

# Awareness among Pediatricians Regarding National Telemedicine Guidelines during the COVID-19 Pandemic: A Survey

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## Abstract

The success of telemedicine depends on awareness among doctors on how to implement it. We aimed to assess knowledge about national telemedicine guidelines in pediatricians during the coronavirus disease 2019 (COVID-19) pandemic. A cross-sectional study of pediatricians across India was conducted through a structured online questionnaire containing 16 marks. The mean knowledge score (KS) was calculated. Participants were divided into two groups: poor KS (KS <8) and good KS (KS ≥8). The association between factors and KS was assessed using univariate analysis. A total of 503 pediatricians participated (private sector: 80.7% and public sector: 19.3%). Most (61%) belonged to the age group of 31–50 years and were males (75%). The minimum educational qualification was a Doctor of Medicine (MD) in 57% of cases. Despite work experience of more than 5 years in most (70%) of the cases, very few had provided teleconsultation before the pandemic (13.9%). The mean KS was 10.60 ± 2.8, that is, 66.25%. The minimum KS was 1 (6.25%), and the maximum was 16 (100%). Assam, Chandigarh, Himachal Pradesh, Jharkhand, Odisha, Sikkim, and Tamil Nadu showed higher knowledge than other states, although no significant difference was found. The majority (89.1%) had good KS, which is significantly higher among private practitioners as compared to public practitioners. There was no association between KS and age, gender, qualification, and work experience. Pediatricians have good information regarding telemedicine guidelines in India; however, training programs will further empower doctors working in the public sector.

**Keywords:** Awareness, COVID-19, knowledge, pediatricians, pandemic, telehealth, telemedicine

## INTRODUCTION

Telemedicine is a cost-effective, emerging healthcare sector that utilizes information and communication technology to provide medical services to distant populations.<sup>[1]</sup> During the coronavirus disease 2019 (COVID-19) pandemic, in view of limited hospital visits and lack of face-to-face consultations,<sup>[2]</sup> telemedicine has proved to be an effective and safe tool for improving accessibility and quality of care in developed countries; however, developing countries seem to lag behind.<sup>[3]</sup>

In India, telehealth was initially employed in private hospitals.<sup>[4]</sup> With the setup of the telemedicine division of the Ministry of Health and Family Welfare, the Government of India has left no stone unturned in the expansion of telemedicine.<sup>[5]</sup> Knowledge and perception of physicians of telemedicine are the deciding factors for its successful adoption into the system apart from others such as standardized guidelines, resources, technical expertise, and public acceptance.<sup>[6]</sup> The Board of Governors, in supersession of the Medical Council of India, has released

“Telemedicine Practice Guidelines” dated March 2020 providing standard framework for the implementation of telemedicine practices.<sup>[7]</sup> However, ignorance among healthcare practitioners in operating telehealth portals is thought-provoking.<sup>[8]</sup>

There is a scarcity of studies investigating physicians' knowledge regarding telemedicine in India,<sup>[9-11]</sup> and none have enquired about recent guidelines. Very few authors have studied awareness of this technology during the COVID-19 pandemic<sup>[12,13]</sup> and none from India. Therefore, we aimed to study the knowledge of pediatricians regarding recent telemedicine guidelines during the COVID-19 pandemic.

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**How to cite this article:** Alam A, Kaur H, Bhatnagar S. Awareness among pediatricians regarding national telemedicine guidelines during the COVID-19 pandemic: A survey. *Indian J Community Med* 2024;49:539-43.

**Received:** 27-07-22, **Accepted:** 26-02-24, **Published:** 24-05-24

### Access this article online

Quick Response Code:



Website:  
www.ijcm.org.in

DOI:  
10.4103/ijcm.ijcm\_644\_22

## METHODS

This is a cross-sectional survey of pediatricians from government and nongovernment medical colleges, hospitals, and private chambers all over India for the assessment of knowledge regarding recent telemedicine guidelines. The study has received ethical approval from the ethics review committee, Era's Lucknow Medical College and Hospital, Lucknow, Uttar Pradesh.

### Inclusion criteria

Doctors in the field of pediatrics, including consultants, specialists, and senior and junior residents, were recruited for the study.

### Sample size

The sample size needed to assess knowledge was determined to be 384, using the formula  $n = z^2pq/d^2$  [ $z = 1.96$  for 95% confidence interval,  $p$  is the proportion of knowledge, and  $d$  (precision) = 5%].  $p$  of 50% was used as no relevant estimate was found in the same population. Considering a 10% nonresponse rate, the total sample size is estimated to be 422.

### Data collection

Data were collected for 2 months using an online questionnaire. It was filled by respondents after they provided informed consent. The questionnaire was formulated in the English language, based on frequently asked questions about telemedicine recent guidelines, released by the Indian government in April 2020.<sup>[14]</sup> It has previously not been used as an assessment tool. The questionnaire included a section of 14 questions where a score of "1" was given for "correct" and "0" for "incorrect" or "not sure" responses, and one could score 0–16. Electronic "SurveyMonkey" was used as a survey tool due to the nationwide lockdown. Information was collected through professional circle forwarding (convenience sampling) and WhatsApp group promotion (snowball sampling). "SurveyMonkey," a professional online survey tool, is fast, low cost, easy to learn, and easy to use as compared to traditional methods.

### Statistical analysis

Data were entered into a Microsoft sheet and tested for normality. Categorical data were expressed as percentages and numerical data as mean  $\pm$  standard deviation (SD). The average score of 8 (50%) was used as a cutoff point to determine the level of knowledge. A mean knowledge score (KS)  $<8$  was considered poor knowledge and  $\geq 8$  was considered good knowledge of telemedicine. Factors affecting the KS of pediatricians were also assessed. A comparison of categorical data was performed using the Chi-square test and of numerical data by the nonparametric Mann-Whitney test or Kruskal-Wallis test. The control chart method was used to find significantly high- and low-knowledge states. Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) version 23.0 (SPSS Inc., Chicago, IL, USA). A  $P$  value of  $<0.05$  was considered significant.

## RESULTS

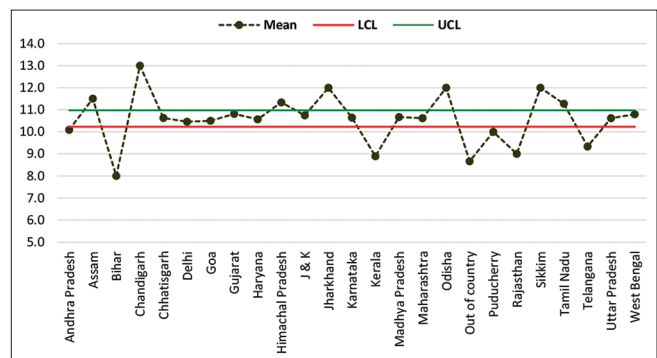
A total of 503 pediatricians were enrolled, mostly males (75%) and in the age group of 31–50 years (61%). Fifty-seven percent (288/503) of respondents were Doctor of Medicine (MD) and post-MD. The majority had experience of  $>5$  years (70%) and were working in the private sector (80.7%). Few had provided teleconsultation before the COVID-19 pandemic (13.9%). The majority of respondents resided in Uttar Pradesh (31.2%), followed by Karnataka (16.1%). Responses to knowledge questions are demonstrated in Table 1.

The overall mean KS was found to be  $10.60 \pm 2.79$ , that is, 66.25% knowledge. The minimum KS was 1.00 (6.25%), and the maximum was 16.00 (100%). Assam, Chandigarh, Himachal Pradesh, Jharkhand, Odisha, Sikkim, and Tamil Nadu demonstrated relatively high knowledge (above the upper confidence line), while Bihar, Kerala, Puducherry, Rajasthan, and Telangana and nonresident Indians (NRIs) showed lower knowledge (below the lower confidence line) [Figure 1]. There was no significant difference among states ( $P = 0.191$ ).

The majority (89.1%) of respondents had good KS. Only one type of practice showed a significant association with knowledge. A higher proportion of private practitioners had good KS as compared to public practitioners [Table 2].

## DISCUSSION

The present study found that the majority of pediatricians had good knowledge of national telemedicine guidelines. The mean KS of our cohort was  $10.6 \pm 2.79$ , that is, 66.25% knowledge level. A mean KS of 7.87 (out of 11), that is, 71.5%, higher than the present study, was found among 200 physicians from Bangladesh.<sup>[15]</sup> Egyptian dermatologists were also noted to have good knowledge (mean 4.17; out of 6), that is, 69.5%, during this pandemic.<sup>[13]</sup> The mean KS lower than our survey was found in the group of dental students and faculty from Saudi Arabia (5.5; out of 11), that is, 50%.<sup>[16]</sup> The minimal level of knowledge was reported from Iran with a mean of 2 (out of 9), that is, 22.2%, likely due to a cohort comprising nurses and laboratory and radiology technicians along with doctors.<sup>[17]</sup>



**Figure 1:** Mean knowledge score of respondents across different states in India, UCL:Upper confidence line, LCL:Lower confidence line

**Table 1: Distribution of responses to knowledge questions regarding telemedicine guidelines**

Question items	Response	n (%)
Under the new guidelines are all pediatricians entitled to provide teleconsultation?	No	28 (5.6)
	Not sure	113 (22.5)
	Yes	362 (72)
A health worker and caregiver can do teleconsultation on behalf of a patient	No	152 (30.2)
	Not sure	124 (24.7)
	Yes	227 (45.1)
If the pediatrician feels the patient requires physical examination, he can stop teleconsultation	No	59 (11.7)
	Not sure	29 (5.8)
	Yes	415 (82.5)
It is mandatory to keep a log or record of teleconsultation interaction	No	21 (4.2)
	Not sure	24 (4.8)
	Yes	458 (91.1)
The pediatrician has the liberty to refuse a teleconsultation request	No	26 (5.2)
	Not sure	38 (7.6)
	Yes	439 (87.3)
The e-prescription sent online will be honored by the diagnostic center and chemist	No	12 (2.4)
	Not sure	42 (8.3)
	Yes	449 (89.3)
A pediatrician does not need to take a print out of e-prescription	No	144 (28.6)
	Not sure	92 (18.3)
	Yes	267 (53.1)
Antibiotics can be prescribed on teleconsultation	No	55 (10.9)
	Not sure	76 (15.1)
	Yes	372 (74)
Pediatrician cannot prescribe injectable medicine directly to the patient via teleconsultation	No	78 (15.5)
	Not sure	102 (20.3)
	Yes	323 (64.2)
Pediatrician cannot record the teleconsultation and advise medication later on	No	268 (53.3)
	Not sure	131 (26)
	Yes	104 (20.7)
First consult mean in telemedicine <sup>a</sup>	Patient is consulting for the first time	377 (75)
	The patient has consulted earlier, but more than 6 months have passed	248 (49.3)
	The patient has consulted earlier, but for a different health condition	321 (63.8)
If the patient initiates teleconsultation, the pediatrician does not require additional consent	No	101 (20.1)
	Not sure	106 (21.1)
	Yes	296 (58.8)
There is no maximum limit on consultation fees, which can be charged for teleconsultation	No	107 (21.3)
	Not sure	144 (28.6)
	Yes	252 (50.1)
A pediatrician can use teleconsultation services to seek an opinion from another pediatrician	No	25 (5)
	Not sure	56 (11.1)
	Yes	422 (83.9)

<sup>a</sup>Each answer had a score of 1

Doctors in our analysis mostly belonged to the age range of 31–50 years, with male preponderance (75%). The majority of respondents were postgraduates and above (57%), and they had experience of >5 years in the field of

**Table 2: Association of demographic and professional characteristics with the good and poor knowledge score (KS)**

Characteristics	KS ≥50% (good)	KS <50% (poor)	P	
Age				
18–30 Yr	32 (6.4)	25 (5.6)	7 (12.7)	0.106
31–50 Yr	307 (61)	274 (61.2)	33 (60)	
>50 Yr	164 (32.6)	149 (33.3)	15 (27.3)	
Gender				
Male	377 (75)	333 (74.3)	44 (80)	0.360
Qualification				
MD	288 (57.3)	254 (56.7)	34 (61.8)	0.469
Resident	215 (42.7)	194 (43.3)	21 (38.2)	
Year of practice				
No/<1 Yr	19 (3.8)	18 (4)	1 (1.8)	0.555
1 Yr–5 Yr	137 (27.2)	120 (26.8)	17 (30.9)	
6 Yr–15 Yr	160 (31.8)	142 (31.7)	18 (32.7)	
16 Yr–30 Yr	117 (23.3)	108 (24.1)	9 (16.4)	
>30 Yr	70 (13.9)	60 (13.4)	10 (18.2)	
Practice type				
Public	97 (19.3)	74 (16.5)	23 (41.8)	<0.001
Private	406 (80.7)	374 (83.5)	32 (58.2)	
Past teleconsultation				
Yes	70 (13.9)	58 (12.9)	12 (21.8)	0.073

pediatrics (70%). Though our cohort comprised mainly of doctors practicing in the private sector (80.7%), only 13.9% had provided teleconsultation before the pandemic. States with better awareness were Assam, Chandigarh, Himachal Pradesh, Jharkhand, Odisha, Sikkim, and Tamil Nadu. Poor performing states were Bihar, Kerala, Puducherry, Rajasthan, and Telangana and NRIs. This variation may be due to discrepancies in their literacy rates. Populations with higher literacy have better knowledge about technology and often use it in day-to-day life. To cater to such technologically sound patients via telemedicine, doctors keep themselves updated with the latest information. There is no previous study in literature that has depicted knowledge of different states across the nation.

The majority (89.1%) of respondents in the present survey had good knowledge, which was on par with respondents from Bangladesh (85.5%)<sup>[15]</sup> and Europe (84%).<sup>[18]</sup> Another study at the teaching hospital in Puducherry, India, showed that a lower proportion of teaching faculties and practitioners, than our study (76%), had good knowledge of telemedicine.<sup>[11]</sup> About 69.3% of Egyptian dermatologists were found to have >50% KS.<sup>[13]</sup> A cross-sectional study from West Ethiopia documented that only 37.6% of 312 health professionals demonstrated good knowledge.<sup>[19]</sup> Similarly, a survey of final-year medical students in Sri Lanka identified a good level of only 43%.<sup>[20]</sup>

Contrary to our findings, 100% of respondents were noted to have good knowledge in a study from Iran as their respondents included experts with experience of >15 years in medicine.<sup>[21]</sup>

In the present study, only 10.9% of pediatricians had poor KS. Unlike, a high proportion (46.1%) of physicians from Saudi Arabia<sup>[22]</sup> and Iran (96.1%)<sup>[23]</sup> presented with low knowledge of this technology. Even in the UK, a significant proportion (64%) of respondents were unaware of medical council guidance concerning remote consultations during this pandemic.<sup>[12]</sup>

There was no significant difference between the KS of various states ( $P = 0.191$ ) in our study. No association was observed between age, gender, qualification, years of practice, and good KS. Similarly, good knowledge was not related to dermatologists<sup>[13]</sup> and dentists<sup>[16]</sup> qualities or demographics; however, certain parameters were found to be associated with good awareness in other studies, such as experience<sup>[24]</sup> and educational degree.<sup>[21]</sup>

The type of practice showed a significant association with knowledge in the present study. A greater proportion of private practitioners (92.1%) demonstrated higher knowledge as compared to public practitioners (76.3%). It may probably be due to the active involvement of private practitioners in telehealth portals rather than government doctors who are restricted from practice outside their institutions. Teleconsultations were not permitted in the public sector before the COVID-19 pandemic. The delayed introduction and licensing of teleconsultations in the public sector during the pandemic to tide over the health crisis are another explanation. Differing from our results, a study from Bangladesh (200 physicians) failed to obtain any such association.<sup>[15]</sup> It also emphasizes that pediatricians in the government sector need programs for training and learning of teleconsultation policies.

### Strengths

To the best of our knowledge, this is the first study from India that assesses awareness about recent telemedicine guidelines and is also the first to assess pediatricians. Previous studies from India were conducted by dermatologists, physicians, and medical students. Our study is unique as it depicts the spectrum of knowledge across the country, highlighting states that require policies to improve awareness. The use of a structured questionnaire based on national guidelines and a good sample size comprising exclusively of pediatricians are added strengths. This is the first from Asia that determines the status of information about teleconsultations in doctors during the COVID-19 pandemic.

### Limitations

An evaluation of attitudes of pediatricians toward telemedicine was not performed. The perception and satisfaction of patients may also be assessed in further studies. We recommend a nationwide assessment of knowledge of telemedicine in doctors of different specialities.

### CONCLUSIONS

The pediatricians of India harbored good awareness about recent telemedicine guidelines, although diversity of knowledge was noted across states. Private practitioners demonstrated better knowledge than those working in the

public sector. Hence, we advocate the conduction of training programs disseminating information regarding telemedicine across the country for all specialities.

### Acknowledgement

We are grateful to Mr. Zeeshan (statistician) for performing a statistical analysis of our work.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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