

Presentation of newly diagnosed type 1 diabetes in children and young people during COVID-19: a national UK survey

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ABSTRACT

In the UK, there have been reports of significant reductions in paediatric emergency attendances and visits to the general practitioners due to COVID-19. A national survey undertaken by the UK Association of Children's Diabetes Clinicians found that the proportion of new-onset type 1 diabetes (T1D) presenting with diabetes ketoacidosis (DKA) during this COVID-19 pandemic was higher than previously reported, and there has been an increase in presentation of severe DKA at diagnosis in children and young people under the age of 18 years. Delayed presentations of T1D have been documented in up to 20% of units with reasons for delayed presentation ranging from fear of contracting COVID-19 to an inability to contact or access a medical provider for timely evaluation. Public health awareness and diabetes education should be disseminated to healthcare providers on the timeliness of referrals of children with T1D.

Diabetes is a significant cause of morbidity and mortality in patients with COVID-19. The recent national diabetes and mortality data in England reported that adults with type 1 diabetes (T1D) had 3.5 times the odds respectively of dying in hospital with COVID-19 compared with those without diabetes.¹ In the UK, there have been reports of significant reductions in paediatric emergency attendances due to COVID-19. The national survey undertaken by the UK Association of Children's Diabetes Clinicians aims to review the impact of COVID-19 on diabetes ketoacidosis (DKA) presentations across the country.

All diabetes units caring for children and young people (CYP) in England, Wales, Scotland and Northern Ireland and those submitting data to the National Paediatric Diabetes Audit (NPDA) were invited to complete a questionnaire (via Google Forms) relating to history given to the clinical teams of presentation T1D between 1 March 2020 to 30 June 2020. Responses were

received from 88 units, 76 from England, 10 from Wales and 2 from Northern Ireland (table 1).

The survey showed that 450 CYP were newly diagnosed with T1D between 1 March 2020 and 30 June 2020. The majority of centres (84%) had at least one patient admitted as newly diagnosed T1D (mean: five cases per unit, range: 0–30). Eighty-eight per cent of centres had 1–10 DKA admissions with 71% having 1–10 severe DKA cases. Of all patients presenting as newly diagnosed T1D, 51% presented in DKA and 54% of presented with severe DKA (defined as pH <7.1). During this time period, no children with T1D died as a result of DKA. In all units, 20% of newly diagnosed T1D were reported to have had a delayed presentation due to COVID-19.

The reasons for delayed reporting of presentation were grouped into themes (table 2). Fear of COVID-19 was reported in 40% of cases. Issues regarding the inability to access GP services as well as limited GP services with no face-to-face reviews were reported in 22% of cases, while 7% had issues accessing secondary care units due to advice not to attend by NHS111 or the general practice (GP). Finally, 17% of cases reported a delayed presentation due to symptoms being misdiagnosed or not recognised as diabetes such as: symptoms mistaken for a respiratory illness during a GP video consultation, tiredness due to lack of routine and increased thirst attributed to a 'heat wave' by the family.

While in non-COVID-19 times, there would be still be delays in presentation; the proportion of new onset T1D in CYP under 18 years presenting in DKA (51%) during this COVID-19 period was higher than previously reported of 38% in the UK around the same time period.² While in comparison,



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**Table 1** Response to the questionnaire on newly diagnosed type 1 diabetes in children or young people and diabetes ketoacidosis (DKA) presentations

| Regions | Number of units returning survey | Newly diagnosed type 1 diabetes children or young people | DKA presentations | Severe presentations of DKA (pH <7.1) | Deaths | Delayed presentations due to COVID-19 |
|------------------|----------------------------------|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Total number | Total number (mean) | Total number (% of new presentations) | Total number (% of new presentations) | Total number (% of new presentations) | Total number (% of new presentations) | Total number (% of new presentations) |
| England | 76 | 399 (5.2) | 205 (52) | 108 (27) | 0 (0) | 82 (20) |
| Wales | 10 | 35 (3.5) | 19 (54) | 12 (34) | 0 (0) | 5 (14) |
| Northern Ireland | 2 | 16 (8.0) | 7 (44) | 4 (25) | 0 (0) | 2 (13) |
| Total | 88 | 450 | 231 (51) | 124 (28) | 0 (0) | 89 (20) |

Table 2 Reasons for delayed presentations

| | Fear of COVID-19, % | Inability to access GP or limited GP service, % | Inability or discouraged to attend hospital A&E or inpatient unit after contacting NHS111, % | Symptoms misdiagnosed or not recognised as diabetes, % |
|------------------|---------------------|---|--|--|
| England | 36 | 22 | 5 | 13 |
| Wales | 3 | 0 | 1 | 4 |
| Northern Ireland | 1 | 0 | 1 | 0 |
| Total | 40 | 22 | 7 | 17 |

A&E, Accident and Emergency.

the percentage of DKA in newly diagnosed cases prior to COVID-19 had remained constant over 10 years at 26.3% in Germany.^{3,4} The proportion of those in DKA presenting as severe DKA was high at 54%, while the 2017, NPDA reported that 26% of newly diagnosed presented in DKA, but no data were available for those presenting in severe DKA.⁵ Increases in DKA and severe DKA at diagnosis in children during the COVID-19 pandemic were reported in Germany, and delayed access of care provisions have been reported globally.⁴ In our report, delayed presentation has been documented in 20% of units. Reasons for delayed presentation have ranged from fear of contracting COVID-19 to an inability to contact access a medical provider for timely evaluation. Limitations from this report was reliance on professional's recall as to the number of presentations delayed due to COVID-19 and the reasons for their delay.

The global epidemiological and clinical patterns of COVID-19 among children with diabetes are still very limited. Further emphasis should be made on the dissemination of education to healthcare providers regarding the timeliness of referrals of children with T1D.

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