

Concise report

Telemedicine in rheumatology: a reliable approach beyond the pandemic

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Abstract

Objectives. The SARS-CoV-2 outbreak has imposed considerable restrictions on people's mobility, which affects the referral of chronically ill patients to health care structures. The emerging need for alternative ways to follow these patients up is leading to a wide adoption of telemedicine. We aimed to evaluate the feasibility of this approach for our cohort of patients with CTDs, investigating their attitude to adopting telemedicine, even after the pandemic.

Methods. We conducted a telephonic survey among consecutive patients referred to our CTD outpatients' clinic, evaluating their capability and propensity for adopting telemedicine and whether they would prefer it over face-to-face evaluation. Demographical and occupational factors were also collected, and their influence on the answers has been evaluated by a multivariate analysis.

Results. A total of 175 patients answered our survey (M/F = 28/147), with a median age of 62.5 years [interquartile range (IQR) 53–73]. About 80% of patients owned a device allowing video-calls, and 86% would be able to perform a tele-visit, either alone (50%) or with the help of a relative (36%). Telemedicine was considered acceptable by 78% of patients and 61% would prefer it. Distance from the hospital and patient's educational level were the strongest predictive factors for the acceptance of telemedicine ($P < 0.05$), whereas age only affected the mastering of required skills ($P < 0.001$).

Conclusion. Telemedicine is a viable approach to be considered for routine follow-up of chronic patients, even beyond the pandemic. Our data showed that older patients would be willing to use this approach, although a proper guide for them would be required.

Key words: telemedicine, tele-rheumatology, SARS-CoV-2, COVID-19, connective tissue diseases, systemic sclerosis, systemic lupus erythematosus, idiopathic inflammatory myopathies

Rheumatology key messages

- Most of our CTD patients would accept evaluation through telemedicine.
- Distance from the hospital and educational level are predictive of telemedicine acceptance.
- Telemedicine may be a viable tool for reducing the burden of in-person outpatient visits.

Introduction

In February 2020, the new coronavirus SARS-CoV-2, causative agent of the coronavirus disease (COVID-19), was first identified in Europe, initially affecting regions of

northern Italy [1]. In view of the pandemic, the Italian Government introduced restrictive rules regarding free movement and assembly of citizens [2]. Since many hospitals have become almost entirely dedicated to COVID-19 patients, access to outpatient clinics has been severely restricted, leading to difficulty in providing correct management and follow-up of chronic disease patients, in particular those undergoing immunosuppressive treatment.

Telemedicine is emerging as a useful tool during this pandemic for the assessment of COVID-19 patients [3]. Since the outbreak, the use of telemedicine has been implemented for the early detection and appropriate

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Submitted 4 June 2020; accepted 28 July 2020

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management of COVID-19 cases among patients suffering from chronic conditions, as well as for routine follow-up of these patients [3, 4]. So far, the use of telemedicine in rheumatology has been very limited, and only a few experiences have been reported [5,]. However, this outbreak has forced us to face different issues in the follow-up of chronically ill patients, which needs to be performed under safe conditions for both clinicians and patients. To this end, in agreement with Associazione Lombarda Malati Reumatici (ALOMAR), the rheumatic patients' association acting in Lombardy, Italy, we conducted a preliminary survey beginning 6 April among patients referred to our CTD outpatient clinic aimed at evaluating the feasibility of a telemedicine program [6].

Methods

On 2–9 March 2020, we interviewed consecutive patients who had a visit scheduled between 15 March and 3 April 2020 at the CTD outpatient clinic of the IRCCS Policlinico San Matteo of Pavia, a third-level rheumatology centre in Lombardy, Italy. We could not obtain written informed consent from our patients because of the lockdown; therefore, all contacted patients who agreed to participate in this were asked to provide oral consent, as approved by the Institutional Review Board of our institution. The questions in the survey were drafted taking into consideration the tools offered by our telemedicine platform, which allows us to perform video-calls and to share files (prescriptions, medical records, laboratory test results) in real-time during the consultation and shortly afterwards. Demographics and occupational information were collected, along with the answers to the following pre-selected questions:

1. Is a personal computer available at home?
2. Do you have a smartphone?
3. Do you have an internet connection?
4. Do you have an e-mail address regularly in use?
5. Would you be able to upload your medical documentation in a shared folder?
6. If not able to by yourself, is there anybody who could help you?
7. Would you be willing to be examined by a doctor in telemedicine even after the pandemic?
8. Would you prefer to be examined by a doctor in telemedicine even after the pandemic?

Data were reported as absolute numbers for continuous variables and percentages for categorical variables. Numerical variables were described using median and IQR. Binary logistic regression was conducted for the multivariate analysis. Three models were analysed with respect to attitude to telemedicine, preference over face-to-face evaluation and capacity to upload files. Statistical analysis was performed with SPSS for Mac (v11).

Results

We contacted 200 patients but ultimately reached a total of 175 patients, with an 88% answer rate. We interviewed 147 females (84%) and 28 males (16%). The median age was 62.5 (IQR 53–73). Patients were followed up at our outpatient clinic for SSc ($n=69$; 39%), SLE ($n=49$, 28%), idiopathic inflammatory myopathies ($n=31$, 18%), SS ($n=3$, 2%), and UCTD ($n=23$, 13%). More than a third of patients had a high school degree ($n=66$, 38%), a similar number ($n=52$, 30%) had a secondary school degree, a smaller proportion a primary school degree ($n=35$; 20%) and 16 (9%) patients were college graduates. Data from 6 patients were undisclosed (3%). Almost half of our patients were retired ($n=85$; 49%), 65 patients (37%) had stable employment, 21 (12%) were unemployed and 4 were students (2%). The patient's residence was at a distance <50 km from the hospital in the majority of cases (125, 71.4%). Survey answers organized according to the age range of patients are reported in Table 1. Most patients owned a device on which they were able to perform the telemedicine assessment, either a personal computer or a smartphone ($n=140$, 80%), and 77% ($n=134$) routinely use emails. However, half of our patients would not be able to upload documents by themselves ($n=88$, 50%); of these, 72% of them ($n=63$) would rely on the help of a relative. On that basis, a total of 151 patients (86%) were potentially able to complete a telemedicine evaluation. The majority of these patients ($n=137$, 78%) would be willing to perform some of their routine visits in telemedicine even after the pandemic, and 107 (61%) would prefer it over an in-person visit.

In multivariate analysis, the attitude towards having a consultation via telemedicine was correlated with the distance from the hospital [odds ratio (OR) 4.7, 95% CI: 1.38, 15.94, $P=0.01$] and with level of education (OR 0.17, 0.03–0.86, $P=0.01$). Indeed, college graduates would accept telemedicine in 87% of cases, whereas patients with an elementary degree would only accept telemedicine in 54% of cases. Education but not distance influenced the survey responses regarding preference of telemedicine over an in-person visit (88% vs 34%, OR 0.14, 0.02–0.89, $P=0.04$). In neither case (predisposition or preference for telemedicine), did age emerge as a significant predictive factor (see Table 2). A diagnosis of UCTD emerged as a deterrent from telemedicine vs all the other diagnosis (OR 0.29, 0.09–0.94, $P=0.04$). As expected, the mastery of the skills required for the use of a virtual platform was inversely correlated with age (OR 0.85, 95% CI: 0.79, 0.91, $P<0.001$) and with a low level of education (OR 0.17, 95% CI: 0.08–0.37, $P<0.001$).

Discussion

The limited access to routine care due to the outbreak of COVID-19 produced great concerns in patients affected by chronic diseases, forced home by national

TABLE 1 Answers to the survey organized according to age range

Age, range in years	Number of patients (% ^a)	Availability of a personal computer (%)	Availability of a smartphone (%)	Availability of an internet access (%)	Availability of e-mail account (%)	Skills to direct upload of files in the personal computer (%)	Availability of external support for the upload of files ^b (%)	Willing to do telemedicine visits (%)	Preferring to do telemedicine over in-person visits (%)
18-35	28 (8%)	28 (100%)	28 (100%)	28 (100%)	28 (100%)	28 (100%)	Not applicable	28 (100%)	24 (86%)
36-50	50 (14%)	42 (84%)	46 (92%)	48 (96%)	46 (92%)	46 (92%)	2 (4%)	44 (88%)	34 (68%)
51-60	80 (23%)	66 (83%)	70 (88%)	76 (95%)	70 (88%)	54 (68%)	22 (28%)	76 (95%)	66 (83%)
61-70	74 (21%)	42 (57%)	62 (84%)	62 (84%)	58 (77%)	24 (31%)	40 (54%)	54 (73%)	36 (49%)
71-80	108 (31%)	44 (41%)	60 (56%)	66 (61%)	62 (57%)	22 (20%)	58 (54%)	68 (63%)	52 (48%)
>80	10 (3%)	2 (20%)	2 (20%)	2 (20%)	4 (40%)	0 (0)	4 (40%)	4 (40%)	4 (40%)
All patients	350 (100%)	224 (64%)	268 (76%)	282 (80%)	268 (76%)	174 (49%)	126 (36%)	274 (78%)	216 (62%)

^aPercentage of the total. ^bQuestions only addressed to patients without skills to upload files from their personal computer. Percentages are expressed with respect to the numbers of patients in various groups, if not otherwise specified.

lockdown and fear of catching the infection in at-risk environments such as hospitals and medical care facilities in general. Restriction rules protected patients from unnecessary risk of getting infected, such as during the use of public transport or attendance at health-care facilities, but it represented an objective obstacle for undergoing their routine assessments. In order to cope with this situation, following previous experiences in rheumatologic settings [5, 7-9], we identified telemedicine as one of the possible options to be offered to our patients suffering from chronic inflammatory diseases. We have tested out the possibility of performing a thorough tele-rheumatological assessment through visual interaction and actual data and prescription sharing over a simple phone consultation or email exchange. This may help explain the high rate of acceptance by our patients.

Our survey data show that in a cohort of consecutive rheumatologic CTD outpatients, the vast majority of them are capable (86%) and also willing to accept (78%) telemedicine as a method of participating in their routine consultations. In addition, in more than a half of cases (61%) they would even prefer it over a routine face-to-face assessment after the pandemic.

Surprisingly, in our survey, population age was not a predictive factor for the acceptance of telemedicine nor for its preference, which is a critical factor in rheumatological cohorts with a generally low prevalence of youngsters. In both multivariate analyses, for either predisposition to or preference for telemedicine, a relevant factor impacting the outcome was the patients' education level, a college degree being a significant factor favouring a positive response. As expected, patients residing >50 km away from the hospital had a more favourable opinion of telemedicine, which is an issue that should be particularly taken into account for tertiary referral centers, often accessed by patients living in other regions.

When evaluating patients' preferences for telemedicine, different disease diagnoses was found to have a significant effect on the results. Patients with UCTD were less likely than patients with SSc, SLE, idiopathic inflammatory myopathies or SSj to prefer telemedicine, a factor possibly related to a perception of their clinical picture as having an evolving nature. However, although obtained in a very specific setting such as our CTD outpatient clinic, we think that these findings could be generalizable to other conditions, such as RA or OA. However, additional studies are probably needed to assess telemedicine in those patients with symptoms linked to anxiety or depression, as in the case of fibromyalgia. When exploring the requisites for efficiently using the platform (digital device/email possession and file upload), older patients were less skilled, but in most cases they were efficiently supported by external help and this issue did not affect their responses about telemedicine. A more direct involvement of PARE societies could be a valuable resource for improving the applicability of this approach in this group of patients.

TABLE 2 Multivariate logistic regression for telemedicine acceptance, telemedicine preference and ability to upload files

Variable	OR	95% CI lower bound	95% CI upper bound	P value (Chi-squared)
Telemedicine acceptance				
Age	0.96	0.9	1.03	0.28
Gender (female as reference)	0.54	0.14	2.03	0.36
Diagnosis (vs UCTD as reference)	0.99	0.29	5.59	0.8
Education level (vs college degree as reference)	0.17	0.03	0.86	0.01
Occupation (vs students as reference)	0.54	0.1	2.8	0.88
No. of visit in 2019	0.98	0.77	1.28	0.99
Distance from the hospital (vs patients at <50 km as reference)	4.7	1.38	15.94	0.01
Telemedicine preference				
Age	0.97	0.92	1.02	0.27
Gender (female as reference)	0.48	0.17	1.35	0.16
Diagnosis (vs UCTD as reference)	0.29	0.09	0.94	0.04
Education level (vs college degree as reference)	0.14	0.02	0.89	0.04
Occupation (vs students as reference)	0.87	0.24	3.14	0.83
No. of visits in 2019	0.82	0.66	1.01	0.06
Distance from the hospital (vs patients at <50 km as reference)	1.83	0.78	4.33	0.17
Ability to upload files				
Age	0.85	0.79	0.91	<0.001
Gender	5.45	1.46	20.33	0.012
Diagnosis	1.36	0.93	1.99	0.11
Education level (vs college degree as reference)	0.17	0.08	0.37	<0.001
Occupation (students as reference)	0.69	0.32	1.47	0.34
No. of visits in 2019	0.74	0.56	0.98	0.036

OR: odds ratio

Although our survey showed that in 2020 our patients were ready for (and sometimes preferred) telemedicine, several issues concerning the respect of patients' privacy should be evaluated when a similar process of care is applied. In fact, both confidentiality of patients' information and security of data exchange should be ensured. We have tested the attitude of patient to a video-consultation experience, not just a phone consultation, to ensure visual contact between the patient and his/her physician. It is equally critical to make the sharing of documents and prescription easy and safe. The widespread use of internet, social media, e-mails and smartphones, although essential for telemedicine implementation, could induce incorrect behaviours, thus driving the need for a strict regulation of teleconsultations.

The outbreak of the SARS-CoV-2 pandemic requires a global change of perspective and a gain of awareness about these issues. Rheumatologists should gain competence in providing this kind of service and comprehension of the value of virtual communications through safe channels [10].

This outbreak has already changed and will continue to change our social behaviour, and as a consequence our approach to the daily practice. We believe the use

of telemedicine is a valuable tool we should consider. So far, the easy access to rheumatology care in the majority of European countries has limited the need and advantages of telemedicine over traditional consultations. Patients' reduced direct access to outpatient clinics, in addition to its actual role in reducing the risk of SARS-CoV-2 spreading, may also be an important tool for easing the economic burden of chronic diseases, a matter not to be ignored in the economic crisis we will face due to COVID-19. Telemedicine could be useful in reducing some indirect costs of the rheumatic diseases, like the loss of working days for patients and/or caregivers [11, 12], and on the other hand it may favour a more rapid access to the clinic for those urgent and acute conditions that cannot be addressed by telemedicine alone [13]. Moreover, the use of other available technology resources may increase the continuity of patient monitoring through the use of dedicated apps, and the ability to report day-by-day conditions, symptoms and signs [14]. The steadily increasing penetration of smartphones may facilitate telemedicine and the integration of new technologies in the regular follow-up of patients. However, although a link between platform visit and smartphone-based apps is desirable due to

increased user friendliness [15], privacy and data security must always be ensured. Our experience is surely encouraging and indicates that people are ready to change their approach to routine care. Telemedicine is proving itself as a valuable aid in routine medical care over this period, but it should be recognized that it cannot replace in-person evaluation. For our CTD patients with stable disease, we believe that a yearly in-person evaluation should be performed, in order to assess the possible presence of new physical signs. A careful evaluation of the pertinence of this approach must be carried out by clinicians, assessing on a case-by-case basis what the best strategy would be for every patient.

Acknowledgements

We thank Drs Alessandro Biglia and Emanuele Bozzalla-Cassione for their constant help and assistance of the patients. The data underlying this article will be shared on reasonable request to the corresponding author.

Funding: No specific funding was received from any funding bodies in the public, commercial or not-for-profit sectors to carry out the work described in this manuscript.

Disclosure statement: The authors have declared no conflicts of interest.

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