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Type 2 Diabetes Mellitus During the COVID-19 Pandemic

Erica Wee

Children's Mercy Hospital

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Type 2 Diabetes Mellitus During the COVID-19 Pandemic

Erica Wee, MD

Pediatric Endocrinology Fellow



Background

- The prevalence of type 2 diabetes mellitus (T2D) in youth has increased significantly over the past decades.
- Epidemiologic data estimates that the incidence of youth-onset T2D increased 5% per year between 2002 and 2012.
- Recently published literature has shown more severe presentation of diabetes during the pandemic.

Objectives

- To evaluate new-onset T2D in youth during the COVID-19 pandemic (March 2020 to February 2021) compared to the 2 years pre-pandemic (March 2018 to February 2019 and March 2019 to February 2020).
 - Frequency of new-onset T2D
 - BMI and HbA1c at onset of T2D diagnosis
 - Proportion of new-onset T2D presenting in diabetic ketoacidosis (DKA) and/or hyperglycemic hyperosmolar state (HHS)

Hypothesis

- There will be higher mean BMI and HbA1c at T2D diagnosis during the COVID-19 pandemic year compared to the 2 years pre-pandemic.
- There will be a greater proportion of DKA and/or HHS at T2D diagnosis during the COVID-19 pandemic year compared to the 2 years pre-pandemic.

Study Design

- A retrospective chart review of new-onset T2D in patients < 21 years old was conducted between March 2018 and February 2021.
- Patient characteristics and clinical data including frequency of DKA/HHS were collected.
 - DKA defined as serum bicarbonate <16 mmol/L
 - HHS defined as calculated osmolality ≥ 330 mOsm/kg and serum glucose >600 mg/dL.
- Patients with type 1 diabetes mellitus were excluded.

Statistical Analysis

- Data were analyzed using SPSS version 24
- Descriptive statistics were calculated for all patient characteristics and clinical data.
- ANOVA or T-test were used to compare continuous variables and Chi-square test for categorical variables between the pre-pandemic and pandemic groups.

Results: Frequency of New T2D Diagnosis

Period	March to February	Number of New T2D Patients	Mean
Pre-pandemic Year	2018-2019	35	47
	2019-2020	59	
Pandemic Year	2020-2021	69	
Total		163	

There was a 46.8% increase in new T2D diagnosis during the pandemic year compared to the mean of the 2 years pre-pandemic.

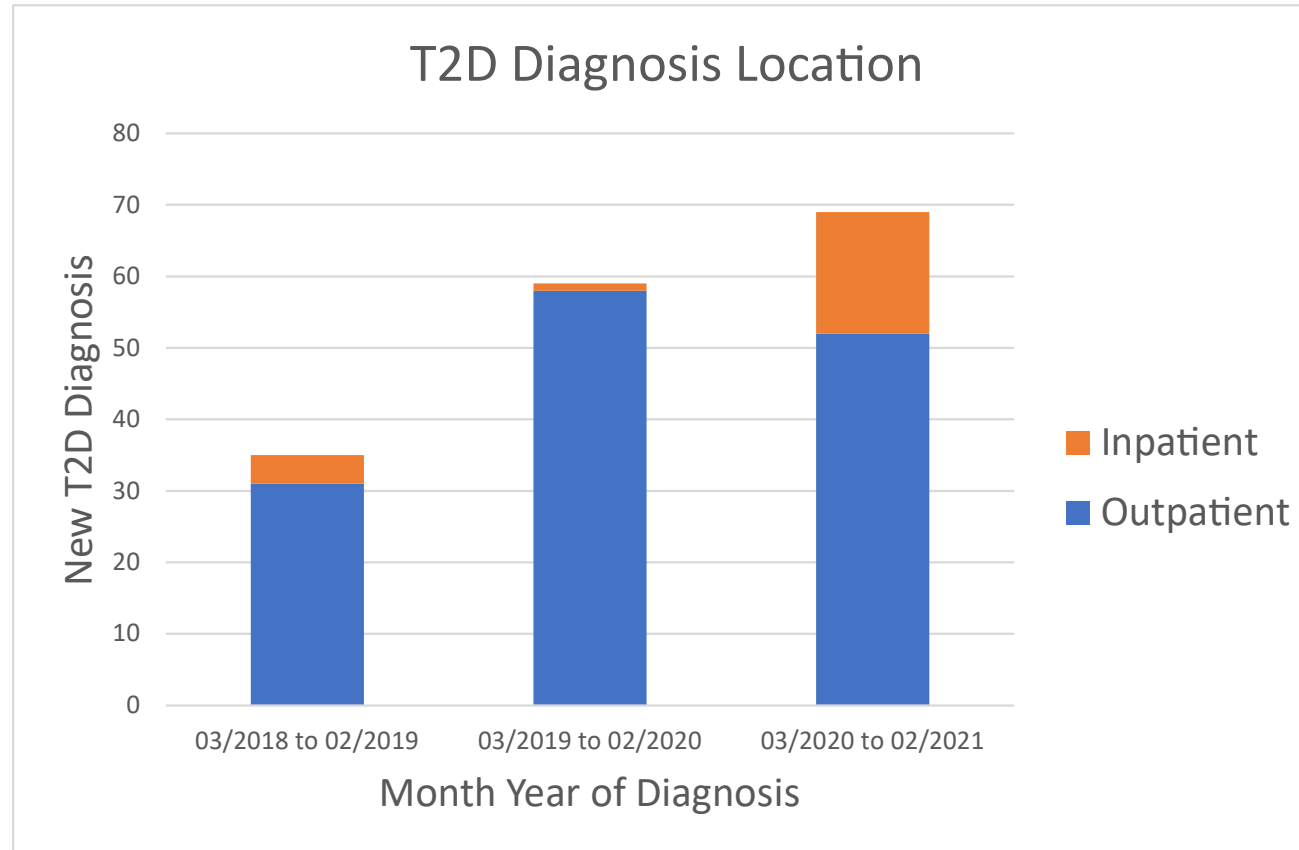
Results: Patient characteristics

Patient characteristics	March to February			p-value
	2018-2019 (n=35)	2019-2020 (n=59)	2020-2021 (n=69)	
Age at diagnosis (Mean +/- SD in years)	14.3 +/-2.5	14.4 +/-2.5	14.2 +/- 2.1	0.899
Sex assigned at birth				0.977
Female	18 (51.4%)	31 (52.5%)	37 (53.6%)	
Male	17 (48.6%)	28 (47.5%)	32 (46.4%)	
Race				0.114
White	9 (25.7%)	14 (23.7%)	17 (24.6%)	
Black	16 (45.7%)	25 (42.4%)	25 (36.2%)	
Asian	2 (5.7%)	0	0	
Other	8 (22.9%)	18 (30.5%)	25 (36.2%)	
Unknown	0	2 (3.4%)	2 (2.9%)	
Ethnicity				0.260
Hispanic	5 (14.3%)	18 (30.5%)	21 (30.4%)	
Non-Hispanic	30 (85.7%)	40 (67.8%)	47 (68.1%)	
Unknown	0	1 (1.7%)	1 (1.4%)	

Results: Clinical Data of New T2D Diagnosis

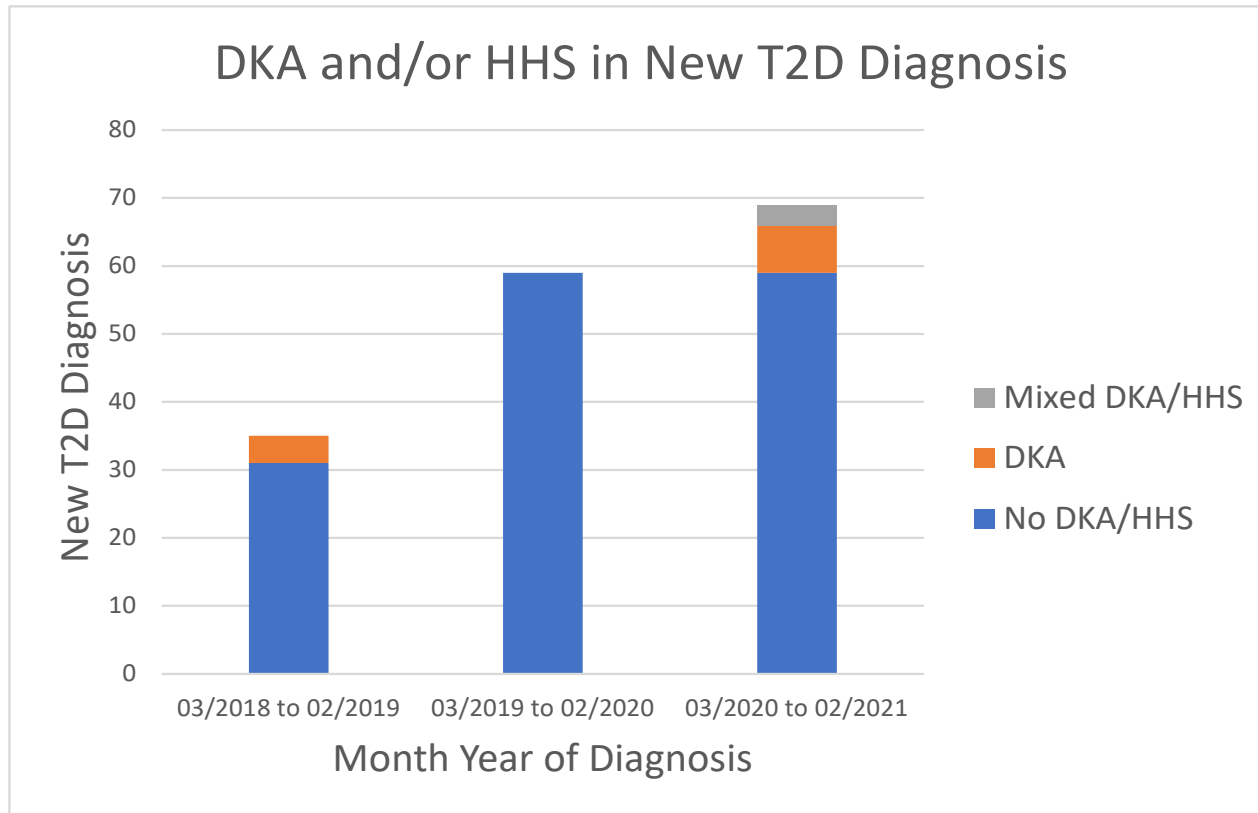
Clinical data	March to February			p-value
	2018-2019 (n=35)	2019-2020 (n=59)	2020-2021 (n=69)	
BMI at diagnosis (Mean +/- SD in kg/m ²)	35.3 +/- 6.2	35.7 +/- 7.3	37.1 +/- 8.1	0.440
HbA1c at diagnosis (%)	9.6 +/- 2.7	9.2 +/- 2.9	9.7 +/- 2.7	0.584
Glucose at diagnosis (mg/dL)	264 +/- 135	231 +/- 140	298 +/- 247	0.151

Results: T2D Diagnosis Location



There was significantly more newly diagnosed T2D, about 1 in 4, needing inpatient admission at presentation during the pandemic vs. 1 in 20 pre-pandemic ($p < 0.001$).

Results: DKA and/or HHS



*DKA defined as bicarbonate <16
**HHS defined as calculated osmolality ≥ 330 and serum glucose >600

There was twice the number of patients (n=8) presenting with DKA/HHS at presentation of new T2D diagnosis during the pandemic compared to pre-pandemic (p = 0.021).

Results: COVID-19 diagnosis

- Only 15 were tested for COVID-19
 - All were inpatient
 - Only 2 had positive COVID-19
 - One presented with DKA
 - The other one admitted for PO intolerance

Discussion

- Increased frequency of T2D during the pandemic year as compared to the mean frequency of the 2 years pre-pandemic.
- No significant difference in BMI and HbA1c in new T2D diagnosis between pandemic year and 2 years pre-pandemic.

Discussion

- A significant increase in DKA and/or HHS at T2D diagnosis during the pandemic year compared to the 2 years pre-pandemic.
 - Correlates with the significant increase of newly-diagnosed T2D needing inpatient admission during the pandemic year compared to the 2 years pre-pandemic.

Limitations

- Retrospective chart review
- May have included other forms of diabetes
 - Steroid-induced hyperglycemia
- Did not take into account outside interventions

Conclusion

- There was an increased in the frequency of new-onset T2D diagnosis in youth during the COVID-19 pandemic.
- There was no difference in BMI and HbA1c in new T2D diagnosis between pandemic and 2 years pre-pandemic.
- There was a significant increase in the proportion of new-onset T2D with DKA/HHS at diagnosis during the COVID-19 pandemic.
- Further studies are needed to determine if this increase in frequency and severity will persist over an extended period.

References

- Lawrence JM, Divers J, Isom S, et al. Trends in Prevalence of Type 1 and Type 2 Diabetes in Children and Adolescents in the US, 2001-2017. JAMA. Aug 24 2021;326(8):717- 727. doi:10.1001/jama.2021.11165
- Mayer-Davis EJ, Lawrence JM, Dabelea D, et al. Incidence Trends of Type 1 and Type 2 Diabetes among Youths, 2002-2012. N Engl J Med. Apr 13 2017; 376(15):1419-1429. doi:10.1056/NEJMoa1610187
- Chao LC, Vidmar AP, Georgia S. Spike in Diabetic Ketoacidosis Rates in Pediatric Type 2 Diabetes During the COVID-19 Pandemic. Diabetes Care. Apr 26 2021;44(6):1451-3. doi:10.2337/dc20-2733
- Marks BE, Khilnani A, Meyers A, et al. Increase in the Diagnosis and Severity of Presentation of Pediatric Type 1 and Type 2 Diabetes During the COVID-19 Pandemic. Horm Res Paediatr. 2021;doi:10.1159/000519797
- Neyman A, Nabhan Z, Woerner S, Hannon T. Pediatric Type 2 Diabetes Presentation During the COVID-19 Pandemic. Clin Pediatr (Phila). Dec 7 2021:99228211064030. doi:10.1177/00099228211064030

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