

Original Research Article

Current pattern of use and barriers to implementation of eSanjeevani telemedicine services in Kerala, India

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ABSTRACT

Background: Kerala State in India presents a distinctive context for studying the implementation and impact of telemedicine, owing to its high levels of digital literacy and relatively well-structured public health infrastructure. This study analyses the adoption and utilization patterns of eSanjeevani, the national telemedicine service, examining both beneficiary and provider perspectives within the state of Kerala.

Methods: We conducted a survey among 300 eSanjeevani beneficiaries by covering details of socio-demographics, experiences, motivations for use, patterns of use and challenges. The in-depth interview of key informants assessed implementation challenges in both Outpatient Department and Health and Wellness Centre platforms. Univariate and bivariate analyses were performed for quantitative analysis, while qualitative data were thematically analyzed.

Results: Majority (75%) of the beneficiaries were satisfied with eSanjeevani services. However, 21.3% were unaware that the service's continuation. Users appreciated time savings but reported system glitches, slow platform response, connectivity failures and interface difficulties. Younger, employed, college-educated males found the service easier to use. The findings from stakeholder perspectives highlight critical technical, operational and policy challenges affecting the effective implementation of eSanjeevani. Stakeholders recommended integrating eSanjeevani with national health programs, expanding awareness and improved training for healthcare providers, particularly in mental health services.

Conclusions: eSanjeevani has strong potential to expand healthcare access in Kerala, but challenges remain for more awareness on continuity of the services. Efforts to enhance digital skills and address healthcare professionals' concerns are key to ensuring equitable and sustained use of the platform.

Keywords: Barriers to implementation, Digital health, eSanjeevani, India, Kerala, Patient satisfaction

INTRODUCTION

India has been a pioneer in adoption and advocacy of telemedicine, recognizing its ability to bridge the gap in healthcare access, especially in the underserved and rural areas.¹ Since the early 2000's, the Government of India has been actively working on telemedicine initiatives like the Indian Space Research Organization's pilot project in 2001.² In 2005, India's Department of Information Technology created standardized telemedicine guidelines and the Ministry of Health and Family Welfare

(MoHFW) established a National Telemedicine Task Force to develop effective strategies and policies for telemedicine, specifically targeting healthcare challenges in underserved communities.^{2,3} However, the adoption of telemedicine in India has been marked by uneven progress, with urban centres witnessing greater uptake compared to rural areas.⁴ This difference is primarily driven by the disparate distribution of healthcare professionals and infrastructure deficiencies between urban and rural settings.^{5,6} Over 85% of all health care visits in India are made by the rural population, with a majority travelling long distances to receive the

services.^{7,8} eSanjeevani, the national telemedicine service launched by the Ministry of Health and Family Welfare, has become a significant platform for both patient-to-doctor and doctor-to-doctor consultations.⁹ Though launched towards the end of 2019, the broader adoption of the telemedicine services happened in 2020, facilitating real-time consultations between patients and healthcare providers in response to the increasing demand for remote healthcare services primarily due to the advisory for maintaining physical distancing during the COVID-19 (Corona Virus Disease 2019) pandemic.¹⁰ In 2020, the use of telemedicine in India saw a rapid increase, with the MoHFW reporting a 200% rise in teleconsultations between March and May 2020 compared to the previous year.¹¹ During the pandemic, the rapid adoption of telemedicine also proved its effectiveness in maintaining continuity of care while reducing the strain on healthcare facilities and the risk of virus transmission.¹² As of October 7, 2024, it has facilitated over 299 million consultations nationwide, with more than 222,682 healthcare providers onboarded and operational in over 129,191 Ayushman Arogya Mandirs across the country.⁹

Kerala, a southern state in India, known for its evidently well-functioning public health system and high digital literacy rates.¹³ Yet, challenges persist in further scaling of telemedicine adoption. A major reason for this is the preference among Kerala residents for in-person consultations, often at private healthcare facilities, despite the higher out-of-pocket expenses.¹⁴ During the COVID-19 pandemic, there has been a need for increased awareness and skill development among healthcare professionals on telemedicine practices. Studies from India indicate that only 35.3% of medical professionals have a strong understanding of telemedicine, while the remaining 64.7% have limited knowledge of its concepts, technologies, regulations and practical applications in clinical settings.¹⁵ This gap is a significant hurdle to the widespread and effective implementation of telemedicine services. Although Kerala has made significant strides in digital health adoption, a comprehensive understanding of the telemedicine usage patterns and the challenges faced by both patients and health care providers is limited. We examined the pattern of use and barriers to implementation of eSanjeevani telemedicine services in Kerala state of India.

METHODS

This cross-sectional, mixed-methods study investigated the patterns of use and challenges associated with eSanjeevani telemedicine services among adults aged between 20 and 69 years in Thiruvananthapuram district of Kerala. The study focused on eSanjeevani telemedicine users in Thiruvananthapuram district where there were 71,033 recorded consultations between June 1, 2020 and June 30, 2022. Of these, 75% (53,275) were adults aged 20 years or older. For this study, we selected 300 beneficiaries of eSanjeevani from the list using simple

random sampling method. The sample size was determined based on feasibility. This selection considered the age-sex distribution of the study population, aiming for 60 participants in each ten-year adult age group. With five age groups considered (20-29, 30-39, 40-49, 50-59 and 60-69 years).

Data collection was conducted through telephone interviews, using a pre-tested semi-structured interview schedule which included sections on demographic details, patterns of service utilization and barriers to accessing the eSanjeevani platform. These telephone interviews were carried out via the DISHA (Direct Intervention System for Health Awareness) helpline, which operates under the Government. DISHA is a Tele Medical Health Helpline, a joint venture undertaken by the National Health Mission (NHM) and the Department of Health of Kerala. It operates as the State's first Health Helpline, providing 24×7 free call service covering all parts of Kerala and Lakshadweep, a Union Territory of India.

All the calls were made by the first author (NR), a trained public health physician, making it easier to interact with the beneficiaries. Three attempts were made and if the call connection was unsuccessful, the contact was replaced with another randomly selected individual. The author contacted 789 participants to obtain a sample of 300. The individuals who were unable to communicate verbally, were excluded from the study. Socioeconomic status (SES) was determined based on the type of the ration card issued by the civil supplies department; pink or yellow cards indicated below poverty line (BPL) families, while blue or white cards indicated above poverty line (APL) families. The data collection period spanned two months, from October to November 2023.

Qualitative interviews were done with beneficiaries of eSanjeevani and with stakeholders. Interviews with beneficiaries were conducted to collect information on their perspectives and the experiences regarding eSanjeevani. Key informant interview examined the implementation challenges encountered in both the eSanjeevani OPD (Outpatient Department) and HWC (Health and Wellness Centre) platforms. Additionally, these interviews elicited suggestions for program improvements and probed into specific difficulties experienced during consultations.

Eight key informants were purposively selected from the eSanjeevani program to ensure diverse representation across different roles and expertise. This group included administrative personnel, specialist doctors, general medical practitioners and health personnel who have worked or were working in the program. To guide the interviews, we used a semi-structured interview questionnaire. The key areas covered in the stakeholder interview were perceptions of eSanjeevani (overall impressions, utility and user-friendliness of the platform) and implementation challenges (connectivity issues, workload issues and training issues). Beneficiary

interviews cover their experience in patient satisfaction, barriers to access and perceived quality of care and gathered their suggestions for improvement of the service.

Ethical clearance was obtained from the Institutional Ethics Committee (IEC) of the host institution. For quantitative data collection, oral informed consent was obtained from all the study participants before the survey. For qualitative interviews, written informed consent was obtained from all the participants. Quantitative data were analysed using SPSS version 21.0 (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). Both univariate and bivariate analyses were performed. The in-depth interviews were audio-recorded and transcribed verbatim and analysed thematically to ensure comprehensive coverage of the findings.

RESULTS

Participants' basic characteristics are presented in Table 1. The mean age of the participants was 44 years ($SD \pm 13.5$), ranging from 20-69 years and 54% were male. The majority of participants resided in urban areas (67.6%) and 56% were employed at the time of the survey. A large proportion of the participants were graduates (50.7%) while 27.3% were postgraduates, 21% had only school education and three did not have any formal education. 11.7% had low SES and 10 % reported that they couldn't recall the colour of their ration cards which denotes their SES. Most of the participants were currently married (87.7%). The participants' mean household size was four.

Usage of eSanjeevani services

A very high proportion (98%) of the participants accessed the eSanjeevani telemedicine service through media advertisements (81.7%), while others were referred by friends and family (16.7%) or healthcare workers (1.6%). The COVID-19 pandemic played an important role in accelerating the adoption of eSanjeevani in Kerala, with 98% of users beginning to use the platform primarily during the lockdown. Before the pandemic, only a limited number of individuals (1.3%) had explored the telemedicine service, mainly out of convenience or curiosity (two persons initiated just to give a try). However, disruptions in conventional healthcare services prompted a significant increase in eSanjeevani's usage during the lockdown period.

More than half of the participants (52.3%) reported that their family members concurrently used eSanjeevani and sought consultations across various outpatient departments (OPDs). Various OPDs were accessed by the participants that included general OPD (59.3%), COVID-19 OPD (4.3%), speciality OPD (Out Patient Department) (12.3%) and multiple OPDs (24.0%). While 98% of participants utilized eSanjeevani for physical health issues, the remaining 2% used it for mental health support.

Referring to the platform's potential for ongoing care beyond the acute phase of the pandemic, one beneficiary reported:

"In addition, my wife received post-COVID advice. The doctors were compassionate, providing mental health support and offering proper referrals and guidance."

Most of the employed participants found the eSanjeevani helpful during their long day working hours and one of them eloquently stated.

"Telemedicine is incredibly beneficial for employed individuals like me as it can save a significant amount of time and prevent loss of work by avoiding hospital visits that usually consume a full day" (35 years, male eSanjeevani user). The platform demonstrated its utility across various patient groups, including those with limited mobility and vulnerable populations.

"It proved helpful not only for bedridden patients but also for the geriatric population and children. This platform also allows us to easily avoid the risk of infection associated with hospital visits" (29 years, Female, eSanjeevani user). A considerable proportion (13.7%) needed assistance in navigating the platform, although the majority (86.0%) found it easy to use and accessed it through their devices (87.3%). On average, participants made five consultations during the study period, each lasting an average of seven minutes.

Among the 100 participants who accessed speciality OPDs, dermatology (35.0%) and paediatrics (28.0%) were the most frequently used. Other specialties, including Ear, Nose and Throat (ENT), gynaecology, ophthalmology, surgery, orthopaedic, non-communicable diseases (NCD) and psychiatry, were also used. Within the last six months, 15.3% (46 out of 300) of participants have used eSanjeevani. However, among the participants who were not currently using the telemedicine program, 36.2% preferred in-person medical appointments, whereas 21.3% were unaware that telemedicine services were still available, highlighting the need for improved awareness. Among those not using eSanjeevani, 23.4% claimed that their healthcare conditions were not suited for telemedicine use, while 19.1% didn't have any illness.

Three fourth of the participants expressed satisfaction with the services. Nearly all participants (99.7%) reported that they could communicate their health concerns effectively, 96.7% were asked about their medical history and 98.3% felt that their privacy was maintained. Around 98% of participants felt comfortable with the communication and 94.3% were satisfied with the audio/video quality during the calls. Additionally, the vast majority (99.3%) expressed an interest in using telemedicine services again and 98.7% were willing to recommend it to others.

The perception about eSanjeevani services was generally positive, with participants noting several benefits. Specifically, 12.7% appreciated easy access to healthcare providers without hospital visits and 18.1% highlighted convenience during the COVID-19 lockdown. Users highlighted the significant cost savings and increased convenience offered by eSanjeevani. Other benefits reported were emergency health advice (8.9%), efficiency and time savings (11.8%), user-friendly interfaces (15.6%), remote consultations (4.2%), referral advice (11.0%) and improved communication between doctors and patients (12.2%).

One user highlighted this by stating, "The information was very useful, especially since specialty OP timings were listed. Didn't feel like the doctor was away since we could see the doctor through video. It was very comfortable and I could access E-prescription" underlining the importance of clear and accessible scheduling information. An eSanjeevani user shared their experience, stating, "Having a psychiatric patient in the family, the platform was incredibly useful because she was very uncooperative and unwilling to go to the hospital. The mental health support provided was very well received" (45 years, female, eSanjeevani user).

One user said, "Usually if I go to a private hospital, there are extra outpatient charges, medicines and transportation costs totaling Rs 1500 per visit, coupled with long delays and the fear of spreading infection, including Hospital-acquired Infections. Teleconsultation helps me bypass all these barriers and I am very satisfied that the doctors clear my doubts and treat me well." (42 years, Female, eSanjeevani user).

Participants also reported the following challenges: technical and connectivity issues (13.6%), privacy concerns (1.5%), longer waiting times (7.5%), interface problems (10.9%), doubts about medication accuracy (1.9%), doubtful about the quality of doctor-patient interactions (5.7%) and lack of availability of doctors or specialists (7.9%). "Server issues causing difficulties such as talking to a doctor for some time and getting disconnected in between and then connecting to a different doctor. Moreover, they experienced longer waiting periods." (34 years, Female, eSanjeevani user).

Suggestions from patients to improve the services included increasing awareness about the availability of the services (18.7%), integrating the platform with other existing national programs (6.7%), enhancing doctor-patient interactions (7.3%), improving app usability and interface design (30.7%) and increasing the availability of doctors and specialists (15.3%). "A positive experience during my son's consultation during the COVID period: He had severe abdominal pain and we explained the symptoms and difficulties over the phone. The paediatric eSanjeevani doctor promptly suspected the condition, made the correct referral and helped us secure an appointment at a nearby hospital, where the issue was

safely managed. We were very satisfied and happy with the care and we would like to highly praise the service provided by the eSanjeevani doctors and the program." (45 years, Male, eSanjeevani user).

Socio-demographic factors associated to the user satisfaction, source of knowledge and easiness of use of eSanjeevani: Our analysis found significant associations between socio-demographic factors and the utilization of e-Sanjeevani services. Employment and education emerged as key determinants influencing awareness, ease of use and OPD access through the platform. Employed individuals and those with college-level education were significantly more likely to be aware of e-Sanjeevani and reported finding it easier to use, compared to unemployed individuals and those with only school-level education ($p < 0.001$ for all comparisons). These groups also exhibited significantly higher rates of OPD access via the platform, suggesting that disparities in digital literacy may contribute to these differences. Gender differentials were evident, with men reporting significantly greater ease of use of the services than women. Younger users (<45 years) were also more likely to find e-Sanjeevani easy to use compared to older users.

Insights from stakeholder interview

The stakeholders highlighted a range of challenges that undermine the usability and effectiveness of eSanjeevani. Technical issues, such as problems with app integration and unreliable network connectivity, frequently disrupt consultations and hinder the platform's performance "Network issue is one basic problem, sometimes uploading pictures gets really difficult. "(a Program staff at health department).

While telemedicine has improved healthcare management, doctor-related challenges also persist. Additional workload possibly coupled with insufficient financial incentives for government-employed doctors negatively impacts their motivation and participation. As reported by a program officer "Private empaneled doctors handle significantly more consultations, likely driven by higher financial incentives per consultation and better pay. In contrast, government doctors tend to have a lower consultation frequency, potentially due to lesser commitment and enthusiasm because of lack of incentives.

Stakeholders highlighted the need for policy adjustments to incentivize government doctors, emphasizing that such changes could increase their participation and engagement. They also identified additional challenges, including the inherent limitations of telemedicine in diagnosing conditions that require physical examination. Privacy and confidentiality concerns were frequently raised, alongside the growing issue of fake calls, which further complicates the effective delivery of telemedicine services.

One eSanjeevani doctor stated, "Fake calls are becoming quite prevalent, especially during night-time most of these calls seem to be coming from outside the state".

Suggestions to improve the services

As per their reports, several critical areas require attention to maximize eSanjeevani's impact and ensure its sustainability. Technical challenges have been identified, including connectivity disruptions, server instability and app integration issues, which affect the platform's reliability and user experience. Addressing these concerns is essential for enhancing service delivery and building user confidence.

Additionally, the reports highlight the need for revising incentive structures for government doctors to promote equitable participation and sustained motivation among healthcare providers. Furthermore, integrating eSanjeevani with existing national health programs such as the National Tuberculosis Elimination Program (NTEP), National AIDS Control Program (NACP) and National Program for Prevention and Control of Non-Communicable Diseases (NP-NCD) has been suggested as a strategy to improve access and utilization. This alignment would enable eSanjeevani to function more effectively within India's broader public health framework.

Healthcare providers also require continuous training to adapt to telemedicine best practices effectively. This is especially crucial for professionals delivering mental health services to ensure high-quality consultations. Expanding mental health services on eSanjeevani would

address a significant unmet need, as consultations in this domain remain limited. Additionally, mental health services offered by eSanjeevani require targeted outreach campaigns to increase awareness and utilization. Integrating Tele-Manas (Tele Mental Health Assistance and Networking Across States), the Government of India's initiative providing 24/7 free tele-mental health assistance with eSanjeevani could enhance accessibility and ensure more comprehensive mental healthcare delivery. Investments in training and support for mental health professionals would also improve service delivery and patient outcomes. From the beneficiaries' perspective, raising awareness about eSanjeevani is essential to increase its utilization, particularly in rural and underserved areas. Targeted information campaigns through trusted media channels, such as newspapers, social media and radio, can play a pivotal role in promoting the platform. As one staff member emphasized:

"I strongly recommend conducting IEC (Information, Education and Communication) activities through newspapers due to the trust factor, along with leveraging social media platforms and Radio Jiggles."

To address the digital literacy gap, tailored programs should be developed for specific groups, including unemployed people, women, older adults and those with lower educational attainment. This approach would empower a broader range of users to access and benefit from telemedicine services. Promotional materials should emphasize user-preferred features such as speciality OP timings and video consultations, as these have been identified as key factors for user satisfaction.

Table 1: Socio-demographic characteristics of eSanjeevani beneficiaries.

Variable		N=300	(%)
Age group (in years)	<45	156	52.0
	≥45	144	48.0
Sex	Male	162	54.0
	Female	138	46.0
Place of residence	Rural	97	32.3
	Urban	203	67.6
Education	College	234	78.0
	School education	63	21.0
	No formal education	03	01.0
Occupation	Employed	213	71.0
	Unemployed	87	29.0
SES	APL	234	78.0
	BPL	36	12.0
	Don't know	30	10.0
Marital status	Single	29	09.7
	Currently Married	263	87.7
	Widowed	08	02.7

SES: socio-economic status, APL: Above poverty line, BPL: Below Poverty line.

Table 2: Patterns of utilization of eSanjeevani.

Variable	N=300	(%)
Source of knowledge about eSanjeevani		
Media	245	81.7
Friends or family	50	16.7
others	05	01.6
Reason for usage initiation		
COVID-19 pandemic	294	98.0
Convenience	04	01.3
To just give a try	02	0.7
Time of first use		
2020	219	73.0
2021	60	20.0
2022	21	07.0
Current use		
Yes	46	15.3
No	254	84.7
Family member usage (ever)		
Yes	157	52.3
No	143	47.7
Consultation reason		
Mental health support	06	02.0
Disease management	294	98.0
Sought assistance for use of eSanjeevani		
Yes	41	13.7
No	259	86.3
Easy to use		
Yes	258	86.0
No	42	14.0
Mode of access		
Own device	262	87.3
Family device	38	12.7

Table 3: Association between socio-demographic factors and eSanjeevani usage patterns.

Variable	User satisfaction		Source of knowledge about e-Sanjeevani		Easy to use	OPD accessed	
	Good	Satisfactory	Media	Friends/Family		General OPD	Special OPD
Age group (in years)							
<45 (156)	123 (78.8)	33 (21.2)	121 (77.6)	35 (22.4)	155 (99.4)	84 (53.8)	72 (46.2)
≥45 (144)	102 (70.8)	42 (29.2)	124 (86.1)	20 (13.9)	103 (71.5)	94 (65.3)	50 (34.7)
P value	0.112		0.073		<0.001	0.123	
Sex							
Male-162	118 (72.8)	44 (22.7)	141 (87.0)	21 (13.0)	154 (95.1)	96 (59.3)	60 (40.7)
Female-138	107 (77.5)	31 (22.5)	104 (75.4)	34 (24.6)	104 (75.4)	82 (59.4)	62 (40.6)
P value	0.422		0.011		<0.001	0.525	
Location							
Urban-203	157 (77.3)	46 (22.7)	166 (81.8)	37 (18.2)	175 (86.2)	121 (59.6)	82 (41.2)
Rural-97	68 (70.1)	29 (29.9)	79 (81.4)	18 (18.6)	83 (85.6)	57 (58.8)	40 (40.4)
P value	0.2		1		0.861	0.624	
Occupation							
Employed-213	156 (73.2)	57 (26.8)	184 (86.4)	29 (13.6)	205 (96.2)	123 (57.7)	90 (42.3)
Unemployed-87	69 (79.3)	18 (20.7)	61 (70.1)	26 (29.9)	53 (60.9)	55 (63.2)	32 (36.8)

Continued.

Variable	User satisfaction		Source of knowledge about e-Sanjeevani		Easy to use	OPD accessed	
P value	0.306		0.002		<0.001	0.81	
Education							
College (234)	172 (73.5)	62 (26.5)	195 (83.3)	39 (16.7)	221 (94.4)	135 (57.7)	99 (42.3)
School (63)	50 (79.4)	13 (20.6)	47 (74.6)	16 (25.4)	36 (57.1)	40 (63.5)	23 (36.5)
P value	0.415		0.143		<0.001	0.16	
Socio economic status							
BPL (36)	26 (72.2)	10 (27.8)	28 (77.8)	8 (22.2)	29 (80.6)	24 (66.7)	12 (33.3)
APL (234)	176 (75.2)	58 (24.8)	192 (82.1)	42 (17.9)	204 (87.2)	137 (58.5)	97 (41.5)
P value	0.684		0.498		0.298	0.722	

Percentages presented are row percentages, APL: Above poverty line, BPL: Below Poverty line.

DISCUSSION

Though telemedicine initiatives started in India since 2015, the COVID-19 pandemic played a significant role in their adoption and utilization across the country and worldwide. Kerala State, known for its resilient public health system, was rather quick to integrate telemedicine into its healthcare landscape. The study reported a high level of satisfaction (75%) with eSanjeevani telemedicine services, driven by factors such as convenience, time savings and cost efficiency. This can be attributed to the state's high literacy and relatively higher digital literacy rates. The study revealed a significant decline in eSanjeevani with a usage of 15.3% during the study. The decline in eSanjeevani use after the initial peak during the pandemic reflects similar trends observed in other telemedicine implementations worldwide.^{10,16,17} The extraordinary situation that arose from the COVID-19 pandemic made people seek alternate solutions for in-person consultations and the eHealth platforms became a timely solution.¹⁶ This aligns with the broader trends observed in telemedicine adoption where initial enthusiasm driven by immediate needs often diminishes as the perceived urgency fades.^{18,19}

A key factor contributing to the decline in usage of telemedicine appears to be the prevalent preference for in-person consultations, particularly for specialized care. In contrast, a study conducted in Iran found that users preferred tele-consultations over in-person visits.²⁰ This highlights the importance of understanding the user preferences and addressing concerns about the effectiveness of telemedicine for certain conditions.

The finding that users appreciate features like speciality OP timing listings and video consultations underscores the need to emphasize these aspects in promotional materials. Clear and accessible information about appointment scheduling and available services can significantly enhance user-satisfaction and encourage continued use. The study findings also revealed disparities in usage based on socio-demographic factors. Education level and occupation emerged as important determinants of user-satisfaction. Individuals with higher education levels and employed individuals reported greater satisfaction with eSanjeevani, as the platform might have provided them with an alternative means to

access care for minor health concerns, thereby enabling them to save time and resources.²¹⁻²³ This also suggests the need for targeted interventions to address the digital literacy gaps and ensure equitable access to telemedicine services for all segments of the population. Tailored digital literacy programs for unemployed individuals, those with lower educational attainment, women and older adults could help bridge this divide.²⁴⁻²⁶ The analysis found that geographical issues or remoteness did not significantly impact telehealth utilization, in contrast with findings from similar studies in other countries.²⁷

Furthermore, the study highlighted challenges related to healthcare professionals, particularly government-employed doctors. The reported increased workload and insufficient financial incentives negatively impact their motivation and participation in telemedicine initiatives. The literature suggests that financial incentives can have a positive impact on motivating healthcare workers.²⁸⁻³⁰ Revising incentive structures and integrating eSanjeevani with existing national programs could address these issues and ensure equitable participation by government doctors. Addressing the issue of "fake calls" is also crucial for maintaining the integrity and effectiveness of the platform. Fake callers misuse the system and can interrupt emergency calls or hinder callers seeking help from placing emergency calls.³¹

The potential of eSanjeevani to address mental health needs is an area warranting further investigation. While the current utilization of mental health support is limited, the positive experience reported by the user suggests that telemedicine could play a valuable role in this area. The literature also provides substantial empirical evidence supporting the use of telemedicine interventions for patients with mental disorders across a broad range of demographic and diagnostic groups. Similarly, research has shown positive trends in terms of cost savings associated with these telemedicine interventions.^{32,33} Some general disadvantages of telemedicine include limitations in conducting comprehensive physical examinations, as certain diagnostic procedures may not be feasible without in-person visits. Additionally, persistent technical difficulties, including challenges with internet connectivity, server stability and app integration, continue to hinder the effectiveness of the platform across various settings.³⁴ Furthermore, telehealth may not be

suitable for all medical conditions in which physical examinations and procedures are necessary, Telehealth can be used to supplement in-person visits. A combination of virtual and in-person care may be necessary to provide optimal healthcare services.^{34,35}

The study offers a significant perspective into the potential and difficulties of growing telemedicine programs in comparable situations by analyzing telemedicine acceptance in a highly digital literacy setting like Kerala State. Using a mixed-methods approach, which combines qualitative insights from in-depth interviews with key informants and beneficiary perspectives with qualitative interviews, improves the study's rigor and offers a deeper understanding of the challenges of telemedicine adoption in this setting. This is especially important in context with Kerala's continuing efforts to attain universal health coverage and integrate telemedicine into its healthcare system.³⁶ The study does, however, have certain shortcomings. Relying on a single investigator for data collection reduces the potential for interviewer bias, which could influence participant responses. Limiting the sample to people under 70 years old further limits the findings' applicability to the older adult population. However, the very limited use of telemedicine among the elderly, as indicated by our pilot study findings, addresses this issue, because of recall bias and lack of participation among the older participants of the pilot project.

Although telephone interviews made it possible to reach a wider section of population, they might not have yielded as deep of responses as in-person interviews and may have excluded individuals without access to telephones a factor relevant to understanding the digital divide within Kerala. This underscores the need for tailored digital literacy initiatives and user-friendly telehealth solutions to enhance healthcare accessibility for Kerala's aging population. Despite the state's high digital literacy rate, disparities persist among older adults, who may face challenges in accessing and using telemedicine platforms, highlighting the need for a deeper understanding of telemedicine adoption in this demographic.

CONCLUSION

eSanjeevani has a great potential to enhance healthcare access and usage, especially in a state with a strong public health system and high digital literacy such as Kerala. The success of the platform substantiates its wide adoption across a range of socio-demographic categories and its capacity to reduce the regional challenges on access to healthcare. Despite being less noticeable in Kerala, the digital divide still remains as a challenge for certain populations, especially women, older persons and those with lower educational attainment. Promoting equitable use of telemedicine services requires focused efforts to increase the digital literacy and telemedicine access for these populations. Additionally, it is crucial to address healthcare professionals' concerns about incentives and workload guarantee their continuous participation and engagement on the eSanjeevani

platform Furthermore, eSanjeevani's potential to address unmet mental health needs, as indicated by our findings and supported by existing literature, warrants further exploration and investment. Regardless of the advancements in healthcare systems and widespread awareness campaigns, many individuals still hesitate to access mental health services due to the fear of judgment, discrimination or societal misconceptions. Access to care for this frequently underserved population could be greatly enhanced by extending telemedicine services to include mental health or integrating eSanjeevani with the existing Tele-MANAS, greatly benefit patients by providing quicker access to care, reducing wait times and ensuring timely treatment. Given the growing significance of telemedicine in healthcare, eSanjeevani could serve as a remarkable model for delivering telemedicine services in Kerala and other regions of India. Ensuring its accessibility, effectiveness and sustainability will be crucial in advancing public health outcomes nationwide.

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REFERENCES

1. Kumaravelu S, Ponraj V. Study on the efficacy of telemedicine system implementation at SRMC. *International J Telemed Clin Pract*. 2018;3(1):45-60.
2. Mishra SK, Kapoor L, Singh IP. Telemedicine in India: Current scenario and the future. *Telemedicine and e-Health*. 2009;15(3):250-6.
3. Chellaiyan VG, Nirupama AY, Taneja N. Telemedicine in India: Where do we stand. *J Fam Med Prim Care*. 2019;8(6):1872-8.
4. Mathur P, Srivastava, S, Lalchandani A. Evolving role of telemedicine in healthcare delivery in India. *Journal of Telemedicine and Telecare*. 2017;23(4):345-51.
5. Kumar S, Sharma R. Key barriers in the growth of rural healthcare: An ISM-MICMAC approach. *Benchmarking: An Int J*. 2018;25(3):879-92.
6. Taqi M, Bidhuri S, Sarkar S. Rural healthcare infrastructural disparities in India: A critical analysis of availability and accessibility. *J Med Res Health*. 2017;4(2):89-102.
7. Chatterjee, P. The health system in India: The underserved majority. *Lancet*. 2017;10:2426-7.
8. Sreenu N. Healthcare infrastructure development in rural India: A critical analysis of its status and future challenges. *British J Health Man*. 2019;25(1):34-42.

9. Gupta R, Priya MP, Dash N, Singh A, Das L, Arora A, et al. Evolution of India's National teleconsultation platform e-Sanjeevani: A comparative analysis of versions 2.0 and 1.0, with a preliminary report from the state of Haryana. *Heal Technol*. 2025;15(1):153-60.
10. Bhaskar S, Rastogi A, Chattu VK. Telemedicine across the globe-position paper from the COVID-19 pandemic health system resilience program (REPROGRAM) international consortium (Part 1). *Front Publ Health*. 2020;8:556720.
11. Mahajan V, Singh T, Azad C. Using Telemedicine During the COVID-19 Pandemic. *Indian Pediatr*. 2020;57:658-661.
12. Omboni S, Padwal RS, Alessa T. The worldwide impact of telemedicine during COVID-19: Current evidence and recommendations for the future. *Connected Health*. 2022;1(1):7-35.
13. Ummer O, Scott K, Mohan D. Connecting the dots: Kerala's use of digital technology during the COVID-19 response. *BMJ Global Health*. 2021;6:5355.
14. Adithyan GS, Ranjan A, Muraleedharan VR, Sundararaman T. Kerala's progress towards universal health coverage: the road travelled and beyond. *Ints J Equ Heal*. 2024;23(1):152.
15. Jossy PE, Nandini P, Nair PR. Knowledge, attitude and perceived barriers to telemedicine among medical professionals: A cross-sectional study. *Int J Comm Med Publ Heal*. 2024;11(5):1833-8.
16. Nanda M, Sharma R. A review of patient satisfaction and experience with telemedicine: A virtual solution during and beyond COVID-19 pandemic. *Telemedicine and e-Health*. 2021;27(12):1325-31.
17. Hung KKC, Chan EYY, Lo ES. User perceptions of COVID-19 telemedicine testing services, disease risk and pandemic preparedness: Findings from a private clinic in Hong Kong. *Hong Kong Medical J*. 2023;29(4):89-97.
18. Smrke A, Younger E, Wilson R, Husson O, Farag S, Merry E, Macklin-Doherty A, Cojocar E, Arthur A, Benson C, Miah AB. Telemedicine during the COVID-19 pandemic: impact on care for rare cancers. *JCO Global Oncol*. 2020;6:1046-51.
19. Xu P, Hudnall M, Zhao S, Raja U, Parton J, Lewis D. Pandemic-triggered adoption of telehealth in underserved communities: Descriptive study of pre- and post-shutdown trends. *J Med Internet Res*. 2022;24(7):38602.
20. Moulaci K, Shanbehzadeh M, Bahaadinbeigy K, Kazemi-Arpanahi H. Survey of the patients' perspectives and preferences in adopting telepharmacy versus in-person visits to the pharmacy: a feasibility study during the COVID-19 pandemic. *BMC Med Inform Dec Making*. 2022;22(1):99.
21. Joshi K, Modi B, Katoch CDS. Utilization of telemedicine services of institute of national importance in the western region of India: A mixed-method study. *J Fam Med Prim Care*. 2024;13(9):3782-7.
22. Gabrielsson-Jarhult F, Kjellstrom S, Josefsson, KA. Telemedicine consultations with physicians in Swedish primary care: A mixed methods study of users' experiences and care patterns. *Scandinavian J Prim Health Care*. 2021;39(2):112-20.
23. Ramaswamy A, Yu M, Drangsholt S. Patient satisfaction with telemedicine during the COVID-19 pandemic: Retrospective cohort study. *J Med Int Res*. 2020;22(9):20786.
24. Singh GK, Girmay M, Allender M. Digital divide: Marked disparities in computer and broadband internet use and associated health inequalities in the United States. *International J Transl Med Res and Public Health*. 2020;4(2):12-27.
25. Marston HR, Shore L, White PJ. How does a (Smart) Age-Friendly Ecosystem Look in a Post-Pandemic Society. *Int J Envir Res Public Health*. 2020;17(21):8276.
26. Ellison-Barnes A, Moran AJ, Linton SL. Limited technology access among residents of affordable senior housing during the COVID-19 pandemic. *J Aging Soc Pol*. 2021;33(5):354-66.
27. Breton M, Deville-Stoetzel N, Gaboury I. Telehealth in primary healthcare: A portrait of its rapid implementation during the COVID-19 pandemic. *Healthc Pol*. 2021;17(1):73-90.
28. Stunkel L, Grady C. More than the money: A review of the literature examining healthy volunteer motivations. *Contemporary Clin Trials*. 2010;31(5):385-95.
29. South J, Purcell ME, Branney P. Rewarding altruism: Addressing the issue of payments for volunteers in public health initiatives. *Social Sci Med*. 2013;96:220-6.
30. D'Souza K, Singh S, Westgard C. A qualitative assessment of barriers and facilitators of telemedicine volunteerism during the COVID-19 pandemic in India. *Human Resources for Health*. 2024;22(21):38.
31. Qureshi A, Garcia-Font V, Rifa-Pous H. Collaborative and efficient privacy-preserving critical incident management system. *Expert Syst Applicat*. 2020;163:113727.
32. Bashshur RL, Shannon GW, Bashshur N. The empirical evidence for telemedicine interventions in mental disorders. *Telemed and e-Health*. 2015;22(2):87-113.
33. Manera V, Partos C, Beauchet O. Teleconsultations for mental health: Recommendations from a Delphi panel. *Intervention*. 2023;34:100660.
34. Gajarawala SN, Pelkowski JN. Telehealth benefits and barriers. *The Nurse Pract*. 2020;45(12):20-6.
35. Balestra ML. Telehealth and legal implications for nurse practitioners. *J Nurse Pract*. 2017;13(9):605-11.
36. Department of Health Services, Government of Kerala: Mission and vision, DHS. Available at: <https://dhs.kerala.gov.in/mission-and-vision>. Accessed on 21 June 2025.

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