Pediatric Nephrology (2024) 39:193–201
https://doi.org/10.1007/s00467-023-06062-1

ORIGINAL ARTICLE

Cost analysis of telemedicine use in paediatric nephrology—the LMIC perspective

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Received: 2 May 2023 / Revised: 7 June 2023 / Accepted: 14 June 2023 / Published online: 24 July 2023

Abstract

Background The overall cost of managing chronic diseases is a significant barrier to accessing complete and timely healthcare, especially in rural and geographically isolated areas. This cost disparity becomes more pronounced in the case of children and more so in under-resourced regions of the world. In the era of COVID-19, as the need for physical distancing increased, there was a transition in approach to healthcare provision to telemedicine consultations. This study evaluates the cost saving using teleconsultations in a paediatric nephrology clinic.
Methods This prospective cohort study was conducted at AIIMS Jodhpur, a tertiary care centre in western Rajasthan from March 2021 to October 2022. All consecutive paediatric (29 days–18 years) patients attending telemedicine services for kidney-related illness were enrolled. Basic demographic details were collected. Cost analysis was done after 6 months, regarding perceived cost savings for the patient and family by using telehealth for follow-up during 6 months starting from enrolment.
Results A total of 112 patients were enrolled; 266 teleconsultations attended; 109 patients who could be followed up saved INR 457,900 during 6 months of follow-up. The average cost saving was INR – 1577/patient/visit. Patients saved 4.99% of the family income (median 2.16% (IQR 0.66–5.5)). The highest expenditure per visit was incurred for food and transport. The median distance from the residence to the clinic was 122.5 km (IQR 30–250). Over the 6-month study period, patients saved a travel distance of 83,274 km (743 km/patient).
Conclusions The use of telemedicine as a follow-up method helps save significant costs and distances travelled by patients.

Keywords Telemedicine · Cost analysis · Children · Low middle–income countries · Travel distance

Introduction

Low middle–income countries (LMIC) are defined as those with a GNI per capita between \$1036 and \$4045 (1 USD = 82.5 INR) according to the World Bank definition for 2023. The LMICs are known to be home to a majority of the world's population, especially the poor. India, the largest among the LMICs, is now also the most populous nation with 18% of the world population living here. The skewed doctor/patient ratio makes equitable healthcare distribution an unlikely phenomenon. Telemedicine therefore becomes a crucial tool that can address this disparity and enhance the delivery of healthcare services. It has become increasingly acceptable in the post-COVID pandemic era [1–7].

It is seen that telemedicine is more convenient than travelling to meet a specialist, leading to equal or better patient satisfaction with comparable patient outcomes compared with in-person appointments [6–11]. It is also a more patient-centric and environmentally friendly model of care [3, 5, 11–15]. Some studies have shown reduced expenditure for patients and their families in terms of travel, lodging, and out-of-pocket expenses [15].

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Telemedicine has been used for over three decades in various forms across various countries. Studies from other countries have proven the reduction in cost and environment friendliness of this service for follow-up of chronic illnesses. The same, however, has yet to be evaluated in the setting of a LMIC. In a country like India, a large population lives below the poverty line. Those living above are also plunged into poverty while incurring the cost of a chronic illness. The state-based insurance schemes only cover health expenditures during hospital admission. However, the out-of-hospital expenses patients incur remain unaccounted for in terms of time and travel. This study analyses the cost for the patients utilising our telemedicine services for paediatric nephrology in a rural state in India.

Methods

This prospective cohort study was conducted at All India Institute of Medical Sciences, Jodhpur Rajasthan, a tertiary care centre and an institute of national importance that caters to a population from the entire northwest India. The population of the state of Rajasthan itself is 79.5 million living over an area of 0.35 million km^2, which includes a tough terrain of the Thar Desert. The tertiary care services in the region are also provided through various state medical colleges; however, most of them do not have paediatric nephrology and telemedicine service provision. This study was conducted from March 2021 to October 2022. All consecutive patients who took teleconsultation for paediatric renal problems from March 2021 to April 2022 were enrolled and followed up for 6 months for the study. Patients with kidney failure on dialysis were excluded as their cost factors differ from non-dialysis-dependent patients. Details of patients who met the inclusion criteria were obtained from the Hospital Information System (HIS) every week. During the 6-month follow-up, some of these enrolled patients additionally required an in-person visit, which was recorded and accordingly accounted for during cost analysis. The group was the only group followed up for 6 months for all types of health contacts with us (tele visit or in person). A patient reporting any adverse event at any time during the study was evaluated for a possible relation to teleconsultation or due to lack of an in-person visit (Table 1).

Teleconsultation overview

Physician end

Teleconsultation was provided by a paediatric nephrologist assisted by trainees in Paediatrics and Paediatric Nephrology as well as a data entry operator (DEO). The DEO listed the cases and the trainees initiated contact with the patients on the list and summarised the case history and collected previous records through WhatsApp and email in the initial hours of clinic time. Once compiled, the case was reviewed by the consulting paediatric nephrologist and treatment advised online. The prescription was also sent to the patient online. Appointments for the follow-up for teleconsultation were also provided from the physician's end. Apart from this, a paediatric nephrology on-call number was also provided to patients to contact the team in an emergency.

Patient end

The patients who availed of teleconsultation used smartphones to access the hospital website and make appointments. Those unable to do it themselves availed themselves of the services of E-Mitra (an E-Mitra kiosk or an electronic friend is a government-run computer facility that facilitates the use of computers and electronic transactions to help those who are not computer literate. These are also used for various other government-related assignments like applications for passport, online filling of forms, results declared online). Some of those who did not have a smartphone themselves used a neighbour's or relative's device to exchange any images.

Cost analysis was performed using a predesigned questionnaire 6 months after enrolment and targeted a capture of perceived cost savings for the patient and family by telehealth. All in-person visits during the 6-month observation were also accounted for during the cost analysis.

The cost analysis questionnaire consisted of various components (e.g. food and transport, lost wages, stay, internet services) (Table 2) and the expenditure for availing telemedicine services. The average cost spent by the patient for in-person visits was determined. In case the child needed admission, that cost was excluded. Any cost spent on telemedicine was also accounted for in the analysis. The difference in cost spent for the patient for an in-person visit and telemedicine was calculated. The difference was the expected cost a patient would have saved with one telemedicine visit. When multiplied by the number of telemedicine visits the patient had in the last 6 months, this cost gives us the difference in expenditure for a patient using telemedicine compared to what they would have spent had there been no telemedicine consultation (Table 3). The total cost saved by all the patients was determined and compared to each patient's total family income from all sources to estimate percentage expenditure/saving. The distances travelled by patients for each visit were calculated by multiplying the distance on one side by two and the number of telemedicine visits the patient had, presuming all telemedicine visits required an in-person consultation.

Table 1 Outcomes of patients enrolled in the study (all patients were enrolled after their first telemedicine consult and followed up for 6 months)

Outcomes of patients who had an adverse event during the course of follow-up

S no	Primary disease	Disease state at time of enrolment	Adverse event	Reason for adverse event	Duration between last teleconsult and adverse event (months)
1	SRNS	Remission	Relapse with SBP	No follow-up at the time of relapse	3
2	IFRNS	Remission	Relapse with AKI	No follow-up at the time of relapse	4
3	SRNS	Partial Remission	AKI with CNI toxicity	Poor compliance, no follow-up CNI levels done as per advice. CNI was stopped on the last teleconsult	1/2
4	CKD stage 5 with HTN not on dialysis	BP well controlled as per patient	Hypertensive urgency picked up during an in-person visit	Lack of regular home BP monitoring	1
5	SRNS	Partial remission	Relapse with sepsis with AKI	Poor response to treatment, multiple previous relapses with infections	The previous visit was also an in-person visit
6	IFRNS	In remission	Relapse with CSVT	IFR not on medication, CSVT known complication of relapse	1.5

Outcomes of patients without any major adverse event (15 patients)

S no	Disease entity (n)	Status at enrolment	Status at time of follow-up
1	NS (4)	IFR	SDNS or FRNS
2	NS-SRNS (1)	Remission	Partial remission after relapse
3	SDNS (9)	Remission on LTAD/Levamisole	Additional relapses requiring upgrading immunosuppression
4	CKD	Stage 3	Stage 4

Patient-reported outcomes (perceived). (Score 0 and 1—asymptomatic not on treatment and on treatment (static), 2 and 3 for worsening disease without and with added complications ($n=112$)

S no	Disease entity	Number of patients	Score 0 or 1	Score 2 or 3
1	IFRNS	30	28	2
2	SDNS	21	12	9
3	SRNS	10	7	3
4	GN	11	11	0
5	CAKUT	20	19	0
6	CKD	3	2	1
7	RTA	4	3	1
8	UTI	7	7	0
9	Misc	6	5	1

Abbreviations: *SRNS*, steroid-resistant nephrotic syndrome; *IFRNS*, infrequent relapsing nephrotic syndrome; *CKD*, chronic kidney disease; *HTN*, hypertension; *CNI*, calcineurin inhibitor; *SDNS*, steroid-dependent nephrotic syndrome; *GN*, glomerulonephritis; *CAKUT*, congenital anomalies of kidney and urinary tract; *RTA*, renal tubular acidosis; *UTI*, urinary tract infection

Results

A total of 112 patients were enrolled. The median age was 8 years (4–13); 66.1% ($n=74$) males and 33.9% ($n=38$) were females. Telemedicine consultations were attended by the father, mother, siblings, uncles, and grandparents of our patients, and the father attended the majority. Forty percent ($n=45$) of patients belonged to the nuclear family. The median family income per year was 2 Lakh (~2400 USD) (1–4). Many patients (65%) had some prior idea about telemedicine use.

Disease-wise distribution of patients in the study was as follows (Table 1). Steroid-sensitive nephrotic syndrome, 30; steroid dependent nephrotic syndrome (SDNS), 21; steroid resistant nephrotic syndrome (SRNS), 10; glomerulonephritis, 11; congenital anomalies of kidney and urinary tract (CAKUT), 20; chronic kidney disease of unknown cause, 3; renal tubular acidosis (RTA), 4; urinary tract infection

Table 2 Expenditure for the patient in various domains (figures in INR: 1 USD = 82.2 INR)

	Mean	Median	Total/cumulative
Cost for food of patient for a single visit (40% did not have to pay for food)	87.75 (0–400)	100 (IQR 0–150)	9565
Cost for transport of patient for a single visit (only 29% had to pay for transport)	91.46 (0–700)	-	9970
Cost for food and transport of patients for a single visit	179.21 (0–1000)	100 (IQR 0–300)	19,535
Number of attendants accompanied in a single visit	1.55 (1–3)	2 (IQR 1–2)	
Cost for food of attendants for a single visit (not including the cost of private transport or taxi)	129.67 (0–700)	100 (0–200)	14,135
Cost for transport of attendants for a single visit (not including the cost of private transport or taxi)	369.4 (range 0–7500)	250 (IQR 0–50)	40,270
Cost for food and transport of all attendants for a single visit (not including the cost of private transport or taxi)	851.15 (0–16,000)	500 (100–1000)	92,775
Cost for transport in the case where they used a taxi or private transport	152*	-	16,550
The cost spent for the stay (15% (n = 17) of patients required to stay, of which 10 patients spent on rent)	53*	-	5800
Lost wages for a single visit (There was a loss of work for 75 attendants. There was a loss of wages for the attendants of 47 patients. The rest were having paid leaves.)	332.11 (0–3000)	500 (0–300)	36,200
Expenditure for a single in-person visit (including lost wages)	1577.43 (60–16,310)	1110 (610–1810)	171,940

*This varied if the mode of transport was a taxi or a private transport (n = 26). The total cost in this category was INR 16,550, with an average of INR 152/patient. The median was not calculated for expenditure for stay and transportation by taxi or private transport as the number of patients in this category was less

Table 3 Calculation of cost saving (1 USD = 82.2 INR)

The cost is spent on a single in-person visit	x	The average saving per visit	Rs. 1577/patient /visit
Telemedicine visits in 6 months	y	Average saving per patient over 6 months	Rs. 4200 (Median, 2130 (IQR 820–4390))
Expenditure for telemedicine visit in 6 months (z)	z	Family income	Mean, 2.97 Lakh. Median, 2 Lakh (IQR 1–4)
Saving for each patient	xy-z	Saving on health per family with respect to family income	Mean, 5% (Median, 2.16% (IQR 0.66–5.5)
Total savings on telemedicine for all patients	$(xy\text{-}z)_1 + (xy-z)_2 + (xy-z)_3$ $(xy-z)_{112}$		
Figure in INR			457,900

without CAKUT, 7; other miscellaneous diseases, 6 (2 hypercalciuria under evaluation, 1 each of atypical haemolytic uremic syndrome, renal artery stenosis with hypertension, nocturnal enuresis, and haematuria under evaluation). Thirty-four patients had only teleconsultations during the 6-month observation period. The median number of telemedicine visits was two visits/per patient (IQR 1–4). In-person (physical) visits were required for 75 patients, with a median number of in-person visits of 1/patient. Of those who required additional physical/in-person visits, 17 were for investigations, 9 for routine follow-up only, and 32 for both investigations and routine follow-up.

Of the 109 patients followed up at 6 months, 21 had some form of disease worsening, of which adverse events not related to the natural course of disease progression were noted in only 6 patients. Of these, five were preceded by a telemedicine consultation (only 2 in the previous 60 days). The adverse events appeared to be unrelated to a lack of in-person/physical consultation (Table 1). These adverse events were managed by an in-hospital admission (cost of hospital stay was excluded from analysis). For all others, outcomes were telephonically reported by patients at 6 months. These were recorded and scored in terms of disease course being static or worsening (Table 1).

Figure 1 depicts the geographical distribution of the patients on a map of the state of Rajasthan. We calculated the distance that each patient travelled individually for a hospital visit. It was seen that the median distance from the residence to the hospital was 122.5 km (30–250)

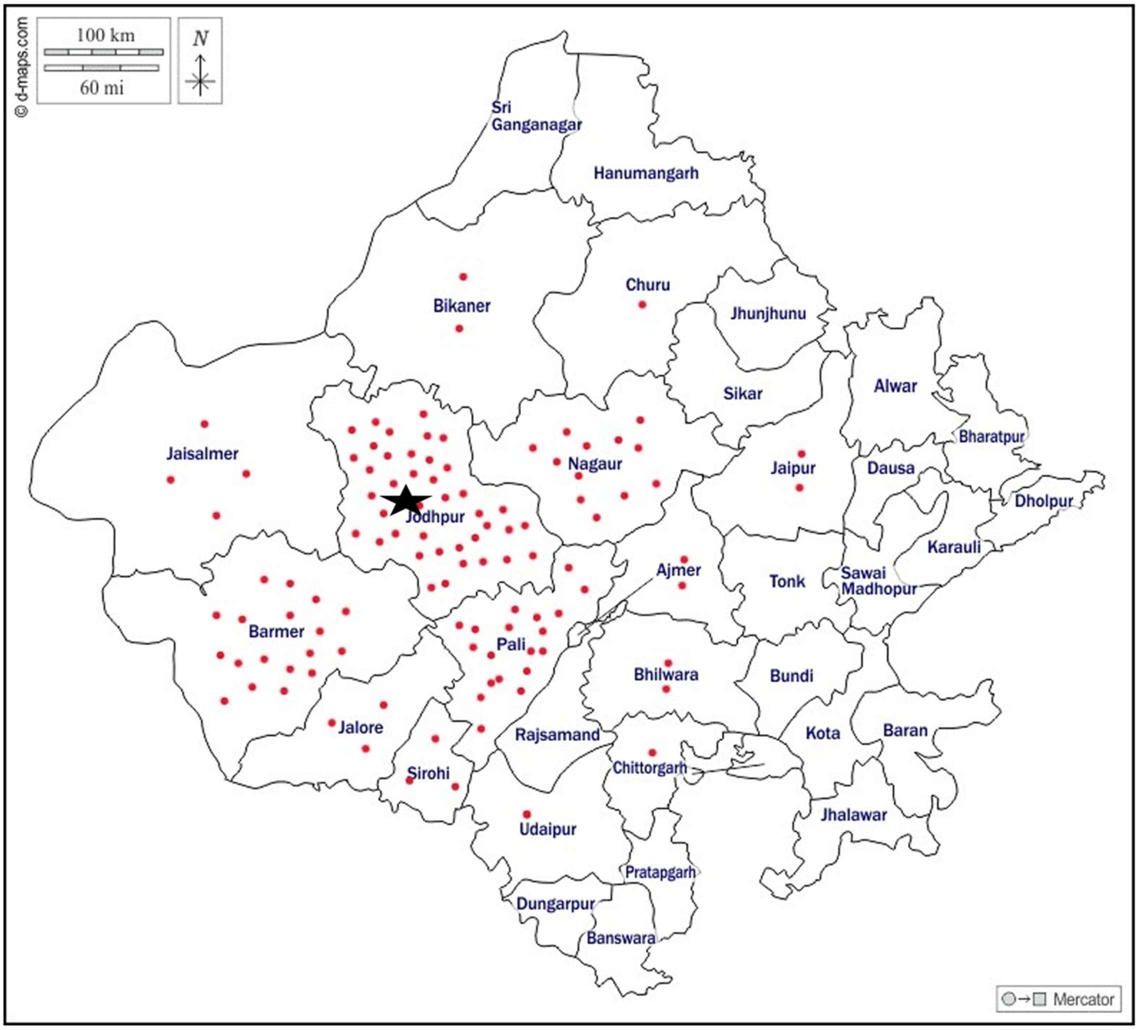

Fig. 1 Map of Rajasthan (spread over 0.35 million km^2) showing the geographic distribution of patients attending Teleconsultation in Pediatric Nephrology at AIIMS Jodhpur (star). Each dot represents a patient. The population of Rajasthan is 79.5 million and 4.2 million people live in Jodhpur itself which is a district spread over 235 km.[2]

(mean = 296 km). The average travel distance saved by a patient over 6 months was 743 km/patient.

Our patients saved a cumulative travel distance of 83,274 km in the 6 months. Table 4 depicts the detailed calculation of the travel distance saved.

Table 4 Calculation of distance saved

Distance travelled by individual patients from home to hospital	N [n1,n2…….n112]	Mean = 147 km Median = 122.5 km (IQR 30–250)
Distance on each round trip	2N	
Number of telemedicine visits of each patient in 6 months	X [×1,×2….×112]	
Distance travel saved by each patient in 6 months	2NX	Mean = 743 km Median = 360 km (IQR 80–1012.5)
Total distance saved	2NX [2n1 × 1 + 2n2 × 2 + 2n3 × 3…2n1 12 × 112]	83,274 km

Cost analysis

Cost analysis was done by assessing the difference between the expenditure for an in-person/physical visit and a telemedicine consultation. All the patients had higher expenditures for physical visits. The loss of wages was also accounted for in expenses of in-person visits. Expenditure for an in-person visit was calculated as per Table 2.

Only four patients had to spend extra on the Internet for telemedicine services. Some patients had to depend on the E-Mitra service for telemedicine appointments, adding to telemedicine expenses. There was a loss of work for 75 accompanying attendants. There was a loss of wages for 47/109 (42%) attendants accompanying the children for in-person visits. The rest had paid leaves. The median loss of wages was INR 300 (IQR 0–500) (~4 USD). The average loss as lost wages was INR 330 (4.2 USD).

None of the attendants had any loss of wages or any additional cost for travel to avail of the telemedicine service. For follow-up telemedicine visits for 1 month, the appointment was free. A total of 27.5% ($n=30$) depended on E-Mitra; 45.5% ($n=46\%$) got it by themselves and others from the hospital during in-person visits.

The median expenditure for telemedicine services over 6 months was INR 30 (IQR 0–50) (0.36 USD). Forty percent had no expenditure on patients' food, and only 29% had a payment for patients' transportation. Fifteen percent ($n=17$) of patients were required to stay, of which 10 spent money on rent, while 7 stayed at relatives' houses. The need for overnight stays added to the cost and affected sleep quality.

There was an average cost saving of INR – 1577/patient/visit (19.23 USD), which amounted to INR 4200 (60 USD) over the 6-month study period per patient (median = INR 2130 (820–4390) (30 USD)).

Considering all the patients, there was a total saving of INR 457,900 (5563.15 USD). These savings were evaluated as a percentage of their monthly family income. Estimated mean saving was 4.99% of the monthly family income (range 0.012–37), a median of 2.16% (IQR 0.66–5.55%) per patient over the 6 months. Table 3 depicts the detailed cost analysis.

Discussion

Even though telemedicine has been in use since the beginning of the nineteenth century [16], it has only found its footing during the time of COVID. Evidence from developed countries shows that telemedicine is economically better than in-person visits [15, 17–21].

In the present study, conducted in a relatively economically backward state of an LMIC, we avoided in-person visits in 34 patients (30%). The median number of telemedicine visits was 2 (IQR 1–4). Telemedicine seemed efficient in all static chronic kidney diseases, such as acute post-infectious glomerulonephritis, CAKUT, stable CKD, and RTAs, but seemed to be less efficient for illnesses with higher chances of being complicated, like advanced stages of CKD and nephrotic syndrome, especially SRNS and SDNS.

Evidently, the expenditure to avail of telemedicine service was negligible compared to in-person visits. This difference was more significant in those who lived far away, where there was a need to stay overnight, several attendants accompanied the patient, and whether the attendants were losing out on work/paydays. The expenditure on the transport and food of the accompanying attendant comprised a significant portion of the expenses during a physical visit. With telemedicine, INR 4200 (60 USD) was the average saving over the 6 months per patient, with a mean saving of 4.99% of their monthly family income. This amount becomes a significant saving, especially in the setting of a low-income family. The total calculated saving amounted to INR 457,900 (5563.15 USD).

In an Australian study, total annual savings were AUD 31,837 (INR 2,640,400) [15]. They calculated the costs of telehealth services, staff salaries, and travel. This study did not include additional costs to the family, such as time off work, parking, fuel, and meals. There is a huge overall cost difference which is also attributed to differences in the cost of living in both countries (per capita income of Australia: 60,443.1 USD vs. India: 2256.6 USD (https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=IN)).

In another study on 208 geriatric patients, AUD 131 (INR 7261) was saved per consultation compared to an in-person visit (present study = INR 1577/AUD 29 [17]). In their study, the cost of providing telehealth and other human resources services was compared to those of in-person service. Studies in diabetic patients in Queensland have also reported the economic benefit of telemedicine. Costs were calculated by quantifying the staff resources and travel costs for each clinic model. They reported savings in travel costs of AUD 517 (INR 42,876) for a single consultation [18]. This study did not consider the expense of running the telemedicine service.

Many of our patients were using public transport (75%). Only 25% were using a private vehicle or taxi. Only 42% of our attendants lost wages; the average loss was only INR 330 (USD 4), as they were daily wage workers with less pay overall. Despite this, there was a benefit of 5% of the family income per patient.

There was a significant benefit of telemedicine services in the assessment of the overall use of the patients.

The median distance from the residence to the hospital was 122.5 km one way (IQR 30–250). As the number of

Table 5 Studies on cost analysis of telemedicine

Sl no	Author (year) /journal	Study title	Study population	Observation	Limitations	Conclusion
1	Smith AC (2007)/BMC Health Services Research [21]	The costs and potential savings of a novel tele pediatric service in Queensland	$n = 1499$ consultations	Cost–benefit of $6 lakh	Cost provided for a group of patients compared with the potential cost of visits to tertiary centre	Telemedicine is cheaper compared to in-person visits
2	Trnka P et al. (2015)/BMC Nephrology [15]	A retrospective review of telehealth services for children referred to a pediatric nephrologist	$n = 168$ 3 months–24 years Median of 8 years	Cost savings with telehealth were $31,837 in 2013 (average saving of $505 per consultation)	Additional costs to the family, such as time off work, parking, fuel, and meals were not included in this study	Paediatric telenephrology is a practical and cost-effective tool for patient evaluation and follow-up
3	Versleijen M (2015)/Journal of Telemedicine and Telecare [17]	A telegeriatric service in a small rural hospital: A case study and cost analysis	$n = 208$/geriatric patients	There was a saving of AUD 131 per patient consultation with telegeriatric service	There is no assessment of cost–benefit in terms of disease outcome	Telegeriatric service offers an economically better approach to avail specialist geriatric care in rural and remote settings
4	Dullet NW et al. (2017)/Value in Health [19]	Impact of a university-based outpatient telemedicine program on time savings, travel costs, and environmental pollutants	19,246 consultations, in 11,281 patients	There were savings of 5,345,602 miles Total travel time savings of 4,708,891 min, almost 8.96 years Total travel cost savings of $2,882,056 Environmental benefits of emissions savings of 1969 metric tons of CO_2, 50 metric tons of CO, 3.7 metric tons of NO_x, and 5.5 metric tons of volatile organic compounds	This was a retrospective study Other cost components, like saved working hours, wages, waiting time, and additional costs like parking	Telemedicine has a positive impact on patients' travel time, travel cost, and environmental pollutants
5	Snoswell CL (2019)/ Journal of Telemedicine and Telecare [18]	A cost-consequence analysis comparing patient travel, outreach, and telehealth clinic models for a specialist diabetes service to Indigenous people in Queensland	Not reported	In this study, while comparing the cost to attend a telemedicine consultation to the cost of travel to a metropolitan or outreach clinic, there was an economic benefit of approximately $517	The analysis was dependent on various assumptions associated with salary, travel, and accommodation costs, which have been outlined throughout	Even though telehealth will not be able to completely replace in-person visits, even the replacement of some of the visits gives an economic advantage for the patient

telemedicine consults increased, the time saved on distance travelled was higher. Our patients have saved a cumulative travel distance of 83,274 km with an average of 743 km per patient over the 6 months. In the study by Qui et al., the median distance to their tertiary centre was 191 km (range 110–1378). The median traveling distance saved by using telemedicine was 190 km (range 88–1377) one way per visit [22].

In another study, 19,246 consultations among 11,281 unique patients were retrospectively analysed. With telemedicine, the patients saved 8,602,912.505 km of total travel distance, 4,708,891 min of total travel time (8.96 years), and a total direct travel cost of $ 2,882,056. Environmental benefits include total emission savings of 1969 metric tons of CO_2, 50 metric tons of CO, 3.7 metric tons of NO_x, and 5.5 metric tons of volatile organic compounds. In our study, the median travel distance saved per visit was 245 km (mean 296 km); this is expected as the geographical condition differs in these two countries. Most patients were using public transport, so it was impossible to calculate fuel requirements and environmental benefits [19] correctly. There is less fuel consumption as there is less requirement for transportation and thus less emission of pollutants, though the same could not be quantified as the majority used public transport. Telemedicine provides many benefits without any adverse effects on disease outcomes. There were significant monetary benefits for the patient, and it saved time. The service also provides environmental benefits, as it decreases travel distance and thus fuel consumption, leading to less emission of pollutants.

Table 5 summarises other studies on cost analysis using telemedicine.

Conclusions

The strengths of the present study lie in detailed cost analysis, including all the domains of expenditure from a LMIC perspective, where the cost of living is lower as compared to the regions in developed countries from where cost analysis studies are currently available [15, 17–21].

However, the expenditure the institute/government had to incur for providing the telemedicine services, like the interface, software, and telephone calls, could not be included, and only patient-side expenditure was considered. Also, the time spent by the doctor on teleconsult compared to physical visits could not be evaluated. The study was conducted during the peak of the COVID-19 pandemic. Hence, comparison with a concomitant physical visit cohort was not feasible. However, it was clear that telemedicine economically benefits the patient, with total savings amounting to INR 457,900 (5563.15 USD), with INR 4200 (51 USD) as the average saving over the 6 months per patient. There was a mean saving of 5% of their monthly family income with telemedicine. The maximum expenditure was incurred on food and transport. However, since the current study is region specific, the figures may vary for different economic regions and in the current study reflect the perspective of a LMIC. In all, telemedicine was very cheap for our patients, and the median expenditure to avail of telemedicine services over 6 months was INR 30 (IQR 0–50) (0.36 USD).

There is an environmental benefit, as the travel distance saved was 83,274 km (743 km per patient over the 6 months). The study emphasises, that while it may be of limited benefit for patients with progressive kidney disease, like nephrotic syndrome or advanced CKD, its utility for chronic follow-up of patients with static kidney diseases cannot be undermined.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s00467-023-06062-1.

Data availability The data that support the findings of this study are Available from the authors upon request to corresponding author.

Declarations

Ethics approval The study was started after obtaining ethical approval from Institute Ethics Committee, All India Institute of Medical Sciences Jodhpur, Rajasthan, India.

Consent to participate Participants were enrolled after obtaining informed consent.

The authors declare no competing interests.

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