



Teleconsultation experience with the idiopathic inflammatory myopathies: a prospective observational cohort study during the COVID-19 pandemic

R. Naveen¹ · T. G. Sundaram¹ · Vikas Agarwal¹ · Latika Gupta¹

Received: 23 September 2020 / Accepted: 21 October 2020 / Published online: 4 November 2020
© Springer-Verlag GmbH Germany, part of Springer Nature 2020

Abstract

Teleconsultation has assumed a central role in the management of chronic and disabling rheumatic diseases, such as the idiopathic inflammatory myopathies (IIM), during COVID-19. However, the feasibility, challenges encountered, and outcomes remain largely unexplored. Here, we describe our teleconsultation experience in a prospectively followed cohort of adult and juvenile IIM. 250 IIM enrolled into the MyoCite cohort (2017-ongoing) were offered the option of audio/visual teleconsultation using WhatsApp during the nationwide lockdown. Clinical outcomes (major/minor relapse) and prescription changes were compared between IIM subsets. Socio-demographic and clinico-serological characteristics of those who sought teleconsultation were compared with those who did not. 151 teleconsultations were sought over a 93 day period by 71 (52.2%) of 136 IIM (median age 38 years, F:M 4.5:1). Nearly one-third (38%) consulted on an emergency basis, with voice consultations being the primary medium of communication. Over a quarter (26.8%) reported relapse (15.5% minor, 11.3% major), these being more common in JDM [71.4%, OR 8.9 (1.5–51)] as compared with adult IIM, but similar across various antibody-based IIM subtypes. Patients who relapsed required more consultations [2(2–3) vs 1(1–2), p 0.009]. The demographic and socioeconomic profile of the patients seeking consultation ($n=71$) was not different from those who did not ($n=65$). Voice-based teleconsultations may be useful to diagnose and manage relapses in IIM during the pandemic. Patient education for meticulous and timely reporting may be improve care, and larger multicentre studies may identify subsets of IIM that require greater care and early tele-triage for effective management of the condition.

Keywords Teleconsultation · COVID-19 · Triage · Remote consultation · Myositis

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has disrupted conventional practice of medicine and called for a revised model of socially distanced health care. Virtual consulting assumes a larger importance for management of chronic and disabling rheumatic diseases (RDs), such as the idiopathic inflammatory myopathies (IIM). With a long-projected duration of the global pandemic, Teleconsultations have become the preferred means of patient–doctor communication and monitoring. In a recent global survey among

patients with IIM, the use of audio–visual communication for a teleconsultation was supported by most (70%), while telephonic consultations were also acceptable to a majority (52%). [1] While teleconsultations are fraught with logistic challenges and penetrance issues in low middle-income countries (LMIC), the safety, cost benefit and convenience may account for greater preference (82%) for remote consultation by rheumatology outpatients, a large proportion of whom may be scheduled for routine assessment of stable disease, as reported in a recent Polish study. In fact, this model may be sustainable post-pandemic, given that merely 8.2% wished to discontinue the tele-services post pandemic [2].

However, the situation in chronic RDs, such as IIM, may be met with additional challenges due to more frequently hampered mobility, distinctive need to measure muscle strength objectively, varied organ system involvement, and frequent need for admissions. [3] In a LMIC, the availability of smartphones and internet access in rural areas may

✉ Latika Gupta
drlatikagupta@gmail.com

¹ Department of Clinical Immunology and Rheumatology,
Sanjay Gandhi Postgraduate Institute of Medical Sciences,
Lucknow, India

be limited. Language diversity and poor literacy is another impediment to successful communication, and a major concern while delivering care remotely. We recently observed that IIM is under-represented among teleconsultations for RDs, but over-represented among admissions. [3, 4] Rheumatologists in various countries have adapted their patient services according to the pandemic situations, with specific focus being minimizing patient health care personnel contact, ensuring safe practices, maximising teleconsultation services, and admitting only when utmost needed [5–7].

Remote consultation does well for chronic diseases where patient-reported-outcome measures for measuring disease activity, damage and functional loss are validated and obtainable. To the same effect, teleconsultation has been extensively studied in rheumatoid arthritis, systemic sclerosis, fibromyalgia, osteoarthritis and juvenile idiopathic arthritis. [4, 8] However, the feasibility, challenges encountered, and patient-reported outcomes in IIM remain largely unexplored. Here, we describe our teleconsultation experience in a prospectively followed cohort of adult and juvenile IIM.

Methods

Patient population

Of 550 registered patients with IIM (1989–2020), 250 are enrolled into a cohort study (December 2017 to present) at a rheumatology tertiary-care center. [9] These patients were contacted by email (sent on 24th March 2020) and the social messaging application, WhatsApp™ after the implementation of a nationwide lockdown in India on 23 March 2020. In view of travel restrictions, patients were intimated to avail teleconsultation facilities through a previously designated helpline number, on their previously allotted appointment dates. Patient could contact the rheumatology team over a phone-call, WhatsApp text, instant message or email. All queries were responded twice a week, on previously designated clinic days (wednesdays and fridays). 136 of the 250 received the message, while the rest did not (the reason could be due to change of phone numbers, termination of follow-up, or death of the patient) (Fig. 1a). We used the STROBE checklist for reporting methods and results [10].

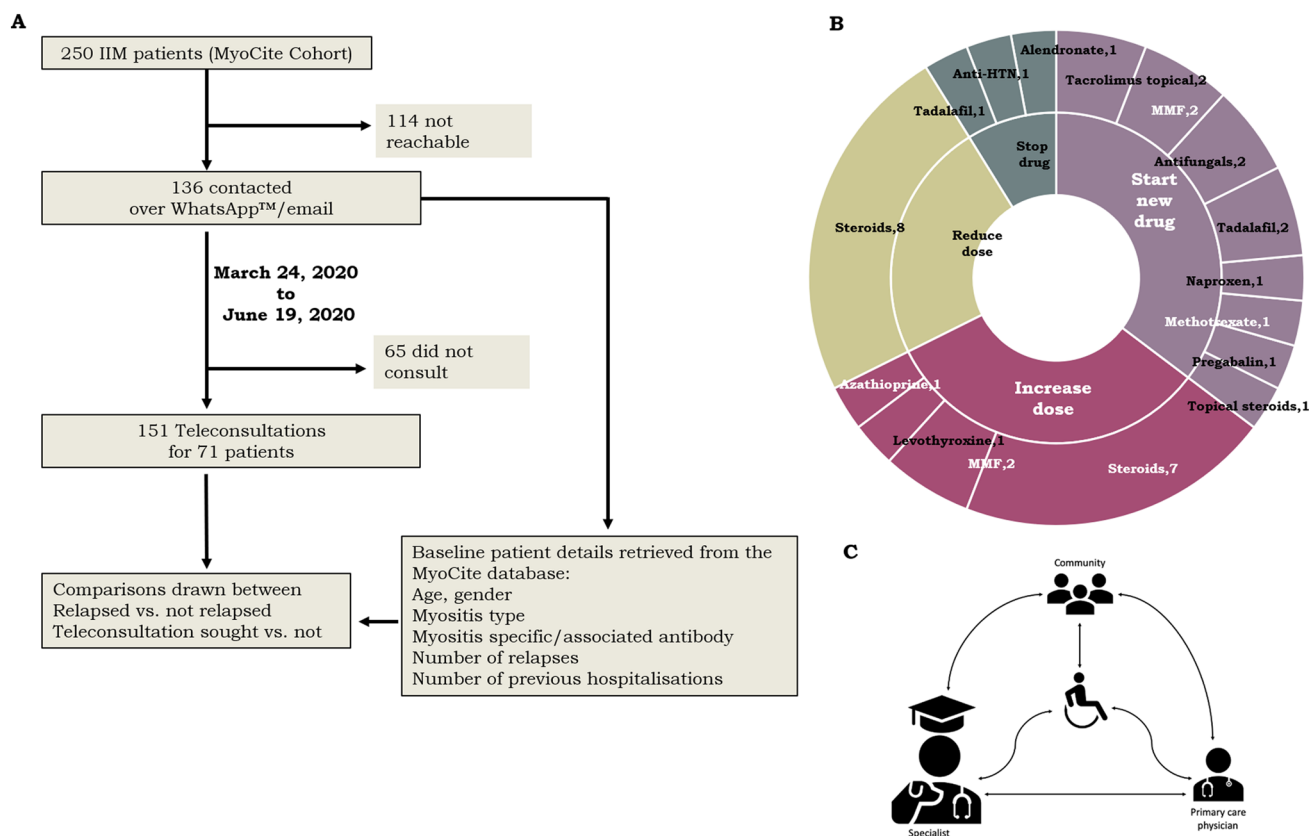


Fig. 1 a Methods flow chart. b Drug interventions. c Proposed three tier health structure

Data collection

When dealing with new skin lesions, imaging or laboratory results, the patients were requested to share photographs or documents on WhatsApp. When the issues could not be sorted out through audio calling or messages, the patients were could opt for video-calling on WhatsApp. Data were collected from 24 March 2020 till 19 June 2020.

The number of consults per patient, time since the nationwide lockdown to the first call, and time between consults was calculated. Prescriptions and ancillary advice were tabulated. Challenges encountered and proposed solutions were also recorded. Patient demographics (age, sex, location by pin-code) and socio-economic strata (annual income of the family) were retrieved from database archive [9, 11, 12]. Details on baseline characteristics, such as myositis subtype, and myositis-specific and -associated antibodies (Line immunoassay, Lubeck, Germany), were also obtained from clinical and biorepository archives. Definitions for organ involvement and type of IIM are as previously described [9, 12].

Relapse was defined as per physician judgement based on two or more among the following: worsening muscle weakness or myalgias, new rashes thought to be consistent with relapse of IIM, increased muscle enzymes, worsened physical function deemed to be related to muscle disease and an improvement with increased dose of glucocorticoids. A major relapse was defined as those managed with glucocorticoid dose equivalent of 0.5 mg/kg body weight or more, while those requiring a lower dose of glucocorticoid were classified as having a minor relapse.

Statistical analysis

Disease-related variables including the clinico-serologic subtypes were compared between those who relapsed versus those who did not. Disease duration, activity and damage (physician assessment) status at the time of enrolment, number of relapses, number of prior hospitalizations and major organ involved were also compared between those who consulted and those who did not. We further explored the socio-demographic differences (income, education, employment status, distance from our institute) between them by intergroup comparisons. All values are in median and inter-quartile range. Non-parametric tests were used. SPSS version 26 was used for analysis.

Results

Demographics

Of 136 patients (54% of 250 in MyoCite cohort) with IIM who could be reached, 71 (52.2%) of age 38 years

(F:M = 4.5:1), sought 151 median 2 (1–3) teleconsultations over 93 days (Table 1). Nearly one-third (38%) consulted on an emergency basis. In contrast, 65 patients (47.8%) did not respond to our e-mail or messages.

Patient outcomes

Over a quarter (26.8%) of those relapsed over this period; 15.5% of which were minor and 11.3% major. The relapses were the highest in JDM (71%) followed by polymyositis (40%). Patients who relapsed had more frequent bulbar weakness [7 (39%) vs 6 (11%), OR 4.8 (1.3–17), p 0.01] and heliotrope rash [7 (39%) vs 7 (14%), OR 4 (1.2–14), p 0.02] at baseline. There were no differences in socioeconomic factors, MSA and ANA patterns between the two groups. 73.2% patients were in remission at the time of teleconsultation.

Teleconsultation advice

In one half (49%), the same drugs were continued at same doses (Fig. 1b). In the remaining, 11 (15%) needed increase in drug dose, 12 (17%) needed addition of new drugs and 8 (11%) had drug dose reduction. Various interventions advised are summarized in Table 1.

Those in remission were advised to continue the same treatment (35, 49.3%) or reduce immunosuppression (8, 11.3%).

Patient variables influencing teleconsultations

Patients of juvenile dermatomyositis (JDM) [71.4%, OR 8.9 (1.5–51), p 0.014] had increased frequency of relapses compared to other IIM subtypes. The number of consultations did not differ among different clinical subtypes of adults with IIM (p = 0.144) and based on myositis-specific autoantibodies (p = 0.287). Patients who relapsed required more consultations [2(2–3) vs 1(1–2), p 0.009, minor relapses 2(2–3) vs 1(1–3), p 0.041] over the observation period.

The demographic and socioeconomic profile of the patients who had at least one consultation (n = 71) and those who did not (n = 65) were compared and no significant differences were observed (Table 2). Teleconsultation-seeking behavior did not differ based on baseline disease-related parameters, such as duration, IIM subtype, major organ involved, prior relapses, distance from home and number of prior hospitalizations.

Logistic issues

A proportion of consultations sought logistic information alone (15%), the major issue being non-availability of drug during the pandemic (1.65%) (Table 1).

Table 1 Characteristics of patients of IIM who sought teleconsultation

	Number out of 71 (100%)
Total number of consults	151
Number of consultations	
One	35 (49.3)
Two	17 (23.9)
Three	10 (14.1)
Four	7 (9.9)
Twelve	2 (2.8)
Median duration after lockdown (days)	44 (17–74)
Median interval between consults (days)	7 (7–12)
Diagnosis	
Dermatomyositis	22 (31)
Overlap myositis	19 (26.8)
Anti-synthetase syndrome	17 (23.9)
Juvenile dermatomyositis	7 (9.9)
Polymyositis	5 (7)
Necrotizing myositis	1 (1.4)
Disease status	
Remission	52 (73.2)
Relapse	
Minor	11 (15.5)
Major	8 (11.3)
Frequency of relapse among IIM subtypes	
Dermatomyositis	4 (18.2)
Overlap myositis	3 (15.8)
Anti-synthetase syndrome	4 (23.5)
Juvenile dermatomyositis	5 (71.4)
Polymyositis	2 (40)
Necrotizing myositis	0
Type of consultation	
Routine	
On time	48 (67.6)
Delayed	5 (7)
Emergency	27 (38)
Advice (per patient over the observation period)	
Continue same treatment	35 (49.3)
Intervention	
Stop drug	3 (4.2)
Add drug	12 (16.9)
Reduce drug dose	8 (11.3)
Increase drug dose	11 (15.5)
Others	2 (2.8)
Infusion	13 (18.3)
Admission	5 (7)
Consult local physician	10 (14.1)
Consult specialist	3 (4.2)
Review with investigations	28 (39.4)

Table 1 (continued)

	Number out of 71 (100%)
Logistic issues	
Drug not available	8 (11.3)
Reimbursement and funding	2 (2.8)

Challenges encountered

The challenges encountered include outdated phone numbers, recording outcome measures, language and communication barriers, poor quality and lighting while taking pictures and videos, dealing with the technology gap and accessibility to laboratory services which were dealt with in specific manners as enlisted in Table 3. Certain problems were anticipated but not encountered.

Discussion

Our prospective evaluation of a cohort of IIM in the early nationwide lockdown period suggests that teleconsultation may be a feasible means of remote evaluation of disabling and severe chronic RDs in a LMIC. Nearly half of our patients sought a teleconsultation in the early pandemic period, of which one-third were for emergencies. A quarter of the IIM patients who reported had experienced a relapse of the disease. Of these, nearly half had a major relapse, mandating high-dose immunosuppression and more frequent remote evaluation. It is noteworthy that children with JDM reported higher relapses compared to adult IIM. Teleconsultation-seeking behaviour was independent of disease duration, IIM subtype, major organ involvement, prior relapses, distance of the hospital from home, and previous hospitalizations.

The early pandemic period was marked by widespread anxiety and concerns of a higher risk of COVID-19 in patients with RDs. There was also a concern of virus-induced relapses in this population, as supported by endogenous and exogenous viral activation in the pathogenesis of several RDs. [1] While such an after-effect has not been demonstrated in other RDs yet, the relapse rate in IIM in the current study is higher compared to previous literature relevant to the disease. [13, 14] This could be due to logistic issues in drug procurement during the lockdown, or the inability of patients to renew prescriptions on time. Alternatively, anxiety and stress due to poor preparedness for a *black swan* event like this could contribute to poor drug compliance, culminating in relapses. [15] Further, a recent study identified enrichment of immunogenic linear epitopes mapping to 20 *Coronaviridae* species including human SARS-CoV-2 in

Table 2 Comparison of demographic and socioeconomic profiles of IIM patients who sought a teleconsultation and those who did not

	Those who consulted (<i>n</i> = 71)	Those who didn't consult (<i>n</i> = 65)	<i>p</i> value
Gender (M:F)	1:4.46	1:3.33	0.492
Median age (years)	38 (24–46)	36 (24.5–46)	0.960
Median disease duration (months)	30.25 (12.34–58.15)	30.3 (12.47–55.40)	0.912
Family income (rupees)	25,000 (10,000–56,250)	30,000 (14,250–50,000)	0.806
Distance of hometown from hospital (Km)	173 (92–326)	210 (93–351)	0.524
Education (<i>n</i> = 64, 57)			0.531
Primary school	7 (11)	4 (7)	
High school	6 (9)	5 (8)	
Higher secondary	12 (18)	11 (19)	
Graduate	13 (20)	17 (29)	
Post graduate	23 (36)	13 (23)	
Doctorate	0 (0)	1 (2)	
No formal education	3 (5)	6 (10)	
Employment (<i>n</i> = 60, 61)			0.720
Professional	9 (15)	12 (19)	
Clerical	5 (8)	1 (2)	
Skilled labour	4 (7)	3 (5)	
Student	16 (27)	12 (20)	
Housewife	31 (52)	32 (52)	
None	1 (2)	1 (2)	
Type of IIM <i>n</i> (%)			0.289
DM	21 (29)	29 (44)	
PM	5 (7)	5 (7)	
ASS	17 (24)	11 (17)	
OM	20 (28)	11 (17)	
JDM	7 (10)	9 (12)	
IMNM	1 (1)	0 (0)	
Disease activity at the time of recruitment <i>n</i> (68.61%)			0.593
Active	30 (44)	21 (34)	
Inactive	6 (9)	7 (11)	
Grumbling	32 (47)	32 (52)	
Damage assessed by physician at the time of recruitment <i>n</i> 38.40(%)			0.47
Minimal	14 (37)	20 (50)	7
Mild	14 (37)	14 (35)	
Moderate	9 (23)	6 (15)	
Severe	1 (3)	0 (0)	
Number of past relapses	0 (0–1)	0 (0–1)	0.236
Major organ involved <i>n</i> (69.63%)			0.553
Muscle	44 (64)	46 (73)	
Lung	20 (29)	16 (25)	
Heart	1 (1.4)	0 (0)	
Renal	4 (6)	1 (1.5)	
Number of hospitalizations so far	2 (1–4)	1 (1–3)	0.091

causing dermatomyositis. Although it is too early to draw firm conclusions from this preliminary data, the possibility of asymptomatic virus infections in patients leading onto relapses of IIM merits further exploration. [16] Even though none of our patients had symptomatic COVID-19, an

asymptomatic infection cannot be ruled out. At this juncture, it seems logical that rheumatologists remain aware of the possibility of relapses of IIM after COVID-19.

We observed a higher relapse rate in children as compared with adults. This is surprising given the better outcomes in

Table 3 Challenges encountered, remedial measures, and proposed solutions for improving teleconsultation services

Challenges encountered	Remedial measures	Proposed solutions
Outdated phone numbers	Phone numbers were updated in baseline data. Few others were recovered from hospital information system. Those who changed the phone numbers after onset of pandemic, couldn't be reached	Electronic verification of phone numbers at the outset
Presumption that pandemic duration will be short (at the onset)	This leads to addressing shorter goals and poorer care for long term goals. This improved with further knowledge of the pandemic	A plan of action with predetermined long-term goals should be addressed in subsequent consults
Recording and reporting outcome measures	We began recording with videos of how to record simple outcome measures and circulated to the accessible patients	The physicians paid greater attention to such complaints.
Early symptoms missed by the patients	Symptoms like itching may be early surrogate for an incipient rash. The symptoms such as itching were often causally associated to "allergies"	List a palette of myositis associated rashes and ask the patients to identify if they have any. Increasing patient awareness regarding the symptoms and signs
Misinterpretation of symptoms by the patient	by the patient, wherein the patient requested anti-allergies instead of listing the exact symptom and ignoring the signs	
Mental health issues	Counselor services may be added to the team	
Diet advice	Team of dieticians, physiotherapists, and nurse to aid during tele-consultation services	
Privacy	Roping in trusted family physician during tele-consult. Allow patient 'lone time' with the physician without their kin	
Sending Images	Images were sent by emails/via Whatsapp™ by patients	A document or text listing clear instructions for recording photographs
Voice and video quality	Patients requiring clinical examination were asked to make video calls through accessible modalities—WhatsApp™	A document or text listing clear instructions for recording photographs
Dealing with technology gap	Younger patients, family members adapted better to the teleconsultation services. For the rest, we chose the traditional modalities with follow up calls with younger family members	
Language and communication barriers	Some patients couldn't understand written language and had to be translated to the native-tongue. If there was a communication gap, we attempted to change the person at doctor's end or the attendant at patient's end, so that clear communication could be established by whichever modality used	Requesting patients to have a family member or caregiver as an attendant to support the logistics of teleconsultation. However, patient privacy may be respected, and an arrangement made to have a few minutes of private discussion as well
Accessibility to laboratory services	Routine blood tests were requested for patients. Most could access local labs. Few had to travel to nearest town to access same. This was limited by the grade of lockdown and government rules regarding travel at the time. Those without investigations were judged only clinically and treatment advised	Government advisory to stepwise unlock restrictions with adequate safety measures to run local labs
Incivility	Sharing of inappropriate content was encountered and dealt with strict warning	Patients may be advised regarding appropriate social behavior using infographics before beginning the consult
Challenges anticipated	The national rules regarding teleconsultation changed in the pandemic	
Ethics of teleconsultation	A hospital information system may be used to sync patient data, including confidential information such as images and laboratory and imaging reports. Patient confidentiality rights ought to be respected, with a system to avoid breach in security of confidential data without adequate permissions from the patients. Caregivers ought to be made aware of patient consent for sharing information, pictures, and material for research and teaching purposes	
Patient rights	The modalities used should be authentic and filtered using appropriate firewalls, with stringent monitoring of data handling and safety	
Data protection	Alternative platforms should be made available	
Technological failure	Have to be borne by the hospital/institute/government	
Internet and smartphone costs	Stepwise approach, digitalizing the nation	
Penetration to the rural areas		

Table 3 (continued)

Challenges encountered	Remedial measures	Proposed solutions
Physiotherapy	Tele-physiotherapy services, and guided home-based group activities are the next step	
Gaining patient trust	Slow and steady process. It may require various visits, reassurance, and a calm and patient ear to the various challenges being faced by the patient. A counsellor may be helpful in difficult cases	
Continuity of care	Bone health, lipid management, eye examinations, damage assessment and vaccination were largely ignored in the initial pandemic period. It is required to develop mechanisms for these while bracing for the long-projected duration of the pandemic	
In person visits	Roping in community health workers for home-based visits may be fruitful to gain trust and provide adequate family support when needed	

children than adults otherwise. However, jDM is rare, as also reflected by the limited number of patients in the current study. A large proportion of jDM is likely to be managed by paediatricians, and paediatric neurologists. Thus, the study setting at a tertiary-care centre may account for a referral bias of more severe or refractory cases. This can be ascertained by larger collaborative multicentre studies.

While surgical specialities may be limited in their capacity to deliver teleconsultations, several medical specialities may do well on remote consultations. Recently Ahmed et al. concluded that over 70% of rheumatology consults could be satisfactorily managed remotely after their extensively review across 5 medical specialities. [17] The appropriateness of e-consult inquiries was assessed with 4 parameters: not answerable by reviewing evidence-based summary sources (“point-of-care resource test”), not merely requesting logistic information, having appropriate clinical urgency, and having appropriate patient complexity. These metrics were published at a date beyond our study inception date, are very insightful of such a study design, which we would like to incorporate in subsequent similar studies. The assessment of disease remotely is fraught with challenges due to limited examination and environmental determinants of good photograph and video quality in the event of a relapse. While transitioning from physical to virtual care, it is imperative to design and validate patient-reported-outcome measures specific to the disease. In the study group, the authors later resorted to two simple makeshift-outcome measures—the two-minute walk distance (in metres) and the time to life arms overhead ten times (in seconds) for serial monitoring. Since IIM are heterogenous, a multidisciplinary approach with all stakeholders including patients, physiotherapists, dermatologists, neurologists, pulmonologists, paediatricians, internists and rheumatologists may be involved in developing satisfactory and valid PROs for remote monitoring in the future.

Sizeable number of patients in our study sought advice regarding infusions. Previously disrupted physiotherapy has been a concern among patients with IIM during the pandemic. [18] In the future, telehealth may be improved upon to deliver ancillary care, such as information on day admissions services, physiotherapy, diet and nutrition, and yoga or mindfulness. The future is to guide the patients of established diagnosis (like IIM) to follow up via teleconsultation with recorded outcome measures, nurse-led care (NLC) and tele-triaging. This can be aided by delivery of drugs via postal services for those who cannot procure them from their place. Smart phone apps have evolved during the pandemic to suit the current needs. With metrics like Mobile Application Rating Scale (MARS) [19] which assesses the various mobile apps for overall quality, engagement, functionality, aesthetics, and information, these may be more useful to deliver teleconsultation services across the [20, 21].

The concept of tele-triaging (triaging in teleconsultation) has to be practiced in e-consults and has been emphasised in other studies too [3, 22]. NLC has outperformed physician-driven remote consultation in rheumatoid arthritis in Africa and Middle East countries in a few studies. [23] Further, NLC and teleconsultation services have reduced the proportion of inappropriate calls and overall cost of teleconsultation in a UK based study. [24] While it is too early to speculate if NLC will be useful in managing complex conditions, such as IIM, setting up such services at various tiers of Indian health care system may be in sync with sustainable health sector development goals, and improve care delivery in the prevailing pandemic or those that may arise in future.

It is noteworthy that nearly half of the cohort did not tele-consult in the early pandemic period. The analysis of patients who did not consult, based on their last consultation with us, revealed no differences in teleconsultation seeking behavior (disease duration, IIM subtype, major organ involvement, prior relapses, distance from home and hospitalizations). Not seeking tele-consults, could be because they either they did not have the know-how to use the technology or were complacent due to longstanding remission or too sick to respond to our call. Further, one-third consulted on emergency basis. This emphasizes the need for effective patient education in IIM. Knowing when to ask for help and how to do it, could bring a remarkable difference in patient outcomes. Interestingly, most of the patients hailed from rural places and were on an average 200 km away from the institute. Further, distance from home was not a determinant of teleconsultation. However, this could be a factor in whether patient wants to continue teleconsultations after the pandemic resolves. The most important challenge in establishing teleconsultation services was the presumption that the pandemic duration is short, and that teleconsultation is a temporary bridge. This led to significant disregard for delivery of wholesome patient care initially. As the wisdom regarding the pandemic increased, the preparedness and care for subsequent consults improved.

Assessing rural and remote access disparities for patients of established rheumatoid arthritis via video-conferencing has revealed no evidence of a difference in effectiveness between inter-professional video-conferencing and traditional rheumatology clinic for both effective follow-up care and patient satisfaction. [8] The main caveat of the study

is that sizeable proportions did not seek a consultation. A deeper understanding of patient behaviours, logistic, socio-economic and cultural determinants can be obtained by interviewing the non-respondents. This may be possible on retrieving the correct phone numbers or interviewing them in person when they visit the clinics post pandemic. A longer follow-up duration is likely to provide greater insight into means to improve remote consultation to tide over the pandemic period.

The ongoing pandemic mandates an acceptance of teleconsultation in the face of adversity. It offers a cost-efficient model for penetration of outreach clinics to the community, in a country with a dismally low physician–patient ratio. Internet coverage has significantly improved in distant villages, and among social media platforms (SMPs), WhatsApp usage is widespread and preferred. [1, 25] A fair acceptance of SMPs for telecare among 90% rheumatologists has been documented previously. [3, 26] Teleconsultation is an evolving field, and no amount of planning is deemed perfect in delivering care in a pandemic. However, our study provides fresh insights into Tele-care in a large and well-characterised cohort of IIM, which are likely to be useful to other centres catering to myositis patients worldwide.

To conclude, virtual consulting can be successfully used in IIM, albeit with a few challenges. Tele-care may be harnessed with the vision to follow tele-triage, advance tele-sorting to ease rush of cases post-pandemic, formulate community outreach through a structured referral system, and deliver ancillary care. Further, the use of smartphone apps and wearable devices can improve objective recording of simplified patient-reported-outcome measures, while overcoming the constraints of distance and time. Tele-services may be the missing link that interconnect the patient, the primary care physician and the specialist (Figs. 1c, 2).

Conclusion

Voice-based teleconsultations may be useful to diagnose and manage relapses which are frequent in IIM during the pandemic. Patient education for meticulous and timely reporting may be improve outreach, care, and larger multicentre studies may identify subsets of IIM that require greater care and early tele-triage for effective management of the condition.

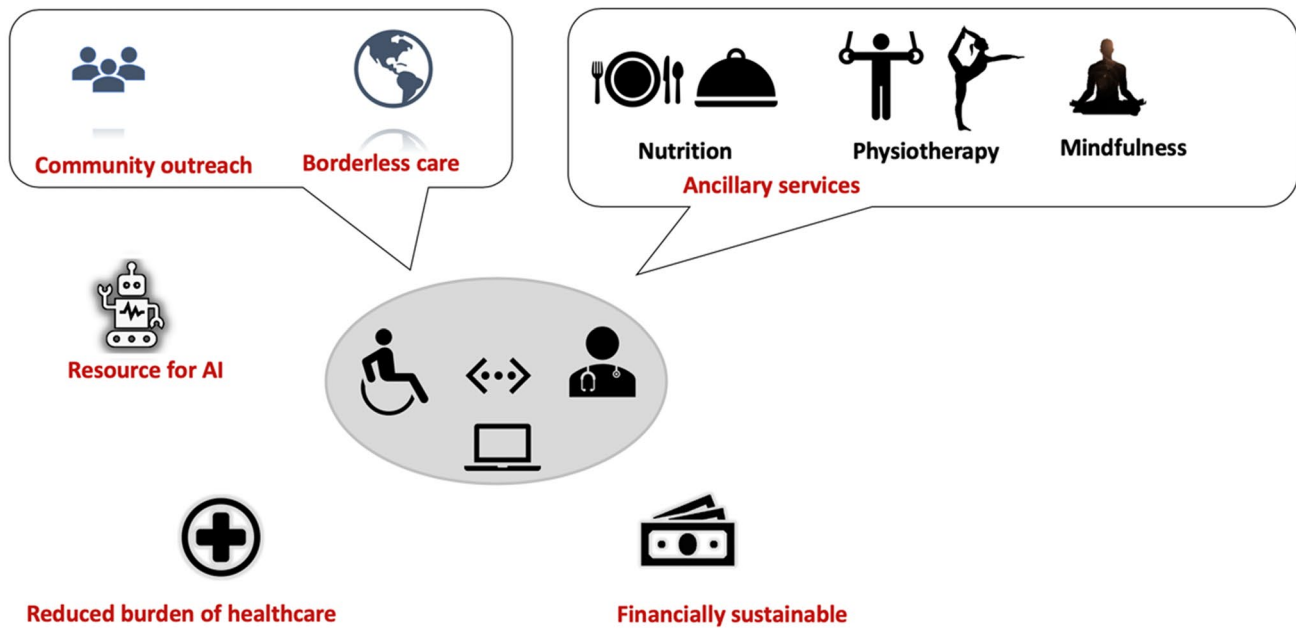


Fig. 2 Advantages of the virtual consultation model for the delivery of Healthcare and ancillary services feasible through this approach

Author contributions All authors were involved in ideation, data collection and manuscript preparation. All agree with the submitted version of the manuscript, take responsibility for the content of the entire manuscript, and affirm that any queries related to any aspect of the same are appropriately managed.

Funding This study was not funded.

Compliance with ethical standards

Conflict of interest The authors declare that there is no conflict of interest relevant to the manuscript.

Ethical approval information Approval obtained from the institute ethics committee of SGPGIMS, Lucknow as per local guidelines (2017-41-IP-76).

Data sharing statement All data pertaining to the study is included in the manuscript and as supplementary material.

Patient and public involvement The data was partly anonymised and stored as part of an ongoing project (2017-41-IP-76) for which written consent had been obtained previously from the respondents.

References

- Gupta L, Misra DP, Agarwal V et al (2020a) Management of rheumatic diseases in the time of covid-19 pandemic: perspectives of rheumatology practitioners from India. *Ann Rheum Dis*. <https://doi.org/10.1136/annrheumdis-2020-217509>
- Opinc A, Łukasik Z, Makowska J (2020) The attitude of Polish rheumatology patients towards telemedicine in the age of the COVID-19 pandemic. *Reumatologia/Rheumatology* 58:134–141. <https://doi.org/10.5114/reum.2020.96665>
- Gupta L, Misra DP, Agarwal V et al (2020b) Response to: ‘tel-rheumatology in COVID-19 era: a study from a psoriatic arthritis cohort’ by Costa et al. *Ann Rheum Dis*. <https://doi.org/10.1136/annrheumdis-2020-217953>
- Piga M, Cangemi I, Mathieu A, Cauli A (2017) Telemedicine for patients with rheumatic diseases: systematic review and proposal for research agenda. *Semin Arthritis Rheum* 47:121–128. <https://doi.org/10.1016/j.semarthrit.2017.03.014>
- Masini F, Gjeloshi K, Ferrara R et al (2020) Rheumatic disease management in the Campania region of Italy during the COVID-19 pandemic. *RheumatolInt* 40:1537–1538. <https://doi.org/10.1007/s00296-020-04648-8>
- Mukusheva Z, Assylbekova M, Poddighe D (2020) Management of pediatric rheumatic patients in Kazakhstan during the coronavirus disease 2019 (COVID-19) pandemic. *RheumatolInt* 40:1351–1352. <https://doi.org/10.1007/s00296-020-04613-5>
- Costi S, Caporali R, Cimaz R (2020) Dealing with COVID-19 in a pediatric rheumatology unit in Italy. *Paediatr Drugs* 22:263–264. <https://doi.org/10.1007/s40272-020-00395-2>
- Taylor-Gjevre R, Nair B, Bath B et al (2018) Addressing rural and remote access disparities for patients with inflammatory arthritis through video-conferencing and innovative inter-professional care models. *Musculoskeletal Care* 16:90–95. <https://doi.org/10.1002/msc.1215>
- Gupta L, Appani S, Janardana R et al (2019) Meeting report: MyoIN—Pan-India collaborative network for myositis research. *Indian J Rheumatol* 14:136. https://doi.org/10.4103/injr.injr_40_19
- STROBE Statement: Available checklists. <https://www.strobe-statement.org/index.php?id=available-checklists>. Accessed 13 Oct 2020
- Naveen R, Anuja AK, Rai MK et al (2020) Development of the myocitebiobank: Cost-efficient model of public sector

- investigator-driven biobank for idiopathic inflammatory myositis. *Indian J Rheumatol*. https://doi.org/10.4103/injr.injr_95_20 ([**Epub ahead of print**])
12. Mehta P, Gupta L (2020) Combined case record forms for collaborative datasets of patients and controls of idiopathic inflammatory myopathies. *Indian J Rheumatol*. https://doi.org/10.4103/injr.injr_56_20 ([**Ahead of print**])
 13. Mamyrova G, Rider LG, Ehrlich A et al (2017) Environmental factors associated with disease flare in juvenile and adult dermatomyositis. *RheumatolOxfEngl* 56:1342–1347. <https://doi.org/10.1093/rheumatology/kex162>
 14. Wienke J, Bellutti Enders F, Lim J et al (2019) Galectin-9 and CXCL10 as biomarkers for disease activity in juvenile dermatomyositis: a longitudinal cohort study and multicohort validation. *Arthritis Rheumatol Hoboken Nj* 71:1377–1390. <https://doi.org/10.1002/art.40881>
 15. Agarwal V, Sharma S, Gupta L et al (2020) (2020) COVID-19 and psychological disaster preparedness—an unmet need. *Disaster Med Public Health Prep* 25:1–4. <https://doi.org/10.1017/dmp.2020.219>
 16. Megremis S, Walker TDJ, He X et al (2020) Antibodies against immunogenic epitopes with high sequence identity to SARS-CoV-2 in patients with autoimmune dermatomyositis. *Ann Rheum Dis*. <https://doi.org/10.1136/annrheumdis-2020-217522>
 17. Ahmed S, P. Kelly Y, R. Behera T et al (2020) Utility, appropriateness, and content of electronic consultations across medical specialties. *Ann Intern Med*. <https://doi.org/10.7326/M19-3852>
 18. Gupta L, Lilleker JB, Agarwal V, Chinoy H, Aggarwal R (2020) COVID-19 and myositis- unique challenges for patients. *Rheumatology*. <https://doi.org/10.1093/rheumatology/keaa610> (**Published ahead of print**)
 19. Davalbhakta S, Advani S, Kumar S et al (2020) A systematic review of smartphone applications available for corona virus disease 2019 (COVID19) and the assessment of their quality using the mobile application rating scale (MARS). *J Med Syst* 44:164. <https://doi.org/10.1007/s10916-020-01633-3>
 20. Kataria S, Ravindran V (2018) Digital health: a new dimension in rheumatology patient care. *RheumatolInt* 38:1949–1957. <https://doi.org/10.1007/s00296-018-4037-x>
 21. Wolthers TO, Wolthers OD (2020) Telephone consultation as a substitute for face-to-face consultation during the COVID-19 pandemic. *Dan Med J* 67:A04200300 (**PMID: 32734880**)
 22. Rowe-Setz G, Behringer W, Roland D et al (2020) Fifteen minute consultation: when can I use a medical app? *Arch Dis Child: EducPract Ed*. <https://doi.org/10.1136/archdischild-2020-319448> (**(edpract-2020-319448)**)
 23. Uthman I, Almoallim H, Buckley CD et al (2020) Nurse-led care for the management of rheumatoid arthritis: a review of the global literature and proposed strategies for implementation in Africa and the Middle East. *RheumatolInt*. <https://doi.org/10.1007/s00296-020-04682-6>
 24. Tomlinson P, Heaton H, Medcalf P et al (2019) A nurse-led rheumatology telephone advice line: service redesign to improve efficiency and patient experience. *Br J Nurs* 28:619–627. <https://doi.org/10.12968/bjon.2019.28.10.619>
 25. Goel A, Gupta L (2020) Social media in the times of COVID-19. *JCR J ClinRheumatol* 26:220–223. <https://doi.org/10.1097/RHU.0000000000001508>
 26. Ahmed S, Gupta L (2020) Perception about social media use by rheumatology journals: survey among the attendees of IRACON 2019. *Indian J Rheumatol*. https://doi.org/10.4103/injr.injr_15_20

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.