

BRIEF REPORT

Effect of COVID-19 pandemic on treatment of Type 1 diabetes in children

Children tend to get very mild symptoms of COVID19 and rarely get severely ill,¹ and COVID19 has no specific influence on diabetes other than any other infection.² However, Covid19 may delay diagnosis, and lock-down of society can lead to that patients with diabetes do not get ordinary care causing poor metabolic control with increasing risks for complications^{3,4} and excess mortality.⁵

Sweden has, as the only country, chosen a policy with recommended isolation of the most vulnerable populations, but otherwise a rather open society. As in most countries, the pressure on hospitals and health care has been hard. Ordinary visits to the diabetes team have sometimes been replaced by telemedicine.⁶

The aim of this study was to estimate the effects of the covid19 pandemic on treatment of T1D in children.

All patient visits in Sweden are registered in a national data base, SWEDIABKIDS with information about eg HbA1c, blood lipids, use of insulin pumps, glucose sensors. Nationwide information on about 7000 children <18 years of age is available. Data for the periods Jan-July 2018, 2019 and 2020, available through the so called 'Knappen', have been compared, and are presented with 95% confidence intervals.

The results are shown in Table 1. The proportion of patients with HbA1c < 52 mmol/L has remained the same in 2019 and 2020 as well as the proportion of patients with HbA1c < 57 mmol/L. The proportion of patients with HbA1c > 70 mmol/mol giving clearly increased risk of complications⁶ has not increased during the first 7 months of 2020. Regarding blood lipids, the great majority of patients have cholesterol <4.5mmol/L and for low-density lipoprotein (LDL) <2.5 mmol/L, the corresponding figures are almost as high, and not deteriorated from 2018 to 2020. The treatment may have become different in some ways, but this is at least not seen in use of technical devices. Proportion of patients treated with insulin pumps have gradually increased and use of glucose sensors has also increased slightly from 2018 to 2020.

In most countries, the corona pandemic has caused dramatic effects on society. Lock-down and other drastic measures, in parallel to the burden of all covid19 patients, have caused an economic crisis and collapse of health service in many countries. Less state income means less resources for the healthcare systems. Unemployment has been shown to increase morbidity and mortality.^{7,8} The effect of

economic collapse in low- and middle-income countries may become tremendous with an excess infant mortality.⁹

There is a risk that treatment of serious diseases like Type 1 diabetes in children and adolescents deteriorate, which may take long time to repair. With poor metabolic control, we know that there is an increasing risk of vascular complications, and HbA1c has to be kept quite low to avoid long-term complications.^{3,4} Sweden has a tradition of very active treatment of T1D with low mean HbA1c on a national level compared to many other countries.¹⁰ Still those who have got the diagnosis T1D in childhood have a much shorter expected length of life than a reference population.⁵ It is therefore extremely important to preserve high quality of care also during the corona pandemic to avoid start of vicious circles.

When physical distancing is necessary to decrease the epidemic, it is natural that visits to hospitals become limited. Then telemedicine is an alternative to ordinary visits to the diabetes team.⁶ The effects in the long run are difficult to foresee, but so far during the first 7 months of the epidemic Jan-July 2020, the change of care of children with diabetes and adolescents in Sweden has not impaired treatment. Modern technical devices such as insulin pumps and glucose sensors are common, and the use has not decreased, but rather the opposite. Discussions via telephone or internet, for example, Skype and information on glucose profiles and insulin pumps possible to see using Diasend, have probably stimulated some patients and parents to use this information even more actively, as they have been forced to open Diasend at home and not just passively see the blood glucose profiles at hospital visits. So far HbA1c has not increased but remained comparatively low with about 2/3 of the patients with HbA1c < 57 mmol/L (=6.5%) and only ca 6% of the patients with HbA1c > 70 mmol/L, a level which seems to be rather common in several other countries.¹⁰

To use telemedicine as the only alternative will probably not be good enough in the long run, especially not for patients with psychological problems and less stable family situation. Psychological support is crucial and cannot be given with the same quality only per distance. But the situation created by the corona pandemic may give valuable experience, which in the future might improve care when telemedicine is used as a complement. However, we need to be aware of the risk that both diabetes teams and patients/parents continue with telemedicine instead of physical visits, as it seems

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	2018		2019		2020	
	Mean%	CI	Mean%	CI	Mean%	CI
HbA1c < 52	43.9	42.7-45.1	47.0	45.8-48.2	47.4	46.2-48.8
HbA1c < 57	65.2	64.1-66.3	67.5	66.4-68.6	68.1	67.0-69.2
HbA1c > 70	7.2	6.6-7.8	6.7	6.1-7.3	6.0	5.4-6.6
Cholesterol < 4.5	92.7	92.1-93.3	94.4	93.6-94.8	96.9	96.5-97.3
LDL < 2.5	70.4	67.3-73.5	73.4	70.0-76.0	75.9	73.5-78.3
Insulin pump	64.9	63.8-66.0	67.2	66.1-68.3	70.1	69.0-71.2
Glucose sensor	92.7	92.1-93.3	94.4	93.6-94.8	96.9	96.5-97.3

TABLE 1 The table shows the mean percentage (and 95% confidence intervals) of patients with different degree of HbA1c, with low Cholesterol and LDL, and proportion of patients using insulin pumps and glucose sensors during the periods 1 jan- 31July 2018 resp 2019 resp 2020

comfortable. Furthermore, health care authorities may also become too positive to this cheaper form av care.

In conclusion, the corona pandemic may have great influence on the care of Type 1 diabetes, with both actual and future consequences. The Swedish semi-open approach to fight the corona pandemic has allowed treatment of diabetes in children and adolescents with a combination of visits to hospitals and telemedicine, replacing some ordinary visits to the clinic. The results during the first 7 months (Jan–July 2020) look encouraging, with no deterioration of HbA1c or blood lipids, and the same active treatment as the corresponding periods the years before. Future studies will show what consequences the corona pandemic and change of treatment policies may have for Type 1 diabetes in the future.

KEYWORDS

COVID19, Type 1 diabetes, children, HbA1c, telemedicine

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CONFLICT OF INTEREST

Johnny Ludvigsson has nothing to disclose, and no conflict of interest.

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