

# Patient satisfaction towards telemedicine services at the satellite centre of tribal health and research in district Sirohi Rajasthan, India-a mixed method study

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## Abstract

**Objective** This mixed-method study evaluates patient satisfaction towards telemedicine services at the Satellite Centre for Tribal Health and Research (STHR) in district Sirohi, Rajasthan, India.

**Background** Telemedicine delivers remote medical care using technology, improving healthcare access for marginalised communities in tribal areas. This telemedicine centre at STHR aimed to provide high-quality healthcare services through telemedicine to the tribal population in the region.

**Methods** Conducted from February 6, 2022, to May 31, 2024, the study involved 4570 tribal patients, with 3704 (81%) responding to a satisfaction survey using Telehealth Satisfaction Survey (TeSS) rated on a 3-point Likert scale. Quantitative data were analyzed using SPSS version 22, and qualitative data were collected via open-ended questionnaires and focus group discussions.

**Results** The median age of respondents was 32 years, with 58.6% being male. Satisfaction scores ranged from 2.00 for voice quality to 2.31 for the courtesy of telemedicine staff, indicating a generally high satisfaction level. Thematic analysis identified key themes such as convenience, accessibility, and communication, despite challenges like internet connectivity issues.

**Conclusion** Healthcare service satisfaction among patients helps in building and maintaining sustainable services and is also one of the key factors for service utilization. The telemedicine initiative at Satellite Centre for Tribal Health and Research has high satisfaction levels that underscore the potential of telemedicine to meet the healthcare needs of marginalized communities, provided technological and communication barriers are addressed.

**Key words** Telemedicine · Patient satisfaction · Tribal

Telemedicine has changed the landscape of remote medical care through the use of technology for communication and information exchange [1]. Telemedicine is defined as “The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health

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of individuals and their communities.” [2] Implementing telemedicine can greatly enhance the health and well-being of marginalized communities who mostly stay at places which are remote or inaccessible. Hence, telemedicine can result in numerous benefits, including reduced expenses and more cost-efficiency for both tribal patients and healthcare systems in rural & remote areas [2]. Moreover, telemedicine has the potential to improve the availability and usage of healthcare services, as well as facilitate health education and promote overall satisfaction among indigenous communities. Certain marginalized and excluded communities, such as indigenous people and individuals with restricted mobility, may encounter difficulties in obtaining healthcare services as a result of geographical or transportation obstacles. Telemedicine enables individuals to access medical consultations, guidance, and follow-up care without the necessity of undertaking extensive journeys [3]. The level of patient satisfaction with telemedicine services is closely correlated with the perceived standard of care. Telemedicine achieves high patient satisfaction by effectively meeting patients’ needs, expectations, and medical requirements. Favourable experiences contribute to improved health outcomes and compliance with treatment regimens [4].

## Telemedicine centre at Abu Road

The Ministry of Tribal Affairs (MoTA), Government of India recognises All India Institute of Medical Sciences (AIIMS), Jodhpur as a Centre of Excellence (CoE) of the Ministry for Tribal Health. In order to effectively address the healthcare needs of tribal people, a unique centre was created to approach health problems holistically and develop a roadmap to bridge the gap through the use of modern scientific tools. Therefore, Satellite Centre for Tribal Health was established at Janjati Bhavan Abu Road, which is collaborated with Tribal Area development Department at, and MLV Tribal Research Training Institute, Udaipur, and was funded by the Ministry of Tribal Affairs, Government of India [5].

## Referral telemedicine services for tribal population

AIIMS Jodhpur, in collaboration with the Ministry of Tribal Affairs, Government of India, has successfully enhanced healthcare access for the tribal population of Rajasthan by providing locally available, high-quality care. In November 2020, AIIMS Jodhpur initiated a telemedicine service via consultants at the Community Health Centre (CHC) in Abu Road tehsil, Sirohi district. The initiative received a highly positive response, prompting AIIMS Jodhpur to establish a dedicated telemedicine centre and an integrated research platform. This centre offers specialized and super-specialized services to the tribal communities in aspirational district (Sirohi) Located 250 km from AIIMS Jodhpur; the Satellite Centre efficiently serves tribal populations within a 100-kilometre radius or more. Research into patient satisfaction with telemedicine is crucial for healthcare providers, policymakers, and researchers, as it helps assess the effectiveness of telemedicine services and informs decisions to optimize their implementation. Understanding patient preferences and concerns enables the evolution of telemedicine to better address the diverse healthcare needs of various communities.

A hybrid telemedicine service, meaning provider-to-provider consultations are conducted in the presence of tribal patients visiting the telemedicine centre. Mostly Synchronous Telemedicine involving real-time, interactive communication between the provider at AIIMS Jodhpur and a healthcare provider (Resident doctor, Medical Officer, Nursing Staff) at the Satellite Centre in the presence of patients who are mostly tribal and speak the tribal Garasiya dialect, which is a little difficult to understand for the consultant at AIIMS Jodhpur. The teleconsultation was conducted via video calling, and sometimes, due to network issues, audio teleconsultations were also provided. Every patient receiving teleconsultation was given a prescription.

## Service area

Satellite Telemedicine centre was conceptualised as a referral telemedicine centre for patients attending the Community Health Centre (CHC) Abu Road or the Primary Health Centre, Abu Road, where the majority of speciality care is not available. The Satellite Telemedicine Centre aimed to fill this gap and complement and supplement the existing healthcare services in the region. Tribal patients primarily came to Community Health Centre (CHC), Abu Road, which is half a kilometre from Satellite Telemedicine Centre, mostly catering to patients around 100 km.

Each patient teleconsulted at Satellite Centre of Tribal Health and Research, Abu Road, district Sirohi, Rajasthan, was registered in the Hospital Information System (HIS) of AIIMS Jodhpur. Electronic Medical Records were part of telemedicine services. As many of the Tribal patients lacked an Aadhaar card, the mobile number of the patient or the attendant or sometimes the mobile number of neighbours or the sarpanch was used to register the hospital case ID.

Telemedicine services at the Satellite Centre of Tribal Health and Research, Abu Road, were implemented to primarily help tribals of district Sirohi, Rajasthan, India, residing in remote and inaccessible locations and unable to access speciality care from AIIMS Jodhpur.

The patient visited STHR for telemedicine, primarily referred from the nearest government Community Health Centres (CHCs) or Primary Health Centres (PHCs). After the initial consultation, follow-up care is provided through teleconsultation or, if necessary, patients are referred to AIIMS Jodhpur for further treatment.

Follow-up visits were planned based on the patient's consultation needs and scheduled appointments. These visits proved to be especially effective in the departments of Psychiatry, Cardiology, and Endocrinology. Through these follow-ups, the burden of travelling long distances to physical clinics was significantly reduced for the tribal population. As a result, they were able to access tertiary-level healthcare services within their own region, free of cost.

## Methodology

### Study setting

The study was conducted at the Satellite Centre for Tribal Health and Research (STHR) in Abu Road, district Sirohi. STHR is one of the first tribal telemedicine centre in India [6]. The centre offers a telemedicine service to the tribal population. The study took place between Feb 6, 2022 to May 31, 2024.

The telemedicine service has been specifically designed for tribal patients who have historically been neglected due to poor access to healthcare, social stigma, and lack of awareness. As mentioned in the manuscript, this centre provides specialised and super-specialised services to tribal communities in the aspirational district of Sirohi, which is located 250 km from AIIMS Jodhpur.

While there were general healthcare restrictions across India during the COVID-19 pandemic in 2022, the need for access to super-speciality care in tribal areas remained critical—and continues to be so even today. Therefore, this study remains free from bias when comparing data across 2022 and 2023/24, as the demand and relevance of the service in these underserved regions have been consistent.

### Study design and population

A mixed-method study was conducted to assess patients' satisfaction with telemedicine services. A total of 4570 patients received telemedicine services over the period of two years. All patients who received telemedicine services from STHR were invited to participate in a satisfaction survey; out of 4570 patients, 3704 (81%) patients responded to the satisfaction survey.

Out of a total of 4,570 patients, repeat visits were categorised based on the number of follow-ups as follows:

- Patients with fewer than two follow-up visits: 3,239 (70.88%).
- Patients with three to five follow-up visits: 289 (6.32%).
- Patients with more than five follow-up visits: 64 (1.40%).
- Patients referred to health centres for physical consultation: 345 (7.54%).
- Patients who did not require any referral: 633 (13.85%).

After teleconsultations, patients were asked to provide feedback on their satisfaction with the service based on their consent and interest. Out of 4,570 teleconsulted patients, only 3704 responded.

## Outcome measures

The primary outcome of interest was the participant's level of satisfaction with the newly implemented telemedicine service for tribal population.

## Data collection tool

Pre-validated 10-item TeSS (Telehealth Satisfaction Survey) questionnaire was used for data collection [1]. Scale items are rated on a 3-point Likert scale (1 = Fair, 2 = Good, 3 = Excellent), with higher scores indicating higher satisfaction. We followed translation methodology forward & back (for Garasiya to Hindi to English translation) recommended by International Society of Pharmacoeconomic and Outcome Research (ISPOR) to ensure a) Translation that is culturally acceptable, and b) Translation relevant to the target population. There was no application that required a smartphone. The requirement of digital literacy was not needed.

This was done manually through one-on-one interactions after the teleconsultation, with Garasia as the primary language, since the researcher was proficient in it.

Feedback was collected after the teleconsultation. Average teleconsultation from the start of the session lasted a maximum of 20 min, to providing the prescription. Feedback was recorded immediately after the teleconsultation while the patients' experience was still fresh in their minds.

All the 3704 tribal patients data were collected. As majority of patients teleconsulted were from tribal villages. Moreover, we also recorded their category as requested by the Ministry of Tribal Affairs, Govt. of India, with whose support this project is functional. [Figure 1]

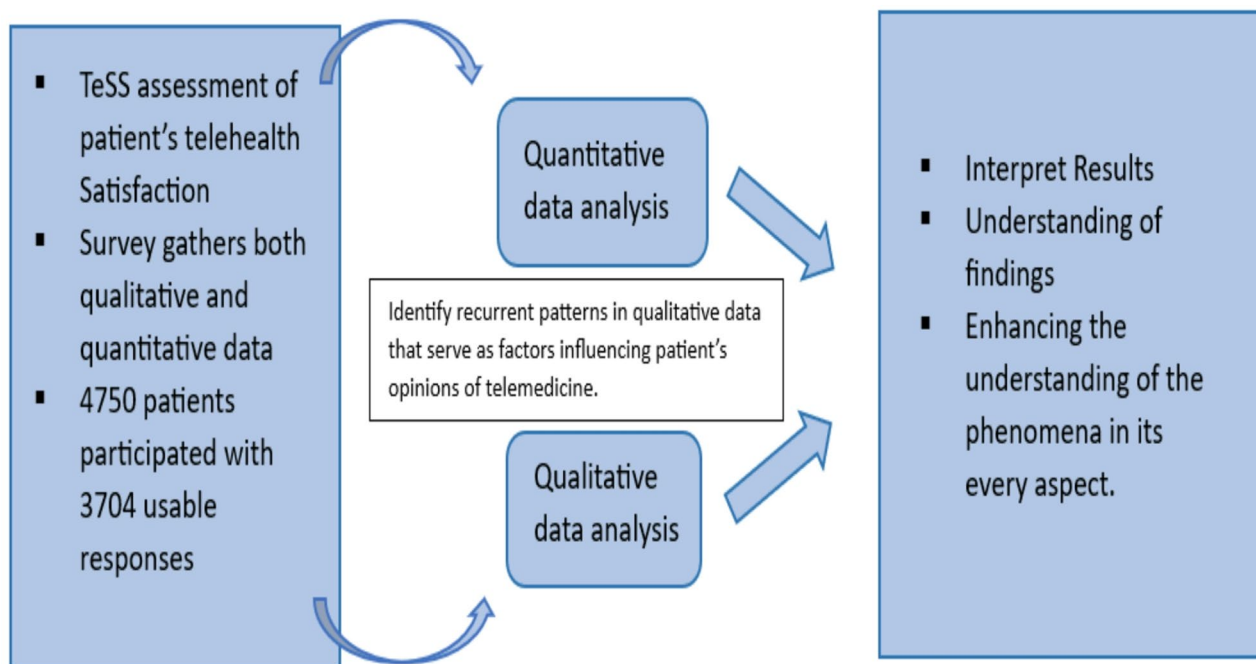
## Statistical analysis

### Quantitative assessment

Data were entered into EpiCollect5 (version 4.2.0) [7] and exported to SPSS version 22 for statistical analysis. Descriptive statistics, including means, standard deviations, and percentages, were calculated. The Likert scale responses for each item were tabulated in Table 1. The satisfaction index (SI) for each item was determined using the formula below [8].

$$SI = \{(a \times 1) + (b \times 2) + (c \times 3)\} \times 20 / N$$

Where a, b, and c are the total number of replies for the coefficients 1, 2, and 3, respectively. N is the total number of participants who achieved the score. A satisfaction index was calculated for each item to evaluate the patients' satisfaction using a questionnaire consisting of 10 items. Every participant was given explicit instructions to evaluate each item using a three-point scale. The scores of Fair, Good, and Excellent were assigned the numbers 1 to 3.



**Fig. 1** Research model for patient satisfaction

**Table 1** Patient responses towards telemedicine service satisfaction using Telehealth Satisfaction Survey (TeSS)

| S. No. | Statement<br>How you are satisfied with                                           | Fair<br><i>n</i> (%) | Good<br><i>n</i> (%) | Excellent<br><i>n</i> (%) | Mean (SD)       | SI<br>(Satisfaction index) |
|--------|-----------------------------------------------------------------------------------|----------------------|----------------------|---------------------------|-----------------|----------------------------|
| 1.     | The voice quality of the equipment                                                | 680<br>(18.4)        | 2329<br>(62.9)       | 695<br>(18.8)             | 2.00<br>(0.069) | 40.1                       |
| 2.     | The visual quality of the equipment                                               | 492<br>(13.3)        | 2516<br>(67.9)       | 696<br>(18.8)             | 2.05<br>(0.563) | 41.1                       |
| 3.     | Your personal comfort in using the telemedicine system                            | 512<br>(13.8)        | 2398<br>(64.7)       | 794<br>(21.4)             | 2.07<br>(0.588) | 41.8                       |
| 4.     | The ease of getting to the telemedicine department                                | 421<br>(11.4)        | 2087<br>(56.3)       | 1196<br>(32.2)            | 2.20<br>(0.626) | 44.1                       |
| 5.     | The length of time with the telemedicine provider                                 | 498<br>(13.4)        | 2429<br>(65.6)       | 777<br>(21.0)             | 2.07<br>(0.058) | 41.5                       |
| 6.     | The explanation of your treatment by the telemedicine provider                    | 315<br>(8.5)         | 1962<br>(53.0)       | 1427<br>(38.5)            | 2.30<br>(0.616) | 46.5                       |
| 7.     | The thoroughness, carefulness and skilfulness of the telemedicine provider        | 345<br>(9.1)         | 1987<br>(53.6)       | 1372<br>(37.3)            | 2.28<br>(0.619) | 45.5                       |
| 8.     | The courtesy, respect, sensitivity, and friendliness of the telemedicine provider | 256<br>(6.9)         | 2041<br>(55.1)       | 1407<br>(38.0)            | 2.31<br>(0.593) | 46.2                       |
| 9.     | How well your privacy was respected                                               | 312<br>(8.5)         | 2000<br>(54.0)       | 1390<br>(37.5)            | 2.29<br>(0.612) | 45.8                       |

As far as dissatisfaction is concerned, in our research, the tool did not capture any dissatisfaction, however, we recorded satisfaction levels ranging from “fair” at the lowest to “excellent” at the highest. Pre-validated 10-item Tess (Telehealth Satisfaction Survey) questionnaire was used for data collection [1]. Scale items are rated on a 3-point Likert scale (1 = Fair, 2 = Good, 3 = Excellent), with higher scores indicating higher satisfaction. In this research, we can categorise.

## Qualitative assessment

An open-ended questionnaire was used to interview 12 patients. A sample size of 12 was sufficient to represent the consultations, as each participant had extensive exposure and received the maximum number of teleconsultations. This teleconsultation model was one of the few initiatives in the region, targeting the tribal population. We divided the patients into two small groups based on their activeness and willingness to participate, focusing on those who received the most teleconsultations (follow-up visits more than five;  $n=64$ , 1.40%). Out of these 64 patients, only 12 consented to participate in the focus group discussion.

Focus Group Discussions (FGD) were conducted in two sessions, each consisting of 5–6 participants and lasting for 30 min. Theme such as satisfactory telemedicine visit, convenient, accessibility, and communication gap identified in this study. The qualitative data were transcribed from the local language (Garasiya) to Hindi and then to English. The FGD focused primarily on satisfaction with telemedicine services at the STHR centre. After transcription, the data were coded and analyzed [9]. All patients are continuing follow-ups after the teleconsultation as per their prescriptions and appointments.

## Result

From Feb 6, 2022, to May 31, 2024, a total of 4570 tribal patients seeking telemedicine services; among them, 3704 responded to a satisfaction survey. The median age of the 3704 tribal patients who participated in the survey was 32 years (IQR 16–32 years). More than half of the patients were male (58.6%). There are five major blocks in district Sirohi (Sirohi block, Abu Road block, Pindwara block, Sheoganj block & Reodar block). Out of these five blocks, Abu Road block & Pindwara block are predominantly tribal blocks. The majority of the patients attending Satellite Centre for Tribal Health & Research, Abu Road, were from Block Abu Road of the district Sirohi, state of Rajasthan, India.

The Telehealth Satisfaction Survey (TeSS) are shown in Table 1. Patients expressed their degree of satisfaction with telemedicine service provided at Satellite Centre for Tribal Health and Research, Abu Road. Average scores ranged from 2.00 (SD=0.069) for the voice quality of the equipment to 2.31 (SD=0.593) for the courtesy, respect, sensitivity, and friendliness of the telemedicine team. The majority of scores on the scale items averaged higher than 2.0, indicating a rating of ‘good’ to ‘excellent’ satisfaction.

Qualitative analysis of patient satisfaction regarding telemedicine in Table 2. Telemedicine has emerged as a valuable and convenient alternative for tribal patients seeking medical consultations. At the STHR centre, patients reported satisfaction with the telemedicine visits, citing convenience, accessibility, and cost-effectiveness as key advantages. The staff’s proficiency in addressing concerns and explaining treatment plans in the patient’s native language (Garasiya) further enhanced the experience. However, challenges such as internet connectivity issues and communication gaps were noted, impacting the effectiveness of teleconsultations. Despite these barriers, telemedicine was still perceived as a valuable option, saving both time and money for patients. Overall, the provision of telemedicine services at the STHR centre has proven to be beneficial, offering tribal patients efficient healthcare services. [Figure 2]

Out of 3704 patients, 26% sought treatment in the general medicine department, 22.9% in dermatology, 20.8% in paediatrics, and 10.9% in physical medicine and rehabilitation. These numbers show the significant impact telemedicine has had on various specialized fields, providing patients with accessible and efficient care.

## Discussion

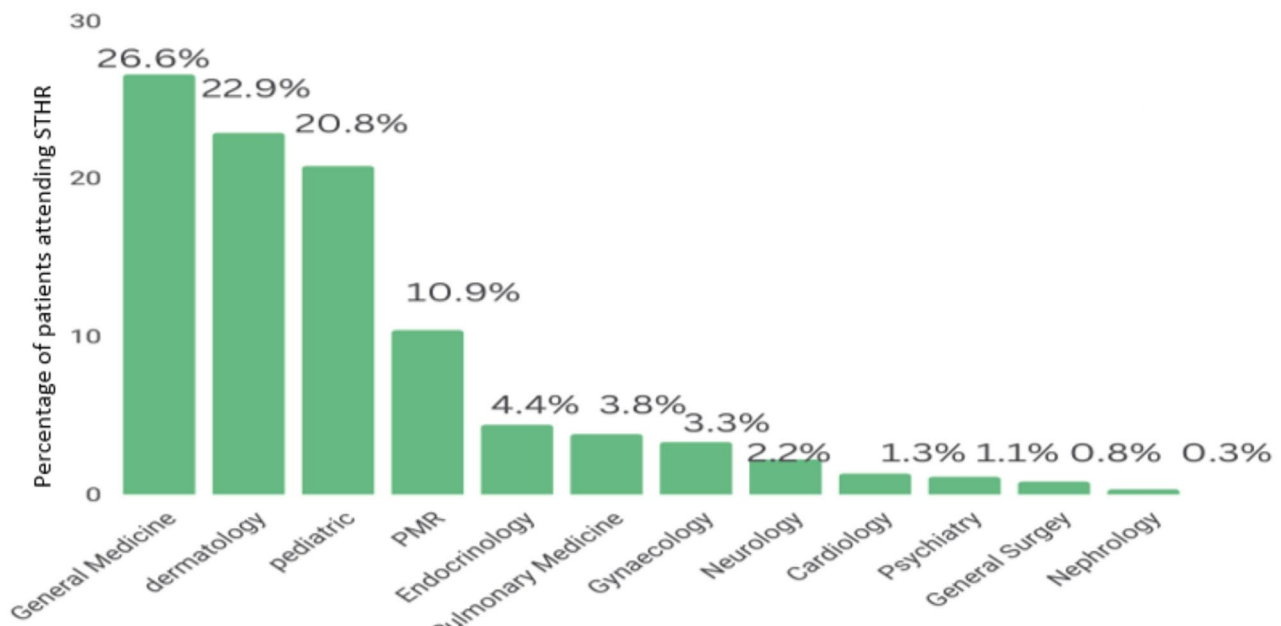
This research work aims to measure patient satisfaction regarding the use of tele-healthcare services among the Indigenous population. Over the past 20 years, the internet and technology have made it possible for healthcare to be delivered digitally, providing new avenues for medicine to improve the value of care [10].

**Table 2** Qualitative analysis of patient satisfaction regarding telemedicine

| Codes                                | Themes                                                                                                                                                                                                                      | Questions                                                                                                                                                                                                                               | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Satisfaction                         | Telemedicine visits were satisfactory.                                                                                                                                                                                      | How long did it take you to get a registration card at the telemedicine center?<br>Does the telemedicine staff at the STHR center easily make you understand your treatment plan?<br>How much does the staff here respect your privacy? | <i>"When I arrived at a STHR Center, I inquired about the treatment procedure. One multitasking employee informed me about the registration card which took between 15 and 20 minutes to complete."</i><br><i>When I asked about my medication intake schedule, he confidently advised me to take it twice daily if I experience a fever, assuring that it will reduce the symptoms and promote a speedy recovery.</i><br><i>"Our privacy is deeply valued and respected"</i>                               |
| Convenience                          | Telemedicine visits were more convenient than in-person visits.                                                                                                                                                             | Your concern and question regarding your health issue were addressed promptly?<br>Did the specialist explain your treatment well on the screen?                                                                                         | <i>"Without a doubt, connecting directly with the doctor on screen was the most convenient way for me to get the information I needed about my health issues. ....The doctor's thorough answers to my questions were incredibly helpful, and I felt confident that I was receiving expert care. Their willingness to take the time to explain things to me in detail is greatly appreciated, and ....I would highly recommend this method of communication to anyone seeking medical advice."</i>           |
| Value                                | Telemedicine visits were considered a valuable option for patients.                                                                                                                                                         | Is Telemedicine a Valuable Alternative to Treating Patients?                                                                                                                                                                            | <i>"We can easily access telemedicine for medical consultations, which is a convenient alternative to dealing with transportation and consultation fees for in-person visits to the doctor."</i>                                                                                                                                                                                                                                                                                                            |
| Accessibility                        | Patients had concerns about accessibility.                                                                                                                                                                                  | Did you have any difficulty getting here today?<br>How long it took you to reach the telemedicine center?                                                                                                                               | <i>"I had no trouble getting to the STHR center today, thanks to their pickup and drop van. It only took us half an hour to get here, which was a relief! .....The van was really convenient and comfortable too. Anyone who needs to go there should definitely consider taking the van....."</i><br><i>"I found taking the bus to be very convenient, and I reached the center in just 15–20 minutes. ....Overall, it was a productive journey."</i>                                                      |
| Related to visit modality preference | In-person preference.<br>Video visit preference over telephone visit<br>Anxiety and lack of confidence in self-monitoring and self-managing health without in-person physical evaluation by a trained medical professional. | What kind of difficulties do you suffer when your video visit converts to a telephone visit?<br>Are you comfortable describing your illness during a telephonic visit?                                                                  | <i>"I feel a sense of discomfort and unease when trying to communicate on the phone due to the unclear and muffled voice on the other end..... It makes it difficult for me to concentrate and fully engage in the conversation, resulting in a less effective communication experience."</i><br><i>"It is important to note that there should be no problems when a video visit is converted to a phone visit."</i><br><i>"We are sorry, but we cannot discuss any medical conditions over the phone."</i> |
| Communication gap                    | Medical officer at STHR center is helpful for you                                                                                                                                                                           | Does the Medical Officer assist you in the physical examination?<br>Does the medical officer know the local language?<br>Can a medical officer at the STHR center explain your treatment in the local language?                         | <i>"During the physical examination, I was assisted by medical officer and female nursing officer, all of whom were proficient in my native language. Furthermore, the center's staff ensured that the treatment plan was explained to me in my native language. This provision of language assistance by the healthcare professionals not only aided in the comprehension of the treatment plan but also helped establish a rapport between the healthcare providers and the patient."</i>                 |
| Barriers                             | What were the factors barriers that hindered the teleconsultation process?                                                                                                                                                  | Does telemedicine consultation face any inconvenience due to internet connectivity?<br>Can you hear and see the expert on screen?                                                                                                       | <i>"I encountered difficulties during my telemedicine consultations due to poor internet connectivity.</i><br><i>During every visit to the center, I spoke directly with the doctor on the screen.....</i><br><i>Sometimes I cannot hear the expert clearly, but I can see them on screen.....</i>                                                                                                                                                                                                          |

**Table 2** (continued)

| Codes              | Themes                                                                                         | Questions                                                                                                                 | Comments                                                                                                                                                                                                   |
|--------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cost effectiveness | Utilizing telemedicine is a cost-effective and efficient way to save both your time and money. | Does telemedicine save you time visiting the center?<br>Is the facility of treatment at telemedicine center free of cost? | <i>"yes, telemedicine save our time..."</i><br><i>"I leave early for work every day, but coming here saves me time."</i><br><i>yes "I received free-of-cost treatment at the telemedicine center....."</i> |

**Fig. 2** Percentage of patients visiting telemedicine departments at STHR centre

The strengths of telemedicine have made it an indispensable tool for delivering healthcare access among hard to reach population [10]. In this study, TeSS demonstrated strong factor structure and excellent internal consistency reliability in a population of tribal patients coming for telemedicine services [1]. In this study, male participants comprised 58.6%, in contrast to the study by Hentati et al. in 2021, where male participants accounts for 33% [11].

These results are similar to a cross-sectional study conducted by Efthymiadis et al., which involved 425 patients using telemedicine services. Among these patients, in domain of voice quality 102 (24%) rated the services as excellent, and 168 (39.5%) gave a good response to telemedicine services. This aligns with our study, where 2329 (62.9%) of participants reported feeling good, and 695 (18.8%) reported feeling excellent about voice quality at telemedicine services [12].

The high satisfaction reported in the current study is consistent with the few existing studies examining satisfaction with telehealth among patients with memory problems. Azad et al. [1] Most of the participants, 26%, sought teleconsultations in the general medicine department. This finding is similar to the study conducted by Ramaswami et al. in 2020 in New York, where patients (26.1%) sought assistance from the general medicine department for their health concerns. Participants expressed high satisfaction with tribal telemedicine via video conferencing at STHR centre encounters. Our qualitative coding facilitated a detailed exploration of patient perceptions, aligning identified themes with existing theories. This analysis enhances understanding of telemedicine acceptability, focusing on factors such as satisfaction levels, communication gaps, barriers, accessibility, and

convenience. Our findings are consistent with other studies that have reported high rates of satisfaction with telemedicine [9].

One of the limitations of the study was the ability to purchase medications is a major factor influencing a patient's clinical outcome. However, telemedicine services do not directly address this aspect, as the ability to buy medicine is equally important in both teleconsultations and in-person consultations. Another limitation was of referral, as in telemedicine services, a referral system is a crucial component, especially in remote and tribal areas where tertiary healthcare services are limited. These services can help guide the course of treatment by providing clear direction and a plan of action, while also reducing the patients' travel time and associated costs. A good healthcare referral system is needed in Indian healthcare; however, we did not focus on it.

## Conclusion

Telemedicine's adoption and satisfaction depend on several factors, including personal considerations like cost-effectiveness and convenience, healthcare provider aspects such as perceived competence and communication with patients, and systemic factors like connectivity and technological needs. Telemedicine is generally seen as safe, efficient, and effective, especially when barriers are minimized. At the Satellite Centre for Tribal Health and Research, a unique hybrid telemedicine facility, doctors and specialized consultants from All India Institute of Medical Sciences Jodhpur provide essential support to tribal communities via video conferencing in the presence of a medical officer and support staff at the centre. This initiative not only enhances healthcare services for tribes but also serves as a crucial screening tool for indigenous populations. Our research underscores that telemedicine is highly rated for its convenience and improved access for the tribal population.

## Abbreviations

|       |                                                                 |
|-------|-----------------------------------------------------------------|
| AIIMS | All India Institute of Medical Sciences                         |
| CHC   | Community Health Centre                                         |
| CoE   | Centre of Excellence                                            |
| COVID | 19–Coronavirus Disease 2019                                     |
| EMR   | Electronic Medical Record                                       |
| FGD   | Focus Group Discussion                                          |
| HIS   | Hospital Information System                                     |
| ICMR  | Indian Council of Medical Research                              |
| IEC   | Institutional Ethics Committee                                  |
| IQR   | Interquartile Range                                             |
| ISPOR | International Society of Pharmacoeconomic and Outcomes Research |
| MoTA  | Ministry of Tribal Affairs                                      |
| PHC   | Primary Health Centre                                           |
| SD    | Standard Deviation                                              |
| SI    | Satisfaction Index                                              |
| SPSS  | Statistical Package for the Social Sciences                     |
| STHR  | Satellite Centre for Tribal Health and Research                 |
| TeSS  | Telehealth Satisfaction Survey                                  |

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1186/s12913-026-14419-z>.

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**Author contributions** PD, RD, KS conceptualized and designed the study; RD, RJ, PG, ADG, GKB, AB, PS participated in recruitment of participants; PD, RD, RJ, PG, ADG, GKB, AB, analyzed the data and drafted the manuscript. PD, RD, PS, KS critically revised the manuscript. All authors reviewed the manuscript and approved the final version to submit for publication.

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**Data availability** The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Declarations

**Ethics approval and consent to participate** The study is approved by the Institutional Ethics Committee, AIIMS Jodhpur (AIIMS/IEC/2021/3888). Voluntary written informed signed consent was obtained before enrollment of participants in the study, in accordance with the ICMR National Ethical Guidelines For Biomedical And Health Research Involving Human Participants 2017.

**Consent for publication** Not applicable.

**Competing interests** The authors declare no competing interests.

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## References

1. Morgan DG, Kosteniuk J, Stewart N, O'Connell ME, Karunanayake C, Beever R. The telehealth satisfaction scale: reliability, validity, and satisfaction with telehealth in a rural memory clinic population. *Telemed J E Health*. 2014;20(11):997–1003. [(2). [https://esanjeevani.mohfw.gov.in/assets/guidelines/Telemedicine\\_Practice\\_Guidelines.pdf](https://esanjeevani.mohfw.gov.in/assets/guidelines/Telemedicine_Practice_Guidelines.pdf)].
2. Ramanadhan S, Ganapathy K, Nukala L, Rajagopalan S, Camillus JC. A model for sustainable, partnership-based telehealth services in rural India: An early process evaluation from Tuver village, Gujarat. *PLoS ONE*. 2022;17(1):e0261907.
3. Abdel Nasser A, Mohammed Alzahrani R, Aziz Fellah C, Muwafak Jreash D, Talea A, Almuwallad N, Salem A, Bakulka D, Abdel Ra'ouf Abed R. Measuring the Patients' Satisfaction About Telemedicine Used in Saudi Arabia During COVID-19 Pandemic. *Cureus*. 2021;13(2):e13382.
4. Elhakeem I, Iqbal P, Nashwan AJ, Abubakar M, Jawad AT, AlHiyari MA, Chandra P, Osman MA, Mohamad SS, Alkhatib M, Yassin MA. Patients' experience and satisfaction using telemedicine for outpatient services in a Tertiary Cancer Center in Qatar during COVID-19: A cross-sectional study. *Health Sci Rep*. 2022;5(6):e883.
5. Tribal [Internet]. [cited 2024 Jun 12]. Available from: <https://aiimsjodhpur.org/tribal/>
6. About Us. – Tribal [Internet]. [cited 2024 Jun 12]. Available from: <https://aiimsjodhpur.org/tribal/about-us/>
7. Epicollect5 -. Login [Internet]. [cited 2024 Jun 12]. Available from: <https://five.epicollect.net/login>
8. Wolters Kluwer Health [Internet]. [cited 2024 Jun 12]. Available from: [https://lww.com/\\_layouts/1033/OAKS.Journals/Error/JavaScript.html](https://lww.com/_layouts/1033/OAKS.Journals/Error/JavaScript.html)
9. Nguyen MLT, Garcia F, Juarez J, et al. Satisfaction can co-exist with hesitation: qualitative analysis of acceptability of telemedicine among multi-lingual patients in a safety-net healthcare system during the COVID-19 pandemic. *BMC Health Serv Res*. 2022;22:195.

10. Abdel Nasser A, Mohammed Alzahrani R, Aziz Fellah C, MuwafakJreash D, Talea A, Almuwallad N, Salem A, Bakulka D, et al. Measuring the Patients' Satisfaction About Telemedicine Used in Saudi Arabia During COVID-19 Pandemic. *Cureus*. 2021;13(2):e13382.
11. Hentati F, Cabrera CI, D'Anza B, Rodriguez K. Patient satisfaction with telemedicine in rhinology during the COVID-19 pandemic. *Am J Otolaryngol*. 2021;42(3):102921.
12. Efthymiadis A, Hart EJ, Guy AM, Harry R, Mahesan T, Chedid WA, Uribe-Lewis S, Perry MJ. Are telephone consultations the future of the NHS? The outcomes and experiences of an NHS urological service in moving to telemedicine. *Future Healthc J*. 2021;8(1):e15–20.

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