

Use of Telemedicine for the Management of Type 1 Diabetes in Children and Adolescents in Bangladesh During the COVID-19 Pandemic

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Abstract

Background: Telemedicine has been an option for healthcare during the COVID-19 pandemic time. According to the COVID-19 forum on the International Society for Pediatric and Adolescent Diabetes, telemedicine is now the reality for all pediatric diabetes centers around the globe. We report here the analysis of telemedicine care provided to children and adolescents with type 1 diabetes by our diabetes team during the first phase of lockdown in Bangladesh. **Materials and Methods:** The Diabetic Association of Bangladesh (BADAS) is providing a highly structured and organized system of diabetes care as an extended arm of the government. Since the lockdown, diabetes care for children was started through telemedicine by the diabetes team in our center. **Results:** We analyzed our phone calls, text messages from March 26 to April 30, 2020. During lockdown, more than 645 calls, including text messages and WhatsApp messages, were received. A total of 235 patients were given advice over the phone in 1 month. Fifty-two percent of phone calls were from the capital city Dhaka and rest from other districts of Bangladesh. While analyzing the problems, three of our patients noticed mild fever, but there was no history of contact with infected persons, and they recovered within 2–3 days. No laboratory test was done for the confirmation of COVID-19. Most of the patients developed hyperglycemia during this period. None of them required hospital admission during this month. Free insulin from CDiC (Changing Diabetes in Children) and LFAC (Life for a Child) programs was sent to the BADAS centers in different districts through courier service even during the lockdown. So, there was no patient without access to insulin during pandemic time. **Conclusion:** Telemedicine service has been found to be a useful medium for the care of children with diabetes in Bangladesh during COVID-19 crisis. In the future, telemedicine service could be a solution for routine care of diabetic children who are unable or unwilling to travel long distances to a clinic.

Keywords: COVID-19 pandemic, telemedicine, type 1 diabetes

BACKGROUND

SARS-CoV-2, the virus that causes COVID-19, has now created a global crisis. Not only adults but also children and young people are affected by the virus. Bangladesh reported its first confirmed case on March 8, 2020, reaching 100 cases on April 9 and exceeding 200 within the next 2 days (case doubling time). According

to the Institute of Epidemiology, Disease Control and Research (IEDCR), there were 23,870 confirmed cases by RT-PCR, including 349 related deaths (CFR 1.46%).^[1] Children and young people appear to be >50%

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less likely than adults to have COVID-19, reported a large review of global test-and-tracing and population screening studies.^[2] Although people with diabetes are at an increased risk of a more severe COVID-19 infection, it is reassuring that, at least according to some reports, young people, with or without diabetes, are coping better with COVID-19 illness. In the USA, of the 2572 laboratory-confirmed cases aged ≤18 years, information on comorbidity was available for 80 patients: 40 had a chronic lung disease, 25 had a cardiovascular disease, and 10 had immunosuppression. Still, neither type 1 nor type 2 diabetes was mentioned.^[3] Very few patients with type 1 diabetes had COVID-19 infection with mild symptoms, as reported by the COVID forum of the International Society for Pediatric and Adolescent Diabetes (ISPAD).^[4] Between March 8 and May 18, 2020, according to IEDCR, 11% of cases were <20 years, death in those aged up to 10 years was reported at 2% of overall, and the mode of transmission was mainly from an infected family member.^[5] There has been a rapid increase in telehealth services for the care of youth with diabetes. Various research reports support the usefulness of telehealth in the care of adult and pediatric diabetes. According to the COVID-19 forum on ISPAD, telehealth is now a reality for all pediatric diabetes centers around the globe. The telecom sector in Bangladesh is rapidly emerging with an extensive mobile network throughout the country. The total number of mobile phone subscriptions in Bangladesh has reached 165,572 million at the end of December 2019.^[6] In Bangladesh, the lockdown started in March 26, 2020, and the number of cases was increasing day by day, which led to a further extension of lockdown by the Government of Bangladesh. Outpatient care was closed in the most of the hospitals; only emergency care was going on. The Diabetic Association of Bangladesh (BADAS) is providing a highly structured and organized system of diabetes care as an extended arm of the government. BADAS has developed a decentralized model yielding a total of 65 affiliated associations (AAs) (almost one in every district) and seven sub-AAs. Globally this is the largest network for diabetic care.^[7] Children with diabetes are managed in the Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM), a central institution of BADAS, where pediatricians have been taking care of children and adolescents with diabetes since 1997.^[8]

It is extremely important that we, as healthcare providers, provide support to our patients and families as well as our colleagues during this stressful time. We started telemedicine since the beginning of lockdown. We report here the analysis of telemedicine care given to children and adolescents with type 1 diabetes by our diabetes team during the first phase of lockdown.

MATERIALS AND METHODS

Diabetes care in Bangladesh

Two programmes of BADAS—Changing Diabetes in Children (CDiC) and the Life for a Child (LFAC)—have been providing free, comprehensive outpatient service to underprivileged children and adolescents with diabetes since 2010. The routine diabetes care provided by the center was closed since the lockdown. Patients needing hospitalization have been admitted to the inpatient department of BIRDEM. Since the lockdown, we have changed our policy of diabetes care delivery.

Telemedicine care for children with diabetes

Care delivery through telemedicine was started by the diabetes team of CDiC since March 26. The diabetes team consists of doctors, educators, dieticians and psychologists who provide care through telemedicine. As per the registration policy, every patient must provide a mobile/land phone number during registration. At the same time, they were given a contact number of a specialist in the diabetes team to get in touch during an emergency. During a 1-month period, the following instructions were given to the patients:

- Avoid hospital visit for routine follow-up
- Do follow-up over phone with your doctor
- Do SMBG (self-monitoring of blood glucose) and adjust the insulin dose
- Eat a healthy balanced diet
- Do physical exercise, yoga, meditation, aerobic exercise
- Try to be calm, maintain a normal, stress-free mental state
- If you are sick, follow the sick day management guideline given by your diabetes team; contact your doctor for help.
- Do not stop insulin even if you are sick
- If you require admission, only then go to the emergency department of the hospital
- Ramadan is approaching. Go on a fasting if you had good control of the disease in the last few months or if you had fasted in previous Ramadans
- Follow the guidelines of your local authority
- Stay at home, stay safe and stay connected

Patients who called the team were asked same questions such as “is there any problem—fever, sore throat, headache, weakness, etc.” If they had mild to moderate hypoglycemia, advice was given regarding insulin dose adjustment. Patients who had hyperglycemia, insulin dose was adjusted. Insulin from CDiC and LFAC programs was sent to the BADAS centers in different districts through courier service even during the lockdown. Patients were advised to visit the respective BADAS center near their home to collect insulin. Those who could not visit the center due to lockdown were provided financial assistance

from our center. So, there was no patient without access to insulin during this pandemic time.

Statistical analysis

Data entry was done concurrent to data collection. Data analysis was performed using the Statistical Package for the Social Sciences (version 21) and was reviewed, edited, and cleaned by performing a series of frequency and data checks. Descriptive statistics are presented as total frequency or percentage.

Ethical policy and institutional review board statement

Ethical approval was not required for this article as this study was done with data retrieved from telemedicine given to the patients during lockdown in COVID pandemic time.

RESULTS

We analyzed our phone calls, text messages from March 26 to April 30, 2020. During the lockdown, more than 645 calls, including text messages and WhatsApp messages, were received by the team. A total of 235 patients were consulted over the phone in 1 month. Among them, a majority (61%) were female. Fifty-two percent of phone calls were from the capital city (Dhaka), and rest from other districts of Bangladesh [Figure 1]. Three of our patients reported mild fever, but there was no history of contact with infected persons, and they recovered within 2–3 days. No laboratory test was done for the confirmation of COVID-19. Most patients developed hyperglycemia during this period [Figure 2]. For some of them, blood glucose fluctuated between 20.0 (maximum) and 4.0 mmol/L (minimum). There was no patient having ketonuria or developing any diabetic ketoacidosis. Very few patients noticed hypoglycemia. Hypoglycemia was mild to moderate and manageable at home. Two patients complained of upper abdominal pain. Two patients developed urinary problems, later diagnosed as a urinary tract infection. None of them required hospital admission during this month.

DISCUSSION

The use of telemedicine is known to provide benefits of significant savings in treatment time and costs.^[9]

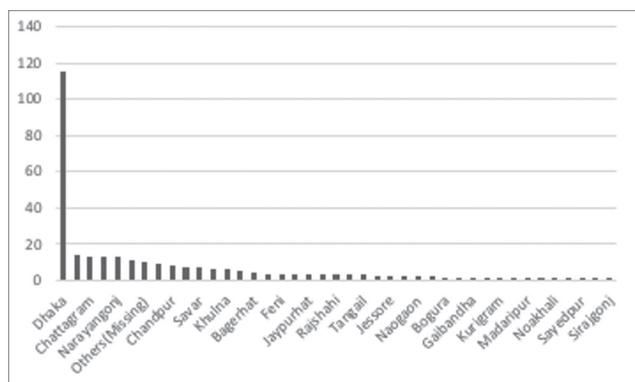


Figure 1: Patients segmented by different districts of Bangladesh

Telemedicine has become an option for healthcare during COVID-19 both to address increased treatment needs and to prevent unnecessary in-person contact. Several technologies have already been tested by providers of clinical services, including endocrinologists and registered dietitians.^[10-13]

Research on telemedicine and diabetes is also sparse in India. In a recent article, success in the screening and management of diabetes using telemedicine was reported.^[14] A previous study has revealed that telemedicine would be a cost-effective solution for patient follow-up.^[15] In our study population, hyperglycemia was the most common problem. More intake of food (including carbs), not attending school, increasing stress and less physical activity may be causing increased blood glucose levels in children. During the COVID-19 crisis, families of children with diabetes were particularly dependent on technology devices and diabetes teams.^[16] Even patients residing in the Dhaka city contacted over phone us to seek advice. The most beneficial part was for patients from remote areas who could not travel by any means during the lockdown. To sum up, the COVID-19 crisis could offer an opportunity to put these tools into practice, establishing a virtual diabetes clinic to complement standard outpatient care.^[17]

CONCLUSION

Telemedicine has been a useful medium for the care of children with diabetes in Bangladesh during this COVID-19 crisis. Our experience during this crisis will help to extend care delivery by offering regular, effective telemedicine consultations by involving a multidisciplinary team care. Further research with newer technology is needed to add strength to the virtual diabetes clinic. Into the future, post-COVID-19, telemedicine service could be a solution for a routine care of diabetic children.

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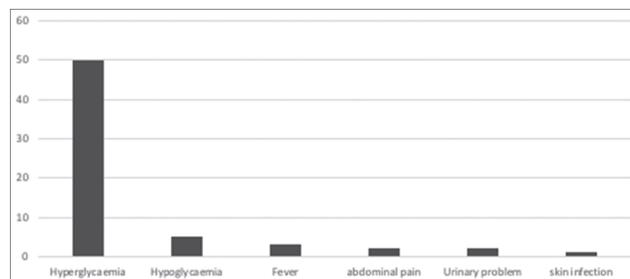


Figure 2: Problems reported by children with type 1 diabetes during COVID-19 crisis

Conflicts of interest

There are no conflicts of interest.

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