

Provider's satisfaction with telemedicine services for tribals of Western Rajasthan: A qualitative analysis

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ABSTRACT

Background: There are significant barriers to healthcare access in tribal areas, even though for every 834 people, there is one public physician (registered allopathic and AYUSH doctors). More than 86% of hospital visits occur in rural areas. Furthermore, the bulk of them travel long distances to reach hospitals. A telemedicine center was established in the aspirational tribal district of Sirohi, Rajasthan, to provide accessible quality health care. **Objective:** To understand providers' attitudes and satisfaction with telemedicine services for tribal populations. **Materials and Methods:** This cross-sectional, mixed-method study enrolled consultants from various clinical departments of AIIMS Jodhpur ($n = 23$) who provide teleconsultations to the tribal population. **Result:** The mean score of the satisfactory index was 54.7 ± 22.04 . The higher score is 87.4 regarding the ability to use the technology platform during teleconsultation. The lower score was 34.7 for video quality during teleconsultation at STHR. 91.3% found this a beneficial model for the tribal population. Consultants providing teleconsultations expressed that this model is a boon for tribal patients as a screening tool and will save time and money for improved accessibility. **Conclusion:** Positive indications of teleconsultation with a provider's utility, acceptability, and satisfaction. Most marginalized people can efficiently access all levels of (primary, secondary, or tertiary) health care from experts through telemedicine, which will broaden outreach in hard-to-reach or inaccessible tribal or rural areas.

Keywords: Provider acceptability, provider perception, provider satisfaction, telemedicine, tribal

Background

Telemedicine is defined as “the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals

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using information and communication technologies for the exchange of valid information for the diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers.”^[1] India, a budding nation with most of the population in the lower middle-income bracket, currently lacks healthcare infrastructure and doctors, including physicians, nurses, and midwives.^[2] In such a scenario, introducing telemedicine technology in India offers new opportunities to address current gaps in the healthcare industry.

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Telemedicine has shown to be a further blessing in the aftermath of the current pandemic, giving patients and healthcare professionals additional benefits such as providing psychological support to patients and their family members, assisting in lessening the strain on tertiary hospitals, providing training to patients' care providers, and for the ongoing management of chronic conditions. Telemedicine proved to be a safer and more cost-effective healthcare delivery method during the COVID-19 epidemic.^[3]

The utilization of telemedicine and technology, particularly in India's tribal and hilly regions, can significantly impact the rural population. It may deliver both cost-effective and high-quality sustainable care.^[4] A scoping review's findings imply that telemedicine implementation in Asia may be a beneficial strategy since it might improve the efficacy of health care by reducing time and travel expenses. Additionally, it can raise the patient's quality of life, lower total care costs, and increase access to critical medical services.^[5]

The All India Institute of Medical Sciences, Jodhpur, is recognized as a "Centre of Excellence (COE) for Tribal Health" by the Ministry of Tribal Affairs, Govt. of India. A center was conceptualized to address the health needs of the tribal people holistically and devise a road map to address the gap using modern scientific tools. Therefore, a "Satellite Centre for Tribal Health and Research (STHR)" was established at Janjati Bhavan Abu Road in collaboration with the Tribal Area Development (TAD) Department, Govt. of Rajasthan and MLV Tribal Research and Training Institute, Udaipur, and was funded by the Ministry of Tribal Affairs, Govt. of India.

Referral Telemedicine Services for the Tribal Population

AIIMS Jodhpur and the Ministry of Tribal Affairs, Govt. of India, conceptualized an idea to start an innovative model for providing a locally available quality standard of care for the tribal population of Rajasthan. Considering the needs, AIIMS Jodhpur started a teleconsultation facility by consultants of AIIMS Jodhpur, initially from the Community Health Centre (CHC) of Abu Road tehsil of "aspirational" district Sirohi in November 2020. With the great response to services, AIIMS Jodhpur established a fully dedicated center for teleconsultation services and an integrated research platform. Speciality and super speciality services to the tribal peoples of aspirational tribal districts. The Satellite Centre was 250 kilometers from AIIMS Jodhpur, and it covers the tribal population located within a 100-kilometer radius or even more.

We wanted to explore the provider's perspectives on it in hopes of helping identify how we might improve our telemedicine encounters to share ideas and information. In this study, we sought the viewpoints of clinicians in several departments on various facets of the telemedicine program to better understand its current use and aid in its expansion.

Materials and Methods

The study was conducted after obtaining approval (AIIMS/IEC/2021/3888) from the institutional ethics committee of the All India Institute of Medical Sciences, Jodhpur. After completing one successful year and more than 1500 teleconsultations designed a cross-sectional study among All India Institute of Medical Sciences consultants, who were involved with Satellite Centre of tribal health teleconsultation for tribal populations from different clinical departments like General Medicine, General Surgery, Paediatrics, Dermatology, Gynecology, Psychiatry, Nephrology, Urology, Endocrinology, Physical Medicine and Rehabilitation Neurology, Pulmonary, and Cardiology. For quantitative assessment capturing their (Consultants, Providers) feedback using a pre-validated questionnaire (TUQ, TAQ, and TSQ)^[6,7] and piloting for assessed the element for teleconsultation at the Satellite Centre of Tribal Health Sirohi Abu Road. The questionnaire was validated using open-ended investigator feedback and revised as per recommendations.

Technology, manpower, and consultation procedure

This telemedicine consultation center, called "STHR Satellite Centre for Tribal Health and Research" (STHR), is well equipped with a laptop and LED screen with an Internet connection, video conferencing software, telemedicine cart, equipment for routine examinations like blood pressure, anthropometry, blood sugar, etc., A medical officer, nurses, technical staff, and medical social workers were appointed to manage telehealth referrals, brief the patient on telehealth services, coordinate with the telehealth provider, facilitate the technical aspects of the visits, and schedule follow-ups as necessary and awareness activities among the tribal community. The medical officer at CHC would refer a patient to the telemedicine center; otherwise, the patient can directly visit the STHR center for teleconsultation with the doctors from AIIMS Jodhpur. The TCS (teleconsultation staff) would facilitate patient registration in the hospital information system (HIS) portal of AIIMS Jodhpur accessed through the teleconsultation center's laptop. After that, nursing officers made detailed history and clinical examinations of the patients at the teleconsultation center. After that, the nursing officers at CHC call the consultants at AIIMS Jodhpur and arrange for a video teleconsultation using the freely available Google Meet platform. The specialist consultant would take a detailed history via teleconsultation and plan for the next action, including recommendations for further investigations, drug management, or physical consultation. All these details would be entered in the HIS by the consultant at AIIMS Jodhpur, which could be downloaded at the center by the TCS.

Feedback

After a year, the providers were asked to provide input to obtain the faculty's perspective. Standardized open- and closed-ended questions were used in one-on-one interviews. At the beginning of the form, a section on informed consent was provided, informing respondents that they could opt out of the survey at

any time. The feedback questions have five sociodemographic details questions, 15 for satisfaction regarding usability, and 11 for satisfaction regarding acceptability and usefulness, totaling 31. Questions with responses on a five-point Likert scale, close-ended and open-ended. For open-ended questions to learn about the providers' perspectives included:

1. "How well is the tribal population's teleconsultation provided with the assistance of the medical officer (trained in the local language) assigned for the patient's clinical examination and communication at the telemedicine center?"
2. "What factors or barriers hindered the teleconsultation process?"
3. "Is teleconsultation distinct from other urban teleconsultation services among rural and tribal populations?"
4. "Every PHC and CHC needs to be connected to a tertiary care facility."

Data analysis

1. Quantitative analysis
2. Qualitative analysis

Quantitative analysis (Descriptive statistics)

Data analysis was performed using SPSS. Descriptive variables were analyzed with counts and percentages for categorical variables. The Likert scale responses for each item were tabulated. The satisfaction index (SI) for each item was determined using the formula below.^[8]

$$N = (a \times 1) + (b \times 2) + (c \times 4) + (d \times 5) \times 20/N$$

Where a, b, c, and d represent the total number of replies for the co-efficients 1, 2, 4, and 5. N is the total number of participants who received the score shown in the subscript for that specific item. The satisfaction index was calculated for each item to determine the providers' satisfaction with each feedback questionnaire item. All participants were asked to score each item on a five-point scale. Numbers 1 to 5 were used to score extremely satisfied, somewhat in order. The arbitrary cut-off points (SI over 60% and SI below 60%) were used.

Qualitative analysis

The open-ended questions on teleconsultation usability and acceptability were obtained through one-to-one interviews to record the consultant's perception. The providers were asked about how the posted medical officer is helpful at the STHR center in teleconsultation and factors/barriers that hindered the teleconsultation process.

Result

Satisfaction regarding their usability

Telemedicine workspace and clinical use of telemedicine. Sociodemographic variable regarding providers for teleconsultation services at STHR is given in [Table 1].

During a telemedicine consultation, 65.2% of clinicians use a smartphone as a resource. Around 69.6% feel that teleconsultation is more beneficial for returning patients and those who need follow-up care after an operation. In addition, 86.3% of respondents took 5–15 minutes to evaluate postoperative patients, and 65.2% said the same for preoperative care [Table 2].

Frequency of technical difficulties and conversion of visits from video to phone

Around 52% of providers said they encountered technical issues most of the time, and 52.2% confirmed that these issues caused video visits to be converted to telephone visits. This primary idea originated from open-ended questions and some providers' opinions given in Table 3.

Posted Medical officer at Telemedicine Centre.

In Figure 1, all providers ($n = 23$) feel that the presence of medical officials at STHR during teleconsultation for the indigenous population is helpful. The theme of opinion expressed by providers is effective teleconsultation, better communication, and innovative ways to improve physical examination [Table 3].

Perception toward this telemedicine model

The participants were asked about the usability of this telemedicine model. Although 83% of participants said it was simple to join video with Google Meet, 91.3% found the productive model for the indigenous population. Consultants

Table 1: Sociodemographic variable regarding providers for teleconsultation services at STHR

	Variables	% (n)
Gender	Female	17.4% (4/23)
	Male	82.6% (19/23)
What type of provider you are?	Consultant	60.9% (14/23)
	Junior resident	8.7% (2/23)
	Senior resident	30.4% (7/23)
Do you have formal telehealth training?	No	69.6% (16/23)
	Yes	30.4% (7/23)
Year of practice	0–5 years	30.4% (7/23)
	6–10 years	34.8% (8/23)
	11–15 years	30.4% (7/23)
	>15 years	34.8% (8/23)
Subspecialty covered by teleconsultation providers	Cardiology	4.3% (1/23)
	Dermatology	8.7% (2/23)
	Endocrinology	13.0% (3/23)
	General medicine	4.3% (1/23)
	Obstetrics and gynaecology	8.7% (2/23)
	Nephrology	8.7% (2/23)
	Pediatrics	8.7% (2/23)
	Physical medicine and rehabilitation	21.7% (5/23)
	Psychiatry	4.3% (1/23)
	Pulmonary medicine	8.7% (2/23)
Urology	8.7% (2/23)	

expressed that this model is a boon for the patient, using screening tools and saving time and money for improved accessibility [Table 3].

Linking with primary and secondary health care for telemedicine services with the tertiary institutions in remote areas.

The key principles of connecting PHC and CHC with tertiary institutes in remote areas, as well as some of the provider's perspectives, are given in Table 3.

Satisfaction regarding their acceptability and usefulness

Around 95.7% of providers gave a positive response [Table 4] when asked about perceived utility, saying, "Using AIIMS Hospital information system (HIS), (Sirohi portal) for providing health

care for the tribal teleconsultation is a good idea." Regarding the patient's prior history and other specifics, all doctors agreed that using the Hospital Information System (HIS), or Sirohi portal, made it simpler for them to conduct teleconsultations. Concerning how STHR teleconsultation differs from other teleconsultation services among India's rural and tribal population, answers to the open-ended question include:

Satisfaction Index (SI)

The satisfaction index was derived using the responses on each item of the feedback questionnaire in Table 5. The mean score of satisfactory indices was 54.7 ± 22.04 . The ability to use technology during teleconsultation, comprehend health history, and develop a plan based on teleinformation had SI values > 60%. While video quality, a virtual physical examination for sensitive and non-sensitive areas, and the

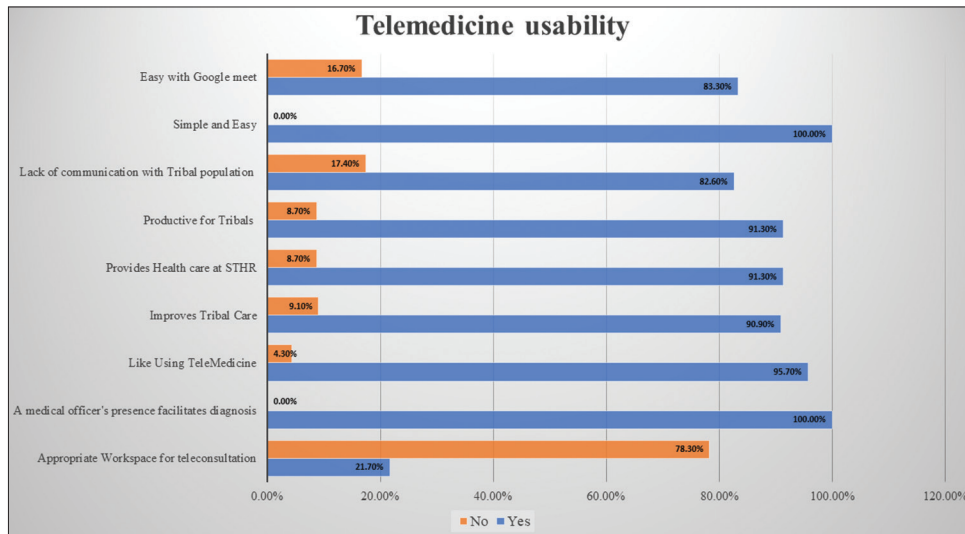


Figure 1: Provider's perception towards the usability of telemedicine

Table 2: Usability questionnaire among teleconsultation providers

Variables	% (n)
I use this equipment for telemedicine services.	Laptop 30.4% (7/23) Smartphone 65.2% (15/23) Tablet 4.3% (1/23)
How do you find your teleconsultation more useful in terms of indigenous population patients?	New patient visits/preoperative visits 30.4% (7/23) Return visit/postoperative visits/follow-up 69.6% (16/23)
How often do you or the patient experience some type of technical difficulty while using the platform?	Always 8.7% (2/23) Most of the time 17.12% (12/23) Half of the time 17.4% (4/23) Never 39.1% (9/23)
How often are scheduled video visits converted to telephone visits due to technical difficulties?	Always 4.3% (1/23) Most of the time 52.2% (12/23) Half of the time 4.3% (1/23) Never 39.1% (9/23)
How many minutes on average, does it take to complete a new patient/preoperative?	5–15 minutes 65.2% (15/23) 16–30 minutes 34.8% (8/23)
How many minutes on average, does it take to postoperative/return visit?	5–15 minutes 86.3% (19/23) 16–30 minutes 13.7% (3/23)

Table 3: Themes that emerged in response to the open-ended question on the feedback questionnaire and representative comments from the providers

Open-ended questions	Code	Themes	Representative comments
How well did the tribal population's teleconsultation go with the assistance of the medical officer (trained in the local language) was assigned to them for patient clinical examination and communication at telemedicine center?	<ol style="list-style-type: none"> 1. Effective teleconsultation. 2. Better communication. 3. Innovative way. 4. Improved physical examination. 	Better teleconsultation with effective communication between doctor and patient through innovative ways for the tribal population.	<p>"Yes, as it facilitates understanding of the vital signs and allows for easier communication with patients regarding their background."</p> <p>"Medical officer helps us in systematic-general, vitals and abdominal examinations and however, for pelvic examination it is difficult."</p> <p>"The neurological examination is simpler with the help of medical officer."</p> <p>"Assists in identifying patients with clubbing, auscultation, ICDs, or asthma."</p> <p>"Helps in knee examination."</p> <p>"Helps in Edema and chest examinations along with vitals."</p>
What were the factors and barriers that hindered the teleconsultation process?	<ol style="list-style-type: none"> 1. Clinical examination. 2. Poor Internet connectivity. 3. Audio-video problems. 4. Poor reliability. 	<p>Only some clinical examinations are possible during teleconsultation.</p> <p>Internet issues during teleconsultations affect patient faith in doctors hindered the teleconsultation.</p>	<p>"Audio-video problems to the patient."</p> <p>"Detailed history, examination, availability of investigations."</p> <p>"We cannot do a pelvic examination for taking office biopsies. It is not possible with telemedicine."</p> <p>Internet connectivity in health camps, sometimes patient\doctor fail to understand what is being communicated.</p> <p>The difficulty is establishing rapport and privacy issues where the patient is uncomfortable discussing personal matters.</p>
Optical property of camera, broadband connection at either end. How does this affect you to convert video visits, to phone visit during teleconsultation?	<ol style="list-style-type: none"> 1. Does not allow clinical evaluation. 2. Decrease patient confidence. 3. Cannot see patient. 	It is difficult to access patient's general clinical physical examination and not able to assess the patient's wellbeing status, which decreases patient faith and confidence.	<p>"Save times."</p> <p>"We cannot see the signs."</p> <p>"We can only talk to the medical officer at teleconsultation; often, talking to patients directly becomes challenging"</p> <p>Accessing the patient's general examination of edema/swelling is difficult.</p> <p>One-to-one interaction is slightly hampered. We have to take the help of the medical officer posted there.</p> <p>Not able to assess patient wellbeing/status.</p> <p>Yes, it affects, cannot see a patient.</p>
How STHR teleconsultation differs from other teleconsultation services in rural/tribal population?	<ol style="list-style-type: none"> 1. Better. 2. Good. 3. Feasible. 		<p>"Medical officer at STHR center helps in better communication."</p> <p>"Patient care in outreach area."</p> <p>"Presence of a doctor facilitates examination and diagnosis."</p>
I endorse the establishment and expansion of the telemedicine services for the tribal population.	<ol style="list-style-type: none"> 1. Boon for poor patient. 2. Saves time and money. 3. Improves accessibility. 4. A screening tool. 	<p>It will improve healthcare facilities in tribal areas.</p> <p>Screening tool among tribal population.</p>	<p>"It will provide expert (highest level of) advice to the most backward part of the society."</p> <p>"At least we can guide the patient, how to go about for a particular problem, whom to consult, and what to do."</p> <p>"Boon for patients who cannot move on a daily basis for medical opinion or follow up."</p> <p>"Yes, at least we can guide the patient, how to go for a particular problem, whom to consult."</p> <p>"Improve accessibility and improve patient care."</p> <p>"Regular and frequent consultation from all the departments."</p> <p>In endocrinology, we are able to solve most of problem through teleconsultation.</p> <p>As a screening tool for tribal population.</p> <p>Better for patient care in remote areas.</p> <p>For readily access the unreachable.</p> <p>Examination is missing, follow up with proper investigation is not good.</p>
Linking of telemedicine services for tertiary care among tribal population is a good or bad idea.	<ol style="list-style-type: none"> 1. Agree. 2. Can be replicated. 3. only for tribal feasible. 	<p>Better patient care among tribal population.</p> <p>PHC and CHC getting connected to the tertiary center.</p>	<p>Good idea to me, however, patients' satisfaction may be low.</p> <p>Medical officer should be trained at PHC and CHC.</p> <p>Visits are booked in advance with proper clinical photographs taken with consent.</p> <p>Communication and video will be improved, sharing of investigation.</p> <p>Adequate training, guidelines needed.</p> <p>Pre-inform of patient care and investigation to tertiary center.</p>

Contd...

Table 3: Contd...

Open-ended questions	Code	Themes	Representative comments
	1. Good idea.	It solves many minor problems.	“Good, it will enhance outreach at difficult to reach.”
	2. Excellent concept.		“Good, it will enhance outreach and reduce unnecessary referrals.”
	3. Better patient care.	It saves time, manpower, and resources.	“It is good idea as an initial screening tool and it gives a platform for patients to access healthcare comfortable, without travelling, etc.”
			“Good idea to me patients’ satisfaction may be low.”
			“Not for all patient but for uncomplicated care through the physicians presented at PHC/CHC.”
			“Good idea, many minor problems are solved. It saves time for manpower and resource.”

Table 4: Satisfaction regarding their perceived, usefulness among providers regarding their acceptability during teleconsultation at STHR

Questions regarding perceived usefulness

Using TCS with the help of a medical officer for language communication with the tribal population is made easy my task.	Yes/No (23/0)	100%
Using TCS with the help of a medical officer for general check-ups which is required during teleconsultation with patients is made easy my task.	Yes/No (23/0)	100%
Using AIIMS Hospital information system (Sirohi portal) * for providing accessibility towards health care for the tribal teleconsultation is a good idea?	Yes/No (22/1)	95.7%
Using HIS (Sirohi portal) makes it easier to do my teleconsultation with respect to the previous history and details of the patient.	Yes/No (23/0)	100%

*AIIMS Jodhpur Hospital Information System (Tribal Sirohi Portal) is a dedicated portal for registering patients from district Sirohi. This portal has all the patient's data captured at district Sirohi

Table 5: Satisfaction index for each item of the questionnaire was calculated as described in the method section, with the SI value ranging from 1 to 120 for each item

Statement	Satisfaction index
Video quality for teleconsultation at STHR.	34.7
Ability to use the technology platform during a teleconsultation.	87.4
Ability to understand (elicit) health history.	73.7
Ability to perform a virtual physical examination for no sensitive area.	45.3
Ability to perform a virtual physical exam for the sensitive area.	35.4
Ability to develop a plan based on the virtual information.	71.04
Ability to break bad news in front of patients during teleconsultation.	35.8

capacity to deliver unfavorable news during a teleconsultation score below 60.

Discussion

Only health professionals can make health systems work; expanding health service coverage and attaining the right to the highest possible standard of health are contingent on their availability, accessibility, acceptance, and quality. According to the WHO, there will be a 10 million health worker shortage by 2030, primarily in low- and lower middle-income countries.^[9] A study by Patel *et al.*^[10] reveals a gap in the availability of health professionals in India, with an overall shortage of 49.1% of

doctors. The Ministry of Tribal Affairs recently launched the Swasthy portal report. In India, Rajasthan Sirohi has been declared as an aspirational district and has 290 CHCs and 175 PHCs, with no government super speciality healthcare facility.^[11] The Satellite Centre for Tribal Health and Research, Abu road, Sirohi is the only center in the tribal area of Rajasthan that provides super speciality services through telemedicine by AIIMS Jodhpur consultants. This telemedicine concept reduces travel costs and delivers free tertiary care to the tribal population. In our study, 13 clinical departments, including 60.9% of consultants, 30.4% of senior residents, and 8.7% of junior residents, have offered their services through the Satellite Centre of tribal health teleconsultation. In a study by Acharya *et al.*^[12] 94% of healthcare providers were satisfied with the diagnosis of the patient's condition, similar to our study. In addition, consultants believed that the presence of a medical officer helps in better communication and general check-up of patients. Around 91% of physicians believed that telemedicine services improved health care among the tribal population. Our study also reveals that telemedicine is effective in 69.6% of postoperative and 30.4% of preoperative visits. According to Kemp *et al.*^[13] providers, new patient video visits took less time than new patient traditional visits, and in urban settings, 72.7% occasionally encountered a technical issue. Most providers (65%) also stated that these technical issues occasionally necessitated the conversion to a phone visit. In contrast, in our experience, around 52% of providers frequently encountered a technical issue; thus, video consultation was converted to phone consultation. Because of this impediment, accessing patients' general clinical physical examination and well-being status is difficult, resulting in lower patient

satisfaction. The difference in perception may be because of urban and rural network coverage.^[14]

Several providers endorsed establishing and expanding this telemedicine system for the tribal population due to the lack of doctor-patient ratio and healthcare services among the marginalized population. In low-resource environments, there are a few tried and tested mobile technology applications that can improve and standardize the quality of health care provided by frontline rural health practitioners. Gautham *et al.*^[15] concluded that mobile phone-based, media-rich procedural guidance applications help provide consistently standardized quality of care by various frontline rural health practitioners, thereby increasing patient acceptability. Telemedicine can improve access to treatment, boost productivity for health practitioners and patients through less travel, save money, and provide an opportunity to establish culturally appropriate services that are more sensitive to the requirements of distinct groups.^[16] Some medical experts support telemedicine because they believe it will provide society's most marginalized access to high-quality advice. Indigenous communities will benefit from enhanced teleconsultations with effective doctor-patient communication using cutting-edge methods. Our research indicates that telemedicine at STHR is viable for enhancing indigenous people's access to healthcare services.

Conclusion

Tribal peoples are usually unaware of available medical care. Telemedicine allows All India Institute of Medical Sciences Jodhpur doctors and super speciality consultants or clinical experts to assist the tribal population. Satellite Centre for tribal health and research, a one-of-a-kind telemedicine facility, will strengthen tribal medical facilities while functioning as a screening tool for native people. Our findings show that provider teleconsultation is useful, acceptable, and satisfying to the indigenous population. Telemedicine has the support of medical professionals and will expand outreach in hard-to-reach locations.

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Conflicts of interest

There are no conflicts of interest.

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