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COVID-19, Type 1 Diabetes Clinical Practice, Research, and Remote Medical Care: A View From the Land Down-Under

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telehealth, diabetes, COVID-19, remote consultation

We have learned that social distancing measures are vital to reduce the spread of COVID-19 in our communities.¹ The COVID-19 pandemic has >2 million confirmed cases and >145 000 deaths globally, with 6497 cases and 63 deaths in Australia at the time of writing.^{2,3} While underlying factors have yet to be defined and the available data do not distinguish between types of diabetes, people with diabetes who contract COVID-19 have a 7.3% risk of death vs 2.3% for the overall population.^{4,6} The authors work in diabetes services in both public and private outpatient clinics of a major city (Melbourne, Australia) and are also active in diabetes clinical research. Multiple processes have been rapidly implemented in both the clinical and research space to support social distancing. Here, we will summarize key changes and present the responses of both patients and physicians to these changes.

In the clinical setting, outpatient interactions are now being conducted via a secure visual/audio interface or telephone, with the exception of time-critical referrals. Nonurgent new referrals and new insulin pump starts are deferred. Insulin pump renewals are performed using telemedicine. Insulin pump data are uploaded online to the appropriate website and blood glucose meter data are emailed or in some cases read out over the phone. Pathology and radiology results are viewed online. Where possible, patients measure their own weight and blood pressure measurements at home. Prescriptions, pathology slips, and follow-up appointments are posted by mail.

Five authors (DNO, AJ, ML, BP, and NV) surveyed 46 patients with type 1 diabetes who had remote consultations over a two-week period (April 2–16, 2020 inclusive). Results are summarized in Table 1.

Positive aspects of remote consultation cited by patients included not requiring to travel and lack of travel-related costs, not requiring leave of absence from work, reduced waiting times and lastly, reduced risk of COVID-19 exposure.

Negative feedback included the lack of a physical examination and the perception of reduced rapport with the treating physician.

For physicians, telehealth consultations were often shorter as data were frequently forwarded preconsultation and a physical examination was not performed. However, differences in the quality of insulin dosing and glucose data between those engaged with technology (ie, on insulin pumps and/or continuous glucose monitors) vs metered dose injections were even more apparent with remote consultation. Some patients avoided attending pathology laboratories and some required additional time to be assisted in pump setting changes.

The authors are also active in clinical research and like many research groups decided to temporarily cease all research participant hospital attendances to minimize infection risk by COVID-19. Those study visits that were able to be conducted remotely (eg, meal tests without frequent sampling and insulin pump uploads) were completed in this manner, while those that required physical attendance such as with frequent sampling meal-tests with a YSI glucose analyser (YSI Incorporated, Yellow Springs, Ohio) were deferred or cancelled. Some studies continued with only minor disruptions, as illustrated by the following example.

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Table 1. Survey Results of Patients With Type 1 Diabetes Mellitus Following Remote Consultation.

Parameter	n = 46
Age (y)	43.5 (35, 55.8)
Sex (male)	21 (45.7%)
Duration of diabetes (y)	24 (15.3, 31)
Insulin delivery method	
Multiple daily injections (MDI)	21 (45.7%)
Continuous subcutaneous infusion (CSII)	25 (54.3%)
HbA1c (%/mmol·mol ⁻¹)	7.2/55 (6.6/49, 7.9/63)
Duration of interaction (min)	20 (16.5, 24.8)
Mode of remote consultation	
Videoconference	8 (17.4%)
Telephone	38 (82.6%)
Preference for mode of consultation	
Face-to-face	13 (28.3%)
Remote	28 (60.9%)
Nil preference	5 (10.9%)
Patient satisfaction with the quality of the interaction (×/10) ^a	9 (8, 10)
Number of patients owning a sphygmomanometer	18 (39.1%)

Continuous data are presented as median (interquartile range).

Categorical data are presented as frequency (%).

^aPatients were asked to rate the extent to which the consultation met their expectations.

An adult type 1 diabetes randomized-crossover study is evaluating a smartphone application incorporating a bolus calculator that recommends meal-time insulin doses based on the meal's mixed macronutrient content. This study was already underway when COVID-19-related restrictions were implemented. The six scheduled face-to-face study visits now occur via a videoconference. Study materials are now posted and questionnaires are completed online (using REDCap).⁷ The study requires self-insertion of a continuous glucose monitoring device which is now supervised via a videoconference. Along with videos and the provision of an instruction manual, participants so far have managed well. Prospective participants find study enrollment more appealing, finding the remote nature of the study less burdensome.

Thus, due to the COVID-19 pandemic, we rapidly transitioned (over two weeks) routine (clinical and research) review appointments from exclusively face-to-face to entirely via remote interactions. Initial responses, particularly from patients, have been positive. It will be of interest to see if the early level of acceptance and satisfaction of remote medicine is preserved as social distancing measures are expected to remain in place over the coming months.¹ However, there remain significant limitations such as the inability to perform a physical exam and the patients' variable access to and knowledge of relevant technologies impact on the success of remote consultation. Also, while not an issue in a public

hospital setting, telehealth reimbursements for private practice consultations represent an interim measure only and will be reviewed after six months.^{8,9} Nevertheless, we predict that the COVID-19 pandemic will change the face of clinical practice and research by accelerating the integration of remote interactions into clinical practice and research.

Declaration of Conflicting Interests

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