



## Usefulness of Telemedicine in Nephrology: The Role Beyond COVID-19

Dear Editor,

Most encouraging reports of the implementation of telemedicine in nephrology are from developed countries. There are few Indian studies on telemedicine in nephrology, especially on its impact after the COVID-19 pandemic. There is considerable variability between nephrology center policies and acceptability among patients in the context of telehealth.<sup>1</sup> We have published our experience of telemedicine<sup>2,3</sup> for kidney transplants during the pandemic. We report the feasibility, acceptability, and effectiveness of telemedicine in kidney care.

This was an observational, prospective, ethically approved study conducted between 1st June 2020 and 31st May 2024 at Fortis Vasant Kunj, Delhi. The procedure involved continually informing patients and relatives of the availability of telenephrology services for clinic visits. Our telenephrology technique was synchronous (both patient and doctor on the same platform) and comprised of an electronic medical record database called "Healthplix". It is a digital application for identifying patients' illnesses; writing prescriptions and treatments; scheduling and managing online consults; providing automated reminders to patients and doctors; customizing letterheads, prescriptions, investigations, and history all on one platform. This application is linked to WhatsApp and email. An online video or phone consultation was arranged as per time slot availability for every request. Patients without a smartphone (n=20) were assisted by a paramedical worker. A formatted message by Healthplix was delivered to patients/guardians via WhatsApp or Email as an output of the meeting. The results included current problems, demographics, vital signs, current and previous investigations, current and changed prescriptions, and follow-up advice. At the end of the e-consult the patient rated their experience on a Likert scale from 0 to 10.

During the study period, 3200 e-consults were given to 850 patients (254 new and 596 follow-ups). There were 2850 Indian residents and 350 patients outside India. All patients spoke Hindi or English. Table 1 describes the patient details. Teleconsultation was done via WhatsApp audio/video calls (74%) or regular audio calls (26%). The prescription was sent by WhatsApp (79%) or E-mailed (21%) as per patient preference. Distribution of the diagnoses was as follows: kidney transplant (n = 304), idiopathic nephrotic syndrome (n = 246), chronic kidney disease (n = 184), IgA nephropathy (n = 54), urinary tract infection (n = 34), acute kidney injury (n = 14) and others (n = 12). The mean age of the patients was 38 years (range 2 months–92 years). Some patients (255) were advised to come to the hospital for review (including 185 new

**Table 1: Patient characteristics in the telemedicine study**

Variables	n = 850
Age, mean (range)	38 (0.17 to 92)
Age group	
<18	50±5.88
18-30	134±15.76
30-40	110±12.94
40-50	236±27.76
50-60	246±28.94
>60	74±8.71
Gender	
Male	689±81.06
Female	161±18.94
Education level	
Illiterate	78±9.18
Higher secondary school	94±11.06
Graduate	155±18.24
Post-graduate	523±61.53
Socio-economic group	
Upper class	213±25.06
Upper-middle class	321±37.76
Lower-middle class	143±16.82
Lower class	173±20.35
Insurance	
Out of pocket	326±38.35
Government	123±14.47
Private	401±47.18
Duration of basic disease	
6 m	112±13.18
1 yr	134±15.76
1-2 yr	232±27.29
2-5 yr	221±26
> 5 yr	151±17.76
Distance from the institute (km)	
50	54±6.35
50-100	232±27.29
100-250	221±27.29
250-500	211±24.82
500-750	83±9.76
>750	49±5.76

patients and 70 follow-up patients). These included those with stage III AKI (n = 43), need for native or allograft biopsy (n = 23), uremic symptoms (n = 14), suspicion of pyelonephritis (n = 3), urinary tract infections non-responsive to oral antibiotics (n = 6), severe pneumonia (n = 11), acute gastroenteritis with intractable symptoms/ or danger signs (n = 31), and others (n = 10). Of these, 54 (21.1%) were advised admission, while the rest were advised to undergo follow-up. The mean (range) patient satisfaction score for e-consults was 8 (7-9). In a formal survey of 659 patients, 67% preferred telenephrology follow-ups to in-person visits.

Currently, the role of telemedicine in nephrology is under-recognized.<sup>4</sup> The concept of teleneurology comes with an exciting opportunity to modify, enhance, or even substitute current practices.<sup>5</sup> In emerging nations like India, where tertiary centers are scarce and unevenly distributed, telemedicine plays a vital role for patients residing in remote places.<sup>6</sup>

The patients in our study were from all age groups and had an evenly distributed educational and economic status. The number of male participants was higher, as prevalent in various studies of nephrology from India.<sup>7</sup> The satisfaction scores were excellent indicating support for teleneurology. The virtual availability of specialist doctors was the most important factor. The satisfaction levels of patients have not been extensively studied before.<sup>8</sup> Schmid *et al.*,<sup>9</sup> tested the role of telemedicine in managing kidney transplants (n = 46), even within the first year of transplantation. With a significantly higher number of post-transplant cases (n = 306), our patient adherence and acceptability resonated with their study. Cumulatively, teleneurology can reduce the cost of travel but cause a loss of daily wage, significantly. Our study group had 38.35% patients who were paying from pockets who would have benefited the most. The patients paying from pocket (38.35%) and those above 40 years (>50%) would find teleneurology a comfortable and cost-effective alternative. A recent study also agrees with these findings.<sup>10</sup> Teleneurology would be preferred if the employment profile of some patients or relatives would not allow them for in-person visits. Importantly, patients with poor knowledge of technology could use teleneurology with assistance. Notably, patients with new diagnoses (13.18%) showed confidence in telemedicine as they are generally more reluctant than chronic patients. The study's limitation was the lack of granular data on cost-effectiveness. We used synchronous telehealth, as other modalities like asynchronous, remote patient monitoring, and mobile health require higher man-power, logistics, and new technology acceptance. We stress that the inability to complete a clinical examination will always exist. Still, the role of this emerging field is immense, and further studies are warranted.

**Conflicts of interest:** There are no conflicts of interest.

**Hari Shankar Meshram<sup>1</sup>, Sanjeev Gulati<sup>2</sup>**

<sup>1</sup>Department of Nephrology, ILBS, Vasant Kunj, <sup>2</sup>Department of Nephrology, Fortis Group of Hospitals, New Delhi, Delhi, India

**Corresponding author:** Sanjeev Gulati, Department of Nephrology, Fortis Group of Hospitals, New Delhi, Delhi, India.  
E-mail: sgulati2002@gmail.com

## References

1. Raina R, Nair N, Sharma A, Chakraborty R, Rush S. Telemedicine for pediatric nephrology: Perspectives on COVID-19, future practices, and work flow changes. *Kidney Med* 2021;3:412-25.
2. Mazumder MA, Gulati S, Sengar A. Telemedicine in paediatric subspecialty: A low cost model for developing countries during the COVID-19 pandemic. *J Indian Med Assoc.* 2022;120:11-5. Available from: <https://imsear.searo.who.int/server/api/core/bitstreams/063e989b-c56c-45f1-b405-76bf1fd9075a/content> [Last accessed 2024 Nov 20].
3. Gulati S, Sengar A. Experience with telemedicine in paediatric nephrology during the COVID pandemic. *Pediatr Nephrol* 2021;36:2499-500.
4. Stauss M, Floyd L, Becker S, Ponnusamy A, Woywodt A. Opportunities in the cloud or pie in the sky? Current status and future perspectives of telemedicine in nephrology. *Clin Kidney J* 2020;14:492-506.
5. Campbell M, Akbari A, Amos S, Keyes C. Feasibility of providing nephrology services to remote communities with videoconferencing. *J Telemed Telecare* 2012;18:13-6.
6. Lea JP, Tannenbaum J. The role of telemedicine in providing nephrology care in rural hospitals. *Kidney360* 2020;1:553-6.
7. Han M, Wong G, Kute VB, Nakagawa Y, Wang HH, Arakama MH, *et al.* Gender disparity in asiAan-pacific countries: An analysis of the ASTREG-WIT-KT registry. *Transplantation* 2023;107:1-5.
8. Osman A, Lee SH, Noori M, Al-Jaishi M, Gallo K, Harwood L, *et al.* Patient perspectives of telemedicine in outpatient nephrology clinics during COVID-19: A qualitative study. *Can J Kidney Health Dis* 2024;11:20543581241293192.
9. Schmid A, Hils S, Kramer-Zucker A, Bogatyreva L, Hauschke D, De Geest S, *et al.* Telemedically supported case management of living-donor renal transplant recipients to optimize routine evidence-based aftercare: A single-center randomized controlled trial. *Am J Transplant* 2017;17:1594-605.
10. Dev V, Mittal A, Joshi V, Meena JK, Dhanesh Goel A, Didel S, *et al.* Cost analysis of telemedicine use in paediatric nephrology-the LMIC perspective. *Pediatr Nephrol* 2024;39:193-201.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, transform, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**How to cite this article:** Meshram HS, Gulati S. Usefulness of Telemedicine in Nephrology: The Role Beyond COVID-19. *Indian J Nephrol.* doi: 10.25259/IJN\_745\_2024

**Received:** 29-11-2024; **Accepted:** 06-01-2025;  
**Online First:** 25-02-2025; **Published:** \*\*\*

**DOI:** 10.25259/IJN\_745\_2024

