INTERNAL MEDICINE JOURNAL

RACP Specialists. Together

doi:10.1111/imj.15336

BRIEF COMMUNICATION

Abrupt change to telephone follow-up clinics in a regional rheumatology service during COVID-19: analysis of treatment decisions

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Key words
telemedicine, COVID-19, rheumatology, health services delivery.

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Received 28 January 2021; accepted 13 April 2021.

Abstract

During the 2020 COVID-19 lockdown our rheumatology service provided follow up by phone. We reviewed clinic documents to compare patients serviced, and patient assessment and treatment outcomes. More patients received care during the lockdown but patient rheumatic disease was deemed active less frequently, more patients had no change to disease-modifying anti-rheumatic drugs and patients were less likely to have an intervention arranged. This suggests careful patient selection and appropriate infrastructure should be part of future rheumatology telemedicine.

On 26 March 2020, the New Zealand government implemented a strict nationwide lockdown to prevent widespread community transmission of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). This 'COVID-19 Alert Level 4' required avoidance of physical contact with people outside the household, including health professionals delivering non-urgent medical care. With only 2 days' notice, our public hospital rheumatology service moved to telephone service, to avoid cancelling appointments. This pragmatic approach was necessary as it was unclear when services would resume in person. After the 2011 Canterbury earthquake, it was feasible to deliver all rheumatology consultations by telephone for 2 weeks.[1]

Telehealth has been used in rheumatology, particularly for rural populations through videoconferencing, with the patient at a 'hub' with a local health professional doing the physical examination while the rheumatologist is remote.[2–5] While this model suffices for most rheumatology care, it may be inappropriate for 20% of visits.[3] However, in studies of well designed videoconference and telephone services, patients report comparable or higher satisfaction with telehealth follow up.[2,5–7]

This retrospective study compared the rheumatology care of patients in follow-up appointments through telephone at our hospital in 4 weeks during COVID-19 Alert Level 4 lockdown to a similar 4-week period in 2019. Research questions included: (i) Was there any difference in the volume of clinic episodes provided or characteristics of the patients in the telehealth period? (ii) Was there any difference in treatment decisions (medication and non-pharmacological) in the telehealth period?

The Rheumatology Department at Hutt Valley District Health Board (HVDHB) provides public rheumatology care for approximately 530 000 in the Wellington region. We examined electronic health records (EHR) from the first 4 weeks of the COVID-19 Alert Level 4 lockdown, from 22 March to 14 April 2020 (telerheum sample), and a 4-week period from 24 March to 19 April 2019 (reference sample). The samples included all patients booked in rheumatology clinics for follow-up appointments. First and/or urgent appointments were excluded as even if telemedicine was routine, these would be in person. Patient records were identified in the HVDHB EHR 'Concerto' from which the

Abbreviations: bDMARD, biologic disease-modifying anti-rheumatic drugs; CI, confidence interval; COVID-19, novel coronavirus-19 disease; DiP, difference in proportions; DMARD, disease-modifying anti-rheumatic drugs; HVDHB, Hutt Valley District Health Board; SARS-CoV-2, severe acute respiratory syndrome coronavirus-2

Funding: None.
Conflict of interest: None.

administrative and demographic records, and rheumatology letter documenting the visit were used for data extraction.

An Excel data extraction tool was refined after piloting with 20 patients' records. Demographic data included age (years), sex (female, male, other) and ethnicity. Data were extracted by one author (JM). The rheumatic disease diagnosis was categorised using SNOMED CT rheumatology reference set.[8] Disease activity was defined as active if the clinician stated the patient had symptoms of rheumatic disease and not active if the clinician stated that there were no current symptoms of rheumatic disease. If there was no comment about disease activity it was classified as indeterminate. Patients were categorised as having no or one or more comorbidity, based on the letter problem list.

To define the visit outcomes, any investigations, medication changes, non-pharmacological management or referral to other specialty requested were noted. Changes recommended in disease-modifying anti-rheumatic drugs (DMARD) were categorised as starting a new DMARD, stopping a DMARD, increased dose of DMARD, decreased dose of DMARD, change in route of administration or further infusion of previously administered biologic disease-modifying anti-rheumatic drugs (bDMARD). When a new DMARD was started and a current DMARD was stopped, this was recorded as 'starting a new DMARD'. If a medication other than DMARD used for a rheumatic disease was started or stopped this was recorded separately. Non-pharmacological management was defined as intervention outside of drug therapy to manage the rheumatic diagnosis (e.g. referral to physiotherapy or occupational therapy). To assess the reliability of data extraction, a second researcher (RG) independently extracted data domains of disease activity, and change in DMARD for 25 patients randomly selected from each sample period.

Data were summarised using descriptive statistics and differences tested with inferential statistics using R[9] and Rstudio.[10] The difference in proportions, with Bonferonni adjustment, was calculated to give a point estimate and 95% (or 99% for ethnicity) two-sided confidence intervals (CI). Exclusion of the null value 0 was reported as a significant difference. To measure the reliability of data extraction between investigators, a percentage agreement was calculated[11] and 95% CI were calculated using a Wilson score with continuity correction.[12] The DHB Clinical Audit committee approved review of clinic records and waived ethical approval for this quality assurance activity.

There were 550 patient visits, with 340 patients in 26 clinics (mean 13.1 per clinic) in the telerheum sample and 210 patients in 20 clinics (mean 10.5 per clinic) in the reference sample. In both samples, just over two-thirds of patients were female with mean age of about 55 years (Table 1). Approximately three-quarters of

Table 1 Characteristics of patients with visits in telerheum and reference periods

	Telerheum sample, $n = 340$	Reference sample, $n = 210$	Difference in proportion (95% CI)†
Age, mean (SD) (years)	55.6 (16.5)	54.6 (16.4)	0.05§
Gender, *n* (%)			
Female	244 (71.8)	142 (67.6)	0.04 (−0.04, 0.12)
Male	96 (28.2)	68 (32.4)	−0.04 (−0.12, 0.04)
Ethnicity, *n* (%)			
NZ European	227 (66.8)	131 (62.4)	0.04 (−0.06, 0.15)‡
Asian	28 (8.6)	19 (9.1)	−0.01 (−0.08, 0.05)‡
Maori	20 (5.9)	22 (10.5)	−0.05 (−0.12, 0.01)‡
Pacific Peoples	21 (6.2)	16 (7.6)	−0.01 (−0.08, 0.04)‡
Other	44 (12.9)	22 (10.5)	0.02 (−0.05, 0.09)‡
≥1 comorbidity, *n* (%)	212 (62.2)	118 (55.7)	0.06 (−0.02, 0.15)
Primary rheumatic diagnosis, *n* (%)			
Inflammatory arthritis	248 (72.9)	158 (75.2)	−0.02 (−0.10, 0.05)
Vasculitis	19 (5.6)	10 (4.8)	0.01 (−0.03, 0.04)
Connective tissue disorder	44 (12.9)	21 (10)	0.03 (−0.03, 0.08)
Muscle disorders	2 (0.6)	6 (2.9)	−0.02 (−0.06, 0.00)
Systemic disorders	4 (1.2)	1 (0.5)	0.01 (−0.02, 0.03)
Other	23 (6.8)	14 (6.7)	0.00 (−0.05, 0.04)

†Confidence intervals (CI) are 95% unless indicated with ‡.
‡99% CI.
§Difference in mean.

patients had a diagnosis of inflammatory arthritis. There were no differences between the telerheum and reference samples for patient age, gender, ethnicity, rheumatic disease or comorbidities (Table 1). During the telerheum period, 34 of 340 patients (10.0%) were not contactable by phone and were deemed 'did not attend' the visit. During the reference period, 15 of 210 patients (7.1%) did not attend the in-person appointment, with no statistical difference in proportions (DiP) between the two samples (0.02; 95% CI −0.02, 0.07) (Supporting Information Table S1). The percentage agreements between investigators were excellent with agreement of 53/54 (98.1%; 95% CI 90.2–99.7) for disease activity and 52/54 (96.2%; 95% CI 87.5–99.0) for change in DMARD.

Fewer patients were recorded as having an active disease in the telerheum sample (43/340, 12.6%) than in the reference sample (44/210, 21.0%) (DiP −0.08; 95% CI −0.15, −0.02) (Table 2). More patients in the telerheum sample (285/340, 83.8%) had no change in their DMARD management than in the reference sample (152/210, 72.4%) (DiP 0.11; 95% CI 0.04–0.19). There was no statistically significant difference in the proportion of patients in each sample who had a new DMARD started, or DMARD dose increased or decreased (Table 2). Fewer patients had any change in their medications in the telerheum sample (84/340, 24.7%) than in the reference sample (79/210, 37.6%) (DiP −0.13; 95% CI −0.21, −0.05). Similarly, the telerheum sample had a smaller proportion of patients that had any intervention (109/340, 32.1%) than the reference sample (102/210, 38.6%) (DiP −0.17; 95% CI −0.25, −0.08).

For patients with active disease, 19 of 43 patients (44.2%) in the telerheum sample had no change in DMARD/bDMARD. This was a higher proportion than the 10 of 44 (22.7%) patients with active disease in the reference sample who had no change in DMARD/bDMARD (DiP 0.21; 95% CI 0.02–0.39). Similar proportions of patients with active disease in each sample had a new DMARD started, 18 of 43 patients (41.9%) in the telerheum sample, and 20 of 44 patients (45.5%) in the reference sample (DiP −0.04; 95% CI −0.23, 0.17). There was no difference in other medication changes (DiP 0.05; 95% CI −0.14, 0.24), non-pharmacological management (DiP −0.04; 95% CI −0.20, 0.12) and any medication change (DiP −0.17; 95% CI −0.34, 0.01). However, 31 of 43 patients (72.1%) with active disease in the telerheum sample had any form of intervention which was lower than the 40 of 44 patients (90.9%) with active disease in the reference sample (DiP −0.19; 95% CI −0.35, −0.02).

Discussion

In our regional hospital rheumatology service, more patients had telemedicine visits during the 4 weeks of lockdown in 2020 than had in-person visits in the similar period in 2019. The characteristics of the patients were similar; however, we report some differences in patient assessment outcomes and interventions. For telemedicine visits, only 12.7% of patients were deemed to have active disease compared to 21% for in-person visits. For patients deemed to have active disease, a lower proportion of patients had DMARD changes or any form of

Table 2 Clinical assessment of disease activity and treatment decisions outcome of 'visit' in telerheum and reference periods

		Telerheum sample, $n = 340$	Reference sample, $n = 210$	Difference in proportion (95% CI)†
Disease activity, *n* (%)	Active	43 (12.7)	44 (21.0)	**−0.08 (−0.15, -0.02)**
	In remission	291 (85.6)	162 (77.1)	**0.08 (0.02, 0.15)**
	Indeterminate	6 (1.8)	4 (1.9)	0.00 (−0.03, 0.02)
Change in DMARD/bDMARD, *n* (%)	None	285 (83.8)	152 (72.4)	**0.11 (0.04, 0.19)**
	Start new	20 (5.9)	22 (10.5)	−0.05 (−0.10, 0.00)
	Stop	8 (2.4)	3 (1.4)	0.01 (−0.02, 0.03)
	Increased dose	11 (3.2)	12 (5.7)	−0.02 (−0.07, 0.01)
	Decreased dose	14 (4.1)	15 (7.1)	−0.03 (−0.08, 0.01)
	Route of administration	1 (0.3)	2 (1.0)	−0.01 (−0.03, 0.01)
	Further bDMARD infusion	1 (0.3)	4 (1.9)	−0.02 (−0.05, 0.00)
Other medication change, *n* (%)		40 (11.8)	33 (15.7)	−0.04 (−0.10, 0.02)
Non-pharmacological management, *n* (%)		35 (10.3)	35 (16.7)	**−0.06 (−0.13, -0.01)**
Any medication change, *n* (%)		84 (24.7)	79 (37.6)	**−0.13 (−0.21, -0.05)**
Any intervention, *n* (%)		109 (32.1)	102 (48.6)	**−0.17 (−0.25, -0.08)**

†Confidence intervals (CI) are 95%. Where the CI does not cross 0 (i.e. significant difference), the CI is in bold. Any intervention indicates that any type of intervention was provided or arranged during the clinic visit.

intervention during telemedicine visits. Our patients, clinicians and hospital systems were unprepared for the change. Access to video consultation and electronic prescriptions may have facilitated care. The lower rate of investigation and non-pharmacological management during lockdown could be explained and justified by the avoidance of non-urgent healthcare recommended by the New Zealand government.[13]

Our findings suggest that telemedicine for rheumatology through telephone may be advantageous for service volumes but, as previously reported, not provide sufficient clinical information for disease activity assessment for some patients. Since intensification of pharmacological treatment is recommended for active inflammatory arthritis,[14,15] our service may not have achieved this as frequently during lockdown. Telephone assessment for disease activity is inherently limited by the lack of physical examination. Perhaps use of validated patient-reported outcomes that correlate well with disease activity, like the Routine Assessment of Patient Index Data 3 (RAPID3),[16] could provide confidence that assessment accurately reflects patient status. Furthermore, future planned telerheumatology should select patients for telephone consultation, such as people with rheumatoid arthritis in remission or low disease activity states.[4] People with rheumatoid arthritis and low disease activity are accepting of remote monitoring, for example by telephone or an app.[17]

The present study has some limitations, which include retrospective data collection, and the single centre nature that might limit generalisability. As more patients were serviced through telephone, it may be that shorter consultation time contributed to the different outcomes observed. We ensured data extraction could be considered accurate by independent extraction of key data domains, confirming excellent agreement. Reassuringly our data seemed consistent with previous findings in telerheumatology.

There have been calls for telehealth to become an integrated part of routine care. This would provide access to rural and remote, more convenient care for stable patients and would ensure more resilient health systems in future pandemics or natural disasters.[18] Patient selection for telemedicine is crucial for its successful delivery.[19,20] It will be critical to identify for which patient's telehealth is appropriate and under what circumstances. Video consultation provides visualisation of joints and to improve communication so is likely to be preferable to phone. Accurate assessment of disease activity, technological infrastructure, staff training, and patient selection will all need to be addressed before widespread adoption of telerheumatology. After any change to telemedicine, patient outcomes should be carefully monitored.

Acknowledgements

The authors thank their colleagues at the Wellington Regional Rheumatology Unit at Hutt Valley District Health Board for providing critical feedback on aspects of the design and analysis of this work. We also thank Robin Willink, Biostatistical Services, University of Otago Wellington for expert advice on statistical analysis.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web-site:

Table S1. Characteristics of patients with 'did not attend' as outcome of visit in telerheum and reference periods.