Commentary

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The Impact of the Off-site Monitoring Clinic (Virtual Monitoring Clinic) on the Practice of Outpatient Rheumatology in a Tertiary Centre during the COVID-19 Pandemic

Li-Ching Chew, [1]*BMedSci and BMBS (UK), FRCP (London, UK), FAMS (Rheumatology)*, Siaw Ing Yeo, [1]*MBBS, FRCP (London, UK), FAMS (Rheumatology)*, Julian Thumboo, [1]*MBBS, FRCP (Edin, UK), FAMS (Rheumatology)*

Abstract

The ongoing pandemic in Singapore is part of a global pandemic caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). To control the spread of COVID-19 and prevent the healthcare system from being overwhelmed, 'circuit breaker' measures were introduced between 7 April and 1 June 2020 in Singapore. There is thus a crucial need for innovative approaches to the provision and delivery of healthcare in the context of safe-distancing by harnessing telemedicine, especially for patients with chronic diseases who have traditionally been managed in tertiary institutions. We present a summary of how the Virtual Monitoring Clinic has benefited the practice of our outpatient rheumatology service during the COVID-19 pandemic. The virtual consultations address the need for safe-distancing by limiting face-to-face appointments and unnecessary exposure of patients to the hospital where feasible. This approach ensures that the patients are monitored appropriately for drug toxicities and side-effects, maintained on good disease control, and provided with patient education.

Keywords: Chronic rheumatic diseases, health services, medication delivery service, severe acute respiratory syndrome coronavirus 2, telemedicine

The Virtual Monitoring Clinic (VMC), a telemonitoring service offered by the Department of Rheumatology and Immunology, Singapore General Hospital, was implemented in 2012 to deliver healthcare to patients with chronic and complex diseases seen in the specialist outpatient clinic. The primary and original function of the VMC was to provide off-site remote monitoring of routine laboratory tests, and telephone-based consultations for stable rheumatoid arthritis (RA) and spondyloarthritis patients with the aim to reduce hospital visits and improve patient convenience. In a previous study on the VMC,[1] patients cited convenience as the main advantage of this nurse-led rheumatology clinic. The study also reported the effectiveness and well-accepted approach for the management of patients with stable RA, which achieved a high level of patient satisfaction based on patient-reported outcomes.

Prior to the COVID-19 outbreak, the VMC was helmed by two advanced practice nurses (APNs) once a week, with up to 50 patients seen per month. When COVID-19 surfaced in Singapore late January 2020, we adapted and expanded the VMC to serve the needs of our patients. Hsu et al. recommended re-evaluating and restructuring delivery of health services for non-communicable diseases to minimise contact with health facilities, including the expansion of telemedicine, home care services, and a move away from the current model of centralised health financing to a decentralised model, as some of the interventions that may be considered to ease the strain on health workers and facilities.[2]

The VMC is a collaborative system between rheumatologists, APNs, pharmacists and the hospital's medication delivery service (MDS). The VMC

[1] Department of Rheumatology and Immunology, Singapore General Hospital, Singapore
Address for Correspondence: Dr Li-Ching Chew, Department of Rheumatology and Immunology, Singapore General Hospital, Outram Road, Singapore 169608.
Email: chew.li.ching@singhealth.com.sg

telemonitoring process involves the patients conveying information via telephone of their current health status remotely from home, to the APNs or pharmacists based at the hospital. The monitoring for the disease modifying anti-rheumatic drugs (DMARDs) is based on existing rigorous, institution-approved protocols. Other processes such as training and education of the APNs/pharmacists in the use of DMARDs, payment structures and hospital credentialing/licensing have been implemented since the inception of the VMC. The APNs/pharmacists helming the teleconsultations are accredited and credentialed to write prescriptions and order blood tests through the National Collaborative Prescribing Programme (CPP). At inception, the VMC was limited to RA and spondyloarthritis patients, but subsequently expanded to a case-mix of gout and connective tissue diseases including Sjogren's syndrome, systemic lupus erythematosus and systemic sclerosis. These patients form the bulk that requires routine visits to the rheumatology outpatient clinic at regular intervals for consultations and blood tests.

The frequency of blood tests for the majority of patients on stable DMARDs, based on universal guidelines, is generally three-monthly. However, prescriptions for a longer duration and increased interval between blood tests in patients depending on their conditions and DMARD therapies are possible. The blood tests are primarily performed off-site at primary care facilities such as government polyclinics that provide subsidised outpatient medical care, or private general practitioners located at close proximity to patients' homes. The APNs/pharmacists review the results via the hospital's electronic medical records system linked to the primary care facilities, contact the patients by telephone to inform them of the results, and provide medication counselling.

Other parameters of the VMC remote monitoring include patients' verbal 'self-reporting' of joint pain, swelling and other related symptoms. If no adverse drug toxicity or disease flare is detected, the patients will receive a medication refill and can opt to have the medications delivered to their homes via the MDS. This helps eliminate the cost and inconvenience of travelling to the hospital. If a disease flare or complication arising from therapy is detected, the APNs/pharmacists would have access to a rheumatologist's input, either via telephone consultation or by arranging an expedited outpatient review. They are able to provide advice in consultation with the primary rheumatologist regarding appropriate treatment modification based on the patients' symptoms and laboratory results. The patients also have ready access to a dedicated nurse advice line.

In Singapore, the Ministry of Health raised the level of Disease Outbreak Response System Condition (DORSCON)—a colour-coded national framework to map the disease situation locally—from Yellow to Orange on 7 February 2020. The burden of chronic diseases became more pervasive and challenging as hospitals went into disease-outbreak response mode. In general, patients attending routine quarterly follow-up appointments for their chronic conditions would have to visit the hospital on two separate occasions for blood test and consultation. Our objective was to safely postpone patients on long-term follow-up until the immediate COVID-19 crisis has passed. Therefore, there was a need to modify clinical practice, especially for patients who have traditionally been managed in tertiary institutions. Although telemedicine has historically focused on rural or difficult-to-reach settings, a transformation in care models during this crisis would be critical in improving the delivery of healthcare. The role of telemedicine to support long-distance clinical care, education and health administration within the US health systems in response to natural disasters (for example, hurricanes) and public health emergencies like COVID-19 have been described.[3,4]

A further escalation of the national status on 7 April 2020 to 'circuit breaker' (which included implementation of service deferment and reduction of non-essential services within the public healthcare, closure of schools and non-essential workplaces, stay-at-home orders, and enforcement of strict social distancing measures within the community) to curb community transmission of COVID-19 infection saw the VMC receiving an exponential increase in the number of consultations. With a prepared structure already in place, we were, and are still, able to adapt and respond quickly to the needs of our patients with chronic diseases during this crisis.

The greater number of patients utilising the VMC was a consequence of the decreased on-site outpatient clinic slots to 30–70% of normal workload. The VMC's capacity had risen from twice weekly (pre-COVID-19) to a total of 8 sessions per week as of February, 2020. This provided a capacity of 96 slots per week, with the potential to contribute to approximately 20% of the department's weekly total patient workload. The expansion of the VMC was made possible by the increase in numbers of CPP-accredited pharmacists and APNs to 3 and 2, respectively. In addition, a similar on-site monitoring clinic (Rheumatology Monitoring Clinic, RMC),[5,6] that conducts in-person consultations of rheumatology patients on DMARDs was converted to the VMC. A significant proportion of patients were able to safely delay their appointments based on

clinicians' review of case-notes, and risk assessment of issuing repeat prescriptions without an in-person consultation. During this period, the numbers of patients utilising the VMC had risen by more than 7-fold (from a baseline of 50 patient visits per month to 370 in May, 2020). As the face-to-face rheumatology clinics gradually resumed from August 2020 with the easing of Singapore's COVID-19 restrictions, the number of VMC sessions were reduced from 8 to 5 per week in accordance with demand. However, this still exceeds the baseline of 2 sessions per week prior to the pandemic.

A crucial outcome of triaging and right-siting patients to the VMC is that the physicians are able to prioritise their slots for more complex cases and ensure shorter waiting time for urgent referrals from the emergency department and primary care. This also ensured that our department maintained adequate clinical manpower to support the frontline workforce in the battle against COVID-19. As the VMC does not involve face-to-face consultations, it ensures safe-distancing for physicians as well as patients, while ensuring safety of DMARD therapy. Given the accessibility to medication delivery and primary-care phlebotomy services, the need for hospital attendance is further reduced.

Although telemedicine is expected to play a central role in future, it has several limitations. For example, patients who routinely receive their influenza and pneumococcal vaccinations, in conjunction with their rheumatology appointments at the hospital, are now unable to do so. Nevertheless, they can still have their routine vaccinations together with blood tests done in primary care facilities. Other clinical limitations of the VMC include the absence of physical examination, and the loss of non-verbal cues or symptoms. As the VMC is not physician-led, tapering of long-term DMARDs is not feasible even though the patient is in remission. Other barriers are logistical issues related to the scheduling of medication deliveries to the patients' homes, and patients being uncontactable despite pre-fixed dates for the VMC consultations. Furthermore, not every individual can be expected to be technologically savvy, therefore the patient's suitability needs to be considered when triaging for teleconsultation.

In preparing for telemedicine, ensure: (1) the environment is suitable for maintaining the privacy of the consultation; (2) patient confidentiality and security when accessing the electronic health records; and (3) necessary precautions to confirm the patient's identity prior to the consultation.

As a rule of thumb, patients deemed suitable for enrolment into the VMC are generally those who can defer or avoid non-essential attendances to the hospital. Specific considerations include patients (1) with chronic diseases requiring routine blood monitoring, (2) on long-standing stable dose medication, and (3) with a confirmed diagnosis and stable disease condition that is not flaring.

For the near future, we intend to accelerate the use of telecommunication technologies through piloting the use of videoconferencing, as well as smart-phone applications to assess arthritis disease activity in a virtual clinic. An example of the latter is the Routine Assessment of Patient Index Data 3 (RAPID3), which is a pooled index of the 3 patient-reported American College of Rheumatology RA Core Data Set measures, comprising function, pain and patient global estimate of status on the multidimensional health assessment questionnaire. Although there is variability across different healthcare settings, novel models of care that harness telemedicine-cum-medication home delivery could effectively be repurposed during peacetimes for other chronic diseases. Maximising out-of-hospital blood testing where resources permit by leveraging primary care facilities, dedicated phlebotomy centres, and mobile home phlebotomy services, may alleviate crowding in the hospital waiting areas, yield shorter wait-time during appointments, and improve patient experience. In fact, the perspective of whether in-person healthcare should become a second option for meeting patients' needs has been raised in previous publications, which recognise that patients prioritise convenience and inexpensive care.[7] For example, at Kaiser Permanente, 52% of the 100 million patient encounters each year are now 'virtual visits'.

Future studies are befitting to determine whether the outcomes of disease control of patients at the VMC are similar to standard outpatient consultations during the COVID-19 pandemic. In addition, the surge in chronic diseases have been cited as a key driver for the adoption of artificial intelligence (AI) in healthcare.[8] There is potential for applying AI-based technology in chronic rheumatic diseases, using medical data arising from comprehensive comorbidities assessment at the VMC (for example, screening for lipids, glucose and bone health) to predict cardiovascular disease, diabetes mellitus, fracture risk and infection.

In conclusion, the VMC has benefited the practice of our outpatient rheumatology service during the COVID-19 pandemic. To limit transmission of the virus, physicians should transition, whenever possible, from in-person consultations to virtual consultations using telephone or video consultations. The healthcare system needs to ensure its preparedness for future pandemics by establishing improved systems, and telemedicine is one of the many platforms to achieve this.

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