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## Diabetes care during COVID-19 lockdown at a tertiary care centre in India



Rajnish Joshi<sup>a</sup>, Shubham Atal<sup>b,\*</sup>, Zeenat Fatima<sup>b</sup>, Sadasivam Balakrishnan<sup>b</sup>, Swati Sharma<sup>b</sup>, Ankur Joshi<sup>c</sup>

<sup>a</sup>Department of General Medicine, All India Institute of Medical Sciences Bhopal, Saket nagar, Bhopal, India

<sup>b</sup>Department of Pharmacology, All India Institute of Medical Sciences Bhopal, Saket nagar, Bhopal, India

<sup>c</sup>Department of Community and Family Medicine, All India Institute of Medical Sciences Bhopal, Saket nagar, Bhopal, India

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### ABSTRACT

Providing scheduled consultations to persons with diabetes during the COVID-19 induced lockdowns posed a major challenge. With the clinicians occupied in COVID management, a strategy of using telemedicine and engaging a team of para-clinical doctors was devised. Telephonic follow up consults were given and diabetes care was efficiently delivered.

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## 1. Introduction

The COVID-19 pandemic is taking a heavy toll on lives of the elderly and those at high-risk for severe illness due to underlying risk factors. Individuals with diabetes are at increased risk for serious COVID-19 and its complications due to multiple potential reasons, with up to 50% higher mortality rates reported. The 'lockdowns' being enforced due to this pandemic affect persons with diabetes at fronts like diet, exercise, availability of medicines, stress, and can lead to uncontrolled glycaemia and worsening of comorbidities [1]. Serious challenges are being posed in India for non-COVID

care, ever since the government announced the first lockdown in the country in the last week of March which continued in phases until June.

With the administrative orders leading to closure of routine outpatient clinics in our institute, which is a designated COVID care hospital, a major challenge was to provide the scheduled follow up consultations to persons with diabetes registered with the specialty clinic run by the department of general medicine. An alternative approach had to be devised involving use of the institute's telemedicine facility, and more importantly engagement of doctors of the para-clinical field to deliver this diabetes care; by providing real time audio con-

\* Corresponding author at: Department of Pharmacology, 3rd floor, AIIMS medical college building, Saket nagar, Bhopal 462020, India.  
E-mail address: [shubham.pharm@aiimsbhopal.edu.in](mailto:shubham.pharm@aiimsbhopal.edu.in) (S. Atal).

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sultations over the telephone. This was done in concordance with the telemedicine guidelines recently published by the Indian government, allowing all registered medical practitioners to provide this type of care [2]. Since the clinicians of the department of medicine were engaged heavily in the task of COVID management at the centre, registered doctors of the pharmacology department who have been part of a diabetes research team in collaboration with the physician from the medicine department since a year were entrusted with conducting these telephonic follow up consultations.

## 2. Methods

Members of the diabetes follow up team, consisting of 2 faculties and 2 residents from department of pharmacology, had been deputed to attend the COVID helpline number of the institute on a 24 × 7 basis in the telemedicine facility of the institute. They were posted on different days on a rotational basis, and called up the individuals with diabetes sequentially on the day of their posting. Access to a dedicated landline number and technical assistance was made available to them; also allowing call backs in case of any queries.

To identify individuals who needed the follow up consult, a one year database of 884 registered persons with diabetes was used which was available through an observational research project being run in collaboration between medicine and pharmacology (approved by institutional ethics committee). Their last records of glycaemic parameters, prescribed therapy, co-morbidities and complications were available. A review of the latest diabetes care guidelines and treatment algorithms was done. The treatment protocol for therapy modifications (escalations, de-escalations) normally followed at the centre was formally written up, and given to all team members after rounds of discussion. Having been involved in consultation of these individuals for a year, and trained regularly by the centre's diabetes physician, the team was already well versed in identifying and solving expected common clinical scenarios such as diet - lifestyle adherence, dose modifications, add on drug selection, addressing hypoglycaemia, insulin dose titrations, and managing adverse reactions. Further practical recommendations were drawn from COVID-19 specific diabetes care documents from the ADA [3], the CDC, U.S. [4], the IDF [5], diabetes organisations in India (like RSSDI) [6], and other expert panels [7]. Tips regarding diet, exercise, drug dosing, insulin administration, storage etc. were thoroughly understood, noted and disseminated. It was decided that in case of medical issues requiring more expert intervention, the chief diabetes physician would be contacted telephonically, and call back to the individual would be arranged. If a medical urgency or emergency was recognised in the consultation, the person would be called immediately to the institute's emergency centre, or advised to visit the nearest medical facility.

## 3. Results

A common set of main questions and sub questions to be asked during the follow up call in a manner akin to a semi structured interview style consultation was formulated, and

kept ready in hand while making the calls. A total of 118 persons with diabetes having scheduled follows ups during the first lockdown period of 3 weeks, and subsequently the second lockdown of over 2 weeks were identified. After confirming the identity of the individual, explicit consent for consultation was obtained at the beginning of the call. We were able to call up and provide tele-consultations to 103 persons with diabetes (61 in the first and 42 in the second lockdown phase); requiring a few repeat calls and dealing with connectivity issues. Twelve persons could not be contacted or didn't respond, while 3 refused to consent for the consultation.

Responses obtained during the consultations were immediately noted down. Demographics of the study population along with basic clinical characteristics are displayed in Table 1. All the people who were called up had type 2 diabetes mellitus (T2DM) except one who had 'other specific type' of diabetes of the exocrine pancreas (pancreatogenic secondary diabetes). The average duration of the calls was 7.54 ( $\pm 2.47$ ) minutes. The key results from the consultations are displayed along with the questions asked in Table 2. All major issues were addressed during the interactions with patients in their native language (Hindi) including their general clinical condition and diabetes specific problems. Medication adherence, drug availability and cost of drugs were not an issue for majority of the patients, while diet - exercise adherence, glucose and blood pressure monitoring posed problems due to the lockdown. Yoga was being practised by 30% of the responders.

Out of the 103 people called, 50 could provide one or more of their recent glycaemic parameter values based on self-monitoring of blood glucose (SMBG) using glucometer or testing in a nearby lab (within a week). Based on the available glycaemic status (mean values in Table 1), therapeutic adjustments were required in less than 20% of individuals; add-on drug in 4, dose escalation in 13 and de-escalation in 2 persons. These adjustments applied to both oral antidiabetics and insulin in the people with T2DM. All basic instructions regarding insulin administration and recognising hypoglycaemia were given to such individuals. Individuals with no recent glycaemic measurements were given advice to get glucose testing done, if feasible, by buying a glucometer, visiting the nearest medical care facility or local pharmacy. A couple of individuals had to be advised to come for emergency consultation due to significant hyperglycaemia and recurrent hypoglycaemia respectively. Call backs from the telemedicine team were made to 5 participants in whom expert advice was sought for therapeutic modifications with discussion within the study team including the diabetes consultant. Rest of the modifications were made during the tele consult itself by the team.

Furthermore, precautions related to COVID-19 like hand washing, social distancing, cough etiquettes, quarantine were re-emphasized. Practical advice regarding basic diabetes self-management in emergencies was also given like tips on available dietary options, home physical activities like spot jumping or jogging, terrace walking, aerobics, yoga, as well as recognising and managing hypoglycaemia, and proper insulin storage. Psychological stress and anxiety linked to the COVID-19 situation could be recognised in some form in 20% of the

**Table 1 – . Demographic and disease characteristics of the study participants.**

Characteristics (N = 103)	Result (Mean ± SD/Proportion)
Age	56.39 (±15.31) years
Gender	
Male	64.1%
Female	35.9%
Type of diabetes	
Type – 2 diabetes	99.03%
Other specific type of diabetes	0.7%
Duration of diabetes	6.36 (±5.00) years
Resident	
Local	82.5%
Outstation	17.5%
Glycaemic values	
RBS (n = 30)	190.83 ± 68.21 mg/dl
FBS (n = 28)	123.21 ± 31 mg/dl
HbA1c (n = 15)	7.36 ± 1.44%
Drugs for diabetes in prescriptions	
1	17.48%
2	34.95%
3	31.07%
>3	16.50%
Insulin use	13.6%
Hypertension	62.13%

\*SD = Standard deviation, RBS = Random blood sugar, FBS = Fasting blood sugar.

respondents, encountered more during the second phase of lockdown; they were counselled appropriately.

#### 4. Discussion

Overall, this preliminary study showed that the practical approach of providing diabetes care through the yet under-used approach of extensively utilising telemedicine in an Indian set up with engagement of trained para-clinical doctors, proved to be a successful and effective endeavour. Being a chronic disease, diabetes requires regular follow ups for lifestyle advice and therapeutic modifications. The Indian telemedicine guidelines now facilitate use of this mode of management for chronic conditions [2]. In times of an emergency like the on-going COVID-19 pandemic induced lockdowns, this approach of providing tele-consultations helped people get the much required basic diabetes follow up advice without being exposed to the risk of infection by visiting a hospital. Participants received dietary and lifestyle advice, adherence reinforcement, and therapeutic adjustments wherever required and feasible. It was heartening to note some of the remarks and statements made by the persons we called which included heartfelt ‘thank yous’, words of appreciation for reaching out, allaying of worries regarding missing consultations, gain of confidence due to the call, and satisfaction at redressal of COVID-19 queries.

Although we could not assess overall efficacy of telemedicine consultation for diabetes care in terms of improvement in glycaemic, blood pressure or lipid targets in this preliminary report, a meta-analysis of 35 RCT’s has shown a significant beneficial effect of using telemedicine in improving

glycaemic control [8]. Similar results have also been demonstrated in a Cochrane review with use of interactive telemedicine, and another review of 46 studies where different modes of telemedicine were used [9,10]. When it comes to India, there is hardly any published research on telemedicine for diabetes care. Recently, a group has published guidelines for physicians on use of telemedicine for diabetes during COVID-19 [11]. They have given recommendations on how to effectively use various modes of telemedicine to help in diabetes management. Our strategy concurs with this guidance, and has practically implemented many of the principles outlined in it successfully.

A small sample size, lack of assessment of efficacy of telemedicine consultation viz a viz improvement in glycaemic, blood pressure, lipid targets, and lack of information on glycaemic parameters for all participants are important limitations of this preliminary report. With further follow up of the responders, analysis of the clinical impact of these teleconsultations can also be planned. The study population also did not include people with type 1 diabetes mellitus (T1DM), restricting the efficiency of this approach mainly for T2DM as of yet.

#### 5. Conclusion

The strategy of utilising telemedicine through a team of trained para-clinical doctors, which has not been attempted yet, is an efficient way of delivering patient care amidst the lockdown restrictions of COVID-19. With the limitations of the present study, we have described a telemedicine approach to the follow up of people with diabetes under constraints

**Table 2 – Diabetes tele-consultation: Questions asked and responses received from participants.**

Leading questions asked (With common follow up questions)	Participant responses	
	Yes (%)	No (%)
Have you been able to maintain dietary adherence?	79.6	20.4
– What have you been eating?		
Have you been able to perform some form of physical exercise?	34	66
– What have you been able to do?		
– If not, why?		
Have you been able to maintain medication adherence by regularly taking your prescribed medicines?	95.1	4.9
– If not, why?		
Have you been able to check your blood glucose recently?	48.5	51.5
– When, how much was it?		
– Do you have a glucometer, can you buy one?		
– Can you find a facility nearby for measurement?		
Are there any issues with availability of medicines?	87.4	12.6
– Do you have a stock of sufficient medicines with you?		
– Can you buy them from a nearby pharmacy?		
Do you have any issues in affording or buying the medicines?	3	97
– If yes, how are you managing it?		
Any therapy modification required – decided by calling doctor	18.4	81.6
Have you suffered from any side effects with your prescribed medicines?	10.7	89.3
– If yes, what happened?		
Do you have any kind of stress, anxiety, loss of sleep or any other troublesome thoughts or ideations?	19.4	80.6
– If yes, what are you feeling?		
Have you been taking your other medicines regularly?	70.9	29.1
– Do you feel any other discomfort?		
– Can you get a test done at a facility near you?		
– (To address relevant comorbidities/complications)		
Are you able to monitor your blood pressure?	48.4	51.6
– When, how much was it?		
– Do you have a BP measuring instrument, can you buy one?		
– Can you find a facility nearby for measurement?		

imposed by the COVID-19 pandemic. We recommend this as a template which can be further explored and developed by other study groups elsewhere; it will continue to be followed for diabetes care in our institute. Similar efforts can now be planned for other chronic conditions like hypertension and asthma by identifying and training more such teams of doctors. Due to its simplified structure, this chosen approach of using semi structured interview type tele consultations may be suitable mainly as a relevant way to let subpopulations of people with diabetes feel confident with regards to their management and as a clinically useful screening tool for otherwise unnoticed conditions that may further require specialised consultation. It may be adapted at other centres which are resource limited during this pandemic, and struggling with delivery of patient care services for non-COVID illnesses like diabetes.

In the current scenario, and even for the foreseeable future, innovative approaches like this are the need of the hour.

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### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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