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# Hemoglobin A1c Increase in Youth at Risk for Developing Type 2 Diabetes Mellitus During the COVID-19 Pandemic

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No conflicts of interest

## Background

Childhood obesity rates continue to increase<sup>1</sup> and have progressed with the COVID-19 pandemic<sup>2</sup>. Obesity is associated with comorbidities, such as prediabetes and type 2 diabetes mellitus (T2D)<sup>1</sup>. The HbA1c progression in overweight/obese youth with risk of T2D during the COVID-19 pandemic is not well reported.

## Objectives

We investigated the impact of the COVID-19 pandemic on HbA1c progression in youth with risk of T2D.

## Methodology

Retrospective review of overweight/obese youth seen in a pediatric endocrinology clinic focused on T2D prevention was conducted.

Patients seen both pre-pandemic (June 2019 to May 2020) and post-pandemic onset (June 2020 to May 2021) were included. June 2020 was chosen as the pandemic onset since the clinic resumed in-person visits at this time.

We evaluated change in HbA1c, LDL, and BMI per **Tables 1-3**. Chi-square or Fisher’s exact test and t-test were used to evaluate HbA1c progression and associated variables.

Table 1. Change in HbA1c

Category	HbA1c (%)
1	< 5.7
2	5.7-6
3	6.1-6.4
4	6.5 to 8.4
5	>8.4

Table 2. Change in LDL

Category	LDL (mg/dL)
1	< 110
2	110-129
3	>=130

“Progression” for HbA1c and LDL is defined as increase in the category.

Table 3. Change in BMI

	BMI z-score
Progress	+ ≥ 0.2
No Progress	< 0.2

## Results

Table 4. HbA1c Progression versus No Progression

	All (N=64)	HbA1c progress (N=12)	HbA1c no progress (N=42)	P-value
<b>Pre-pandemic Age (Mean +/-SD years)</b>	12.6 +/- 3	14.1 +/- 2.3	12.3 +/- 2.7	<b>0.04</b>
<b>Birth Sex</b>				
Female	37 (57.8%)	9 (24.3%)	28 (75.7%)	0.18
Male	27 (42.2%)	3 (11.1%)	24 (88.9%)	
<b>Race</b>				
Black	20 (31.3%)	4 (20%)	16 (80%)	0.54
Hispanic	13 (21.3%)	4 (30.8%)	9 (69.2%)	
Mutiracial	6 (9.4%)	0	6 (100%)	
White	25 (39.1%)	4 (16%)	21 (84%)	
<b>Insurance *Missing 2</b>				
Private	22 (35.5%)	5 (22.7%)	17 (77.3%)	0.83
Public	38 (61.3%)	7 (18.4%)	31 (81.6%)	
Self Pay	2 (3.2%)	0	2 (100%)	
<b>LDL progress</b>	40 (62.5%)	66.7%	17.7%	<b>0.026</b>
<b>BMI progress</b>	8 (12.5%)	16.7%	9.8%	0.61

## Results

64 patients were included – 18.8% (N=12) of which had progression in HbA1c, 62.5% (N=40) had progression in LDL, and 12.5% (N=8) had progression in BMI. Table 4 summarizes comparisons between those with HbA1c progression and those with no progression.

## Summary

Older age and LDL progression were risk factors for HbA1c progression in youth at risk for T2D.

Further studies are needed to evaluate the impact of COVID-19 pandemic on HbA1c progression in youth with risk of T2D.

## References

1. Styne, D.M., et al., Pediatric Obesity-Assessment, Treatment, and Prevention: An Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab, 2017.
2. Jenssen, B.P., et al., COVID-19 and Changes in Child Obesity. Pediatrics, 2021.

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