets, independent of self-management and burden.
- This sample was recruited through social media platforms connected with established diabetes communities and may not be representative of all college students with T1D.
 - High rates of substance use in this relatively advantaged cohort may thus underestimate risk.

Implications

- College students likely underestimate the effects of substance use on glycemic control and may engage in riskier behavior as a result.
 - Only 34.8% correctly identified how the liver's release of glucose is affected by alcohol.
 - Additional education around these effects may help them to achieve glycemic targets during college and beyond.
- Preliminary analyses of trial data suggest that youth are very interested in receiving this information and that it affects both perceived risk and alcohol use behaviors.
 - This information will inform the design of patient-centered interventions that are acceptable to students with T1D, salient at communicating health messages, and efficient for tracking measurable health outcomes.

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