How Might Remote Management of Diabetes Mellitus during the COVID-19 Pandemic Impact Patient Care?

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1. Introduction

The COVID-19 global pandemic has influenced all of our lives to a degree that typically occurs once per century. An event of such magnitude compels us to utilise 'pre-COVID-19' and 'post-COVID-19' terminology, analogous to other major global events such as the world wars of the 20th Century. In many ways, the COVID-19 global pandemic has acted like a catalyst for rapid change, and both challenged and enabled changes in our perspectives that would have been inconceivable in the pre-COVID-19 world. Within the healthcare arena, one of the most radical COVID-19-induced changes has been the adoption of remote management practices. This is particularly relevant for patients with long-term chronic conditions such as malignancies (1) and Diabetes Mellitus (DM), that require focused and regular follow-up by healthcare professionals (HCPs) within diverse settings such as out-patient clinics, primary care facilities or within the community. Given the utility of improved glycaemic control in patients with DM on reducing the risk for adverse clinical outcomes from COVID-19 (2), it is important to consider the impact on patients with DM from the adoption of remote management practices post-COVID-19. We consider this from both the HCP and patient perspective.

2. Remote DM care from a HCP perspective

There are obvious disadvantages to the provision of remote care for patients with DM. During medical training, there is an emphasis on the importance of a detailed history and examination for proper clinical assessment. The remote setting does not allow for comprehensive clinical examination. In the context of DM, examination of feet (including inspection for ulcers or erosions, assessment of foot pulses and sensation [fine touch, vibration and proprioception]) forms an essential component of proper clinical assessment. Proper foot assessment is not possible through a remote setting. Furthermore, it is not possible to assess retinae through remote means. In our view, the inability to perform regular foot and retinal clinical assessments forms the most compelling argument against the widespread adoption of remote clinical management of DM. Conversely, the remote setting does enable detailed history taking. However, given that there is conveyance of much of human communication through non-verbal means (3), conducting a clinical consultation over the phone can limit effective communication somewhat between the patient and HCP, particularly if the patient finds the English language problematic and/or if the phone line is poor. Therefore, when conducting remote clinical appointments, it is important for HCPs to be aware of the potential for misunderstandings or miscommunications, and adapt our approach accordingly through use of simple and clear

language, and perhaps to check with patients their understanding of communicated messages throughout the consultation.

However, despite these disadvantages, remote clinical appointments for DM have potential for improved clinical efficiency from a HCP perspective. Logistically, a phone call is simpler than seeing a patient in person, and it is likely that improved clinical efficiency would allow for a higher clinical throughput for remote versus conventional clinical appointments. Furthermore, the emergence of remote appointments onto the clinical agenda will perhaps make it easier for HCPs to phone patients between appointments for clinical reasons, rather than wait for the next clinical appointment, given the COVID-19-induced normalisation of remote working. Finally, the improved convenience of a remote versus conventional clinical appointment from the patient perspective may indirectly improve the interaction and relationship between the HCP and patient.

3. Remote DM care from a patient perspective

As alluded to, perhaps the most compelling argument for remote appointments for patients with DM from a patient perspective is the improved convenience. For some patients, particularly those who need to travel a long distance to the clinical setting, or those with busy jobs, lifestyles, childcare or other caring roles, attending a clinical appointment can be logistically difficult and inconvenient. This may include the need to take an entire day off work (with potential implications for annual leave and income), potentially costly arrangements for childcare, travel and parking expenses and disruption to personal and social relationships and activities. Frequently, patients living with DM resent having DM, particularly the impact of DM on their lives in general and associated stigma (4). In short, patients with DM prefer their DM to impact as little as possible on their lives generally. It is understandable that regular face-to-face attendances for their DM with a HCP are often problematic. Such inconvenience is likely to enhance the resentment that some patients feel towards their DM that in turn may have a negative impact on self-esteem, self-management, relationships, work productivity and overall wellbeing. Conversely, a remote appointment would have relatively little impact on a patient's life, requiring typically 10-15 minutes at a pre-defined time-point. Furthermore, some patients with DM may be reluctant to attend a hospital-based clinic appointment due to a perceived risk of COVID-19 infection, thereby promoting the relative utility of a remote appointment.

Despite the improved convenience of a remote clinical appointment for the patient, this needs balancing with a relative diminishment of the human-based interactions associated

with remote working. This is particularly relevant for newly referred patients who have yet to develop a functional and trusting clinical relationship with their HCP. Managing DM effectively is far more than simply choosing the correct therapies, optimising glycaemic and lipid control, facilitating healthy weight loss, and screening and managing the associated long-term complications. All of these tasks are theoretically amenable to computer algorithmization with no additional need for HCPs. However, algorithms are not yet able to replicate the human-based elements of the HCP-patient interaction. As humans, we are an intensely social species that relies heavily on social interaction (as evidenced by the negative impact on recent COVID-19-induced national 'lock-downs' and social isolation on our mental health) (5, 6). Living with DM often associates with much distress (7) that requires careful and empathic evaluation and assessment, with the offer of potential solutions such as focused education for example. Often, simply interacting on a human-level with a trusted HCP can offer a therapeutic and cathartic experience for the patient that should not be under-estimated. Arguably, remote interactions offer some human-based support, but the lack of opportunity for non-verbal communication and physical presence ultimately hampers the remote approach for emotional support and properly addressing DM-related distress.

4. Lessons from Other Clinical Settings

In this era of evidence-based medicine, it is important that we learn from lessons from the past. Huang and colleagues reported on >120,000 hospitalizations in Taiwan during and following the SARS-CoV epidemic (8). Following the SARS-CoV epidemic, there was a >10% increase in hospitalizations for patients with DM and hypertension, which persisted for those patients with DM (8). Interestingly, during the SARS-CoV epidemic in Taiwan, there was a reduction by >12% in the regular utilisation of outpatient care for patients with DM (8). The authors hypothesized that the reduction in the provision and uptake of outpatient care for DM during the SARS-CoV epidemic may have contributed toward the peak in admissions to hospital for patients with DM following the SARS-CoV epidemic (2, 8).

Furthermore, our own group reported on data from an electronic survey across centres of excellence for Neuro-Endocrine Tumour management across England to assess the effects of the COVID-19 on provision of clinical care (9). Common themes elicited from HCPs regarding remote clinical appointments included advantages of improved convenience for patients and clinical efficiency for HCPs, and disadvantages of inability to examine patients, problems with clinical trial recruitment and the difficulties of addressing emotional

concerns of patients (9). Importantly, much of these insights apply equally to other clinical settings, including the management of patients with DM.

5. Conclusions and Future Perspectives

Perhaps the most important learning point from the available evidence is that patients with DM require focused and regular clinical follow-up with their HCP regardless of other factors. Any diminishment in the quality and/or regularity of clinical follow-up likely associates with a poorer clinical outcome. Post-COVID-19, in addition to the long-term clinical complications, improved clinical management of DM (including optimization of glycaemic control) has a direct impact on clinical outcomes from COVID-19 infection. Therefore, the emergence of COVID-19 should encourage and promote a redoubling of our efforts as HCPs to facilitate focused and regular clinical follow-up of our patients with DM. Perhaps the worst scenario during the COVID-19 pandemic is to throw all our resources at the acute management of COVID-19 to the detriment of the ongoing management of chronic illnesses such as DM. We need to learn the lessons from Taiwan during the SARS epidemic (8) and avoid such ostrich-like mentality. We need to utilise the recent advances in health-related technologies for patients with DM that include telemedicine and remote continuous glucose monitoring (10). Furthermore, we should innovate novel approaches for future remote management strategies for patients with DM, in preparation for a potential rise in non-communicable cardio-metabolic disease post-COVID-19 (10).

To conclude, let us illustrate how we might optimise a post-COVID-19 world for patients with DM. We need to accept that COVID-19 will leave a substantial legacy over the longer term. It would be a mistake to assume that this COVID-19 legacy is all negative. Indeed, there have been some hugely positive legacy-effects of COVID-19. These include the development of a deeper sense of gratitude and appreciation amongst patients for the healthcare that they receive (as evidenced by the weekly national ‘clap for carers’ within the UK for much of 2020), and a greater sense of empathy and compassion for the plight of patients amongst HCPs. Furthermore, the shared experience of COVID-19-related experiences as a clinical team, a nation, and indeed as a global community, has helped to instil a sense of comradery and support amongst all of us. In the post-COVID-19 world, it is important that we embrace, develop and celebrate these positive legacies of COVID-19, and share our learning and insights with future generations, so that they may be better prepared for the next global pandemic.

Regarding the legacy of remote clinical appointments, it would perhaps be naïve to assume that these will play no role in a post-COVID-19 world, despite all of the attendant disadvantages of the remote clinical arena outlined above. It seems reasonable to assume that the remote clinical appointment will be with us for a long time to come. In a sense, the COVID-19-induced switch to remote clinical appointments has been like a large-scale clinical experiment, but one borne out of pure necessity, and not one that required a laborious and arduous ethical approval *a priori*. For many of us, it has been surprising to see how adaptable healthcare provision can be when delivered remotely. The potential for convenience for the patient and improved healthcare efficiency for the HCP surely augers well for the future of the remote clinical appointment. However, in our view, a focus on healthcare entirely delivered remotely would be a mistake, due to the lack of human-based emotional support and the lack of opportunity for clinical examination. In our view, the post-COVID-19 world should incorporate a combination of both conventional face-to-face and remote clinical appointments. There should be provision of each patient with the option of remote versus conventional appointments, with encouragement of the latter for new and early follow-up appointments, when the need for the development of a trusting HCP-patient relationship and the alleviation of DM-related distress is perhaps greatest (as outlined in *figure 1*). In this way, both HCP and patient can benefit from all the positive aspects of remote and conventional human-based clinical appointments, whilst instilling a greater sense of control for the patient that in turn should help to alleviate DM-related distress and improve overall wellbeing.

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Declaration of Interest

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