

# Missing during COVID-19 lockdown: children with new-onset type 1 diabetes

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## Data Note

**Keywords:** Coronavirus disease 2019, COVID-19, children, new-onset type 1 diabetes, healthcare access, lockdown

**Posted Date:** May 13th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-28594/v1>

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**Version of Record:** A version of this preprint was published on June 23rd, 2020. See the published version at <https://doi.org/10.1111/apa.15443>.

# Abstract

The redistribution of healthcare resources for coronavirus 2019 (COVID-19) pandemic has resulted in unintentional neglect of essential non-COVID-19 care (1). In low- and lower-middle income countries (LMIC), the already overstretched healthcare systems have crumbled under the COVID-19 pressure (2). Additionally, hardline lockdown restrictions, and fear of exposure to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in healthcare settings have forced patients with non-COVID-19 illnesses to stay home and suffer until their illness deteriorates substantially, and sometimes irreversibly. The impact of COVID-19 on the pediatric population has so far been mild, except in children with comorbidities (3). However, children who develop new time-sensitive non-COVID-19 illnesses during the pandemic are at risk of worsening or death due to compromised access to hospital care. In particular, children with new-onset type 1 diabetes (T1D) may progress rapidly to diabetic ketoacidosis (DKA) if treatment with insulin is delayed, and are therefore at risk of increased morbidity and mortality.

## Introduction

The redistribution of healthcare resources for coronavirus 2019 (COVID-19) pandemic has resulted in unintentional neglect of essential non-COVID-19 care (1). In low- and lower-middle income countries (LMIC), the already overstretched healthcare systems have crumbled under the COVID-19 pressure (2). Additionally, hardline lockdown restrictions, and fear of exposure to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in healthcare settings have forced patients with non-COVID-19 illnesses to stay home and suffer until their illness deteriorates substantially, and sometimes irreversibly.

The impact of COVID-19 on the pediatric population has so far been mild, except in children with comorbidities (3). However, children who develop new time-sensitive non-COVID-19 illnesses during the pandemic are at risk of worsening or death due to compromised access to hospital care. In particular, children with new-onset type 1 diabetes (T1D) may progress rapidly to diabetic ketoacidosis (DKA) if treatment with insulin is delayed, and are therefore at risk of increased morbidity and mortality. At our tertiary care pediatric hospital located in Northwest India, we admit all children with new-onset T1D referred either for DKA or for diabetes education as well as those followed up elsewhere but who require change in insulin plan or structured diabetes education (4). During the period of nationwide lockdown, we perceived an unusual decrease in the admissions of children with T1D despite our institute's policy of keeping essential non-COVID services open. To confirm this, we compared data on T1D admissions during the month of lockdown with the previous 12-month period.

## Results

From April 2019 to March 2020, the total number of admissions was 228 averaging 19 (range 12-28) per month; there was a significant reduction (375%, 4 versus 19) during April 2020 (Fig.1). The new-onset T1D cases over the previous 12-month period were 147 (64.48%) with a monthly average of 12.25 (range, 7-19). In April 2020, a sharp decline was noted in the admission rate of children with new-onset T1D as

compared to the mean admission rate of the previous 12 months (3 versus 12.25 per month; reduction 308%) as well as in April months of the previous 2 years (3 versus 12 per month, reduction 300%). All 3 (100%) admissions with new-onset T1D in April 2020 were with severe DKA (mean pH 6.94, range 6.9-7.02; mean serum bicarbonate 4.73, range 4.4-5.0 mmol/L) as compared to only 15% (average 1.83 out of 12.25 per month) during the previous 12 months; the average pH and serum bicarbonate of these patients was 7.07 (range 6.8-7.30) and 8.48 mmol/L (range, 3.7-14.9 mmol/L), respectively. The parents of all three children admitted with severe DKA during April 2020 disclosed that they did not seek timely medical attention due to COVID-19 fear and they were repeatedly turned away from hospitals near their homes until their children became visibly sick.

## Discussion

Our data show a significant reduction in hospitalization of children with new-onset T1D during April 2020. The situation appears similar in other large hospitals in our region, the usual sources of our referred patients (verbal communication). Furthermore, the proportion of presentations in severe DKA increased significantly, suggesting that delays in seeking care by parents, and delayed diagnosis or referral due to closure of neighborhood healthcare facilities probably increased the severity of DKA (5).

The exact reasons for the reduction in admissions are unclear at present. Although the lockdown continues, there are no restrictions on the transport of sick persons. The Indian government has also issued an advisory for re-opening essential non-COVID-19 healthcare (6). The fear of becoming infected with SARS-CoV-2, and delayed access or provision of care, as experienced in the countries with high-COVID-19 burden, probably reduced the hospitalizations in our set-up also (7). Irrespective of the cause, the lower rate of admitted and therefore treated children with new-onset T1D is worrisome for, one that these children may be suffering or dying at home, and second, there might be a surge of presentations with complications related to delayed or missed diagnoses of T1D after the COVID-19 pandemic begins to recede.

In LMIC, children with T1D are considered vulnerable to acute complications due to poor healthcare infrastructure in general and the lack of attention by the government, policy makers, and healthcare professionals (HCPs) in particular (8). Experts still worry about missed diagnoses and deaths before the diagnosis of pediatric T1D, especially in rural areas (8). Currently, the overwhelmed healthcare systems in LMIC are very likely to fail to provide essential care to non-COVID-19 conditions similar to the Ebola virus outbreak of 2014-16. Post-epidemic data analysis revealed that deaths due to non-Ebola conditions exceeded those due to Ebola virus infection because the national healthcare systems failed to provide essential care to non-Ebola patients (9). After the COVID-19 pandemic, we may face a similar revelation about pandemic-time mortality due to non-COVID-19 conditions in children. But whereas, we may get to know the number of children who died due to non-COVID-19 illnesses during the pandemic time, it is impossible to know how many died of undiagnosed or late diagnosed T1D. India's performance on completeness of cause-of-death data is among the lowest of about 10% as compared to the global average of 48% and the European average of 97% (10). Even post-pandemic verbal autopsy analysis is

unlikely to ascertain the cause of death, as the nonspecific initial symptoms of pediatric T1D often do not receive attention by the parents, or even the HCPs (8). Furthermore, after the inevitable COVID-19 related economic recession, the possibility of the national government undertaking a mammoth exercise of verbal autopsy seems remote.

Our preliminary observations at a single centre may change as the lockdown extends further. Nevertheless, this report hints at delays in access to hospital care, which needs systematic monitoring. In this regard, the general public and the HCPs need clear guidelines on the provision of care to children with non-COVID-19 conditions, specifically T1D. The national governments and health agencies in LMIC should respond with aggressive media campaigns to make parents aware that the risk of delayed access to hospital care for new-onset T1D can be much higher than that posed by COVID-19.

## Declaration

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**Sources of funding:** None

**Conflict of interest:** None

**Statement of ethics:** All relevant ethical guidelines have been followed for data collection and reporting. We obtained verbal consent from parents of children admitted during lockdown and approval from the Departmental Review Board for reporting data.

**Contributions:** DD analyzed the data and drafted the manuscript. All authors provided the data, and revised and approved the manuscript.

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## Figures

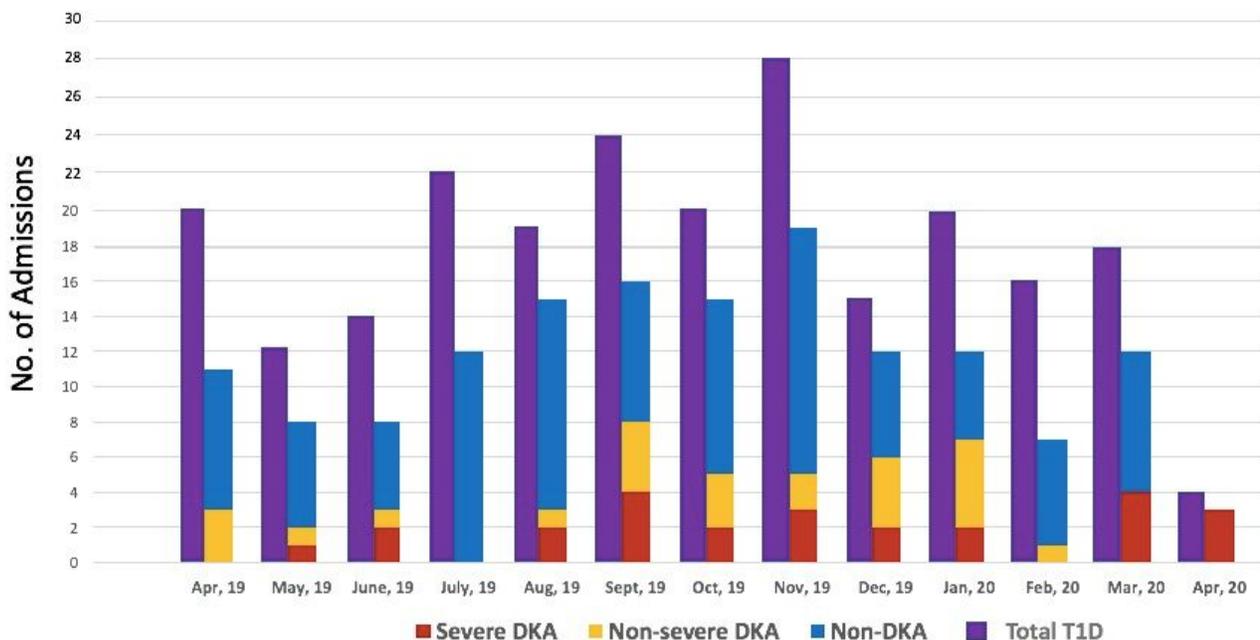


Figure 1

Bar diagram showing total number of type 1 diabetes admissions (left bar, purple coloured) and number of children with new-onset type 1 diabetes (right bar) to the diabetes unit from April 2019 to April 2020