TELEHEALTH AND MEDICINE TODAY

ORIGINAL RESEARCH

Transitioning From Crisis to Continuity Post-COVID-19 Pandemic: Adoption of Telehealth by Sehat Kahani Healthcare Providers, Karachi, Pakistan

Sara Saeed Khurram, MSC Health Policy Management[1]; Iffat Zafar Aga, MSC Global E-Health[1]; Muhammad Muzzamil, MSPH[1]; Mahek Karim, MSc Epidemiology and Biostatistics[1]; and Shahkamal Hashmi, MBBS, MPH, PhD[2]

[1]Sehat Kahani C/O Community Innovation Hub, Karachi, Sindh, Pakistan, Department of Public Health & Digital Health; [2]Ziauddin College of Public Health, Karachi, Sindh, Pakistan

Corresponding Author: Muhammad Muzzamil: muzzamilrao21@gmail.com

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Abstract

Objective: To evaluate the usability and effectiveness of telehealth services among healthcare providers in Karachi, Pakistan post-COVID-19 pandemic, focusing on the Sehat Kahani platform.
Methods: A cross-sectional study, with 388 healthcare professionals utilizing the Telehealth Usability Questionnaire (TUQ). Sociodemographic information was gathered, encompassing age, gender, specialty, and experience.
Results: The predominant demographic of participants was female (89.9%), with ages ranging from 25 years to 46 years (90%). A majority of participants (86%) were of Pakistani origin. The average TUQ score was 5.73 (± 0.4), reflecting a favorable view of telehealth. Identified key challenges included inadequate internet access (92%), limited financial resources (54%), legal issues (49%), and limitations in the treatment of specific diseases (78%).
Conclusion: Telehealth possesses considerable potential to enhance healthcare accessibility and quality in Pakistan. Addressing challenges, including infrastructure, budgetary limitations, and legal obstacles, are essential for extensive implementation. Future investigations should examine the enduring effects of telemedicine on patient outcomes and the efficiency of healthcare systems.

Plain Language Summary

This study examined the experiences of healthcare professionals with telehealth services offered by Sehat Kahani (a Pakistan-based telemedicine company). Most participants were female physicians aged 25 years to 46 years, with six to ten years of experience. Participants expressed satisfaction with telehealth, deeming it convenient and effective for the provision of healthcare services. Nonetheless, obstacles such as inadequate internet connectivity, budgetary limitations, legal issues, and restrictions in the treatment of specific illnesses were recognized. The results underscore the potential of telehealth to enhance healthcare accessibility while stressing the necessity of addressing existing difficulties to maximize its efficacy.

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The significance of telemedicine in our health systems is more apparent than ever, as we progress beyond the global COVID-19 pandemic, which altered our lifestyle and approach to medical care.[1] The pandemic led to the emergence of the online 'work from home' concept, worldwide. Similarly, telemedicine gained popularity in healthcare services, allowing for the continuation of virtual patient-physician relationships.[2] In Pakistan, the use of telemedicine increased significantly during the pandemic due to the implementation of tight lockdown measures, particularly in big cities.[3–4]

Telemedicine services have demonstrated their efficacy in America, Southeast Asia, and Europe. Now their effectiveness must be confirmed in remote, underprivileged areas where there is a shortage of healthcare professionals and inadequate healthcare facilities.[5] The extent of

understaffing and excessive workload in Pakistan can be gauged by considering that the physician-to-population ratio in Pakistan is approximately 1:1000, but is significantly higher considering there is one specialist for every 7,216 individuals.[6] Other factors influencing acceptance of telemedicine to enhance the accessibility of healthcare services in Pakistan healthcare in remote regions have been reported.[7]

Telemedicine is more efficient than traditional care. It provides patients with better convenience at reduced costs—a desired combination for most people.[8] In Pakistan, approximately 63% of the population lives in rural areas, while just 37% lives in urban areas, as per the World Bank statistics.[9] The advantages of telemedicine in this environment include the ability for patients to consult physicians from anywhere in the world, at any time, which particularly benefits those in rural areas with limited healthcare resources. In addition, telemedicine saves time, which patients would otherwise spend traveling and waiting in clinic queues. Its cost-effectiveness is achieved by eliminating travel expenses and reducing the need to transport disabled or bedridden patients to clinics or hospitals. Additionally, telemedicine helps reduce the risk of cross-infection, particularly during pandemics, and minimizes the number of follow-up visits required for patients with chronic or long-standing diseases.[10]

In low- and middle-income countries, healthcare could be drastically altered by mobile and wireless technologies. Success stories include the eCompliance system in India, which tracks patients with tuberculosis through mobile devices, improving medicine adherence and decreasing treatment dropout rates.[11-13]

In the context of Pakistan, a range of problems, despite advancements in technology, hinder telehealth acceptance and success in rural and distant places. For example, patients encounter several challenges, such as limited access and resistance to technology, provider-patient relationship dynamics, and varying levels of health literacy.[3] Telemedicine apps can address patient confusion and misconceptions by using simple calls or messages, which can be made secure and efficient to enhance interactions between patients and physicians. This method of disseminating medical knowledge leads to efficient patient treatment and enhances literacy in telemedicine, hence gaining patient trust.[14]

The purpose of this study is to assess the suitability and effectiveness of telehealth services among healthcare providers post-COVID-19 pandemic in Karachi, Pakistan. Additionally, the authors identify obstacles hindering widespread adoption of these services through the Sehat Kahani Platform—a telehealth platform that serves the population of Pakistan through its healthcare application. By exploring these questions, this research seeks to contribute valuable knowledge to the ongoing discourse of the role of telehealth in post-pandemic healthcare delivery.

Methods

A systematic random selection technique was used to select participants. Sehat Kahani has a roster of 7,500 healthcare professionals with expertise using its platform. The number of physicians registered on this healthcare platform on any given day is sufficient to facilitate a large number of consultations. Sehat Kahani, a pioneering e-health platform established in 2017, is at the forefront of recasting healthcare delivery in Pakistan. By leveraging technology through a telemedicine application and a network of 63 e-health facilities, Sehat Kahani is contributing to Sustainable Development Goal 3, which aspires to ensure health and well-being for all at all ages. The platform empowers individuals with convenient access to quality healthcare, breaking down geographical barriers and ensuring that essential medical services reach underserved communities.

The questionnaire used to collect data in this study was comprised of two parts. Part one of the open-ended questionnaire was the Telehealth Usability Questionnaire (TUQ), which was developed to evaluate the usability of telehealth services among healthcare practitioners.[15,16] Previous research confirmed the validity and reliability of TUQ.[17] A total of 21 items on the TUQ are arranged into six subdomains. A seven-point Likert scale, from one (strongly disagree) to seven (strongly agree), was used to assess each question.[17] The second portion of the survey was used to collect basic demographic information, such as the respondent's age, gender, medical specialty, years in practice, and country location, along with the average daily patient load.[15]

Prior research was used to calculate the sample size[15], which was determined with a 5% margin of error, a 95% confidence interval, and a prevalence rate of 50%. The minimum recommended sample size was 385 participants. However, accounting for a 10% rejection rate, the total sample size was calculated as 423. The survey was conducted from August 1, 2024, to October 1, 2024, on the Sehat Kahani platform, where all healthcare professionals received a Google questionnaire. A reminder was sent after ten days to those who had not completed the questionnaire. Participation was contingent upon their decision and desire to either participate or decline. Ultimately, there were 35 incomplete data forms, resulting in 388 participants in this study. All prospective participants who fulfilled the study's eligibility criteria were considered, and in the event that a participant was deemed ineligible, the next feasible candidate was chosen. The entire process of acquiring data adhered to a consistent approach.

Participants eligible for inclusion in the study were currently affiliated with Sehat Kahani as a healthcare

professional, indicating their active involvement in delivering healthcare services within the organization. The respondents consisted of individuals who regularly use the specified application to provide healthcare solutions to patients monthly. This requirement ensured that participants were actively engaged in telehealth practices, in line with the study's emphasis on the adoption and usability of telehealth technologies. Healthcare practitioners who did not use the specified app and are not associated with Sehat Kahani as healthcare professionals were not included in the study.

Results

The sociodemographic characteristics of the 388 participating physicians are presented in Table 1. Of the 423 physicians initially contacted, 388 completed the survey. The research data were classified across multiple factors. Females constituted the majority of participants (89.9%), while the age groups of 25 years to 35 years (50.3%) and 36 years to 46 years (39.7%) make up the majority of age categories. The medical professionals represented in the study were diversified, with 46.9% general physicians/clinicians and 53.1% specialists. The majority of participants (86.1%) were Pakistani nationals who were registered on the platform. The participants' experience exhibited considerable variation, with a notable proportion (47.2%) having accumulated six to ten years of experience.

Table 1. Sociodemographics of participants.

Variables	Categories	Frequency	Percentage
Gender	Male	39	10.1%
	Female	349	89.9%
Age of the participant (yrs)	25–35	195	50.3%
	36–46	154	39.7%
	47–57	33	8.5%
	57+	6	1.5%
Primary profession	General physician/clinician	182	46.9%
	Specialist	206	53.1%
Physician registration based on country	Pakistani citizen	334	86.1%
	Non-Pakistani citizen	54	13.9%
Experience working as a licensed professional (yrs)	1–5	104	26.8%
	6–10	183	47.2%
	10+	101	26%
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	10+	101	26%

The findings presented in Table 2 indicate that, overall, participants had favorable experiences with telehealth. The majority expressed satisfaction with the telehealth platform's treatment quality, system use, and other aspects. Users commended telehealth for its convenience as it enabled them to provide medical care from their residences, reduce travel time, and enhance the availability of healthcare services. However, a few physicians expressed concern about certain aspects of telemedicine, such as restrictions towards problem-solving regarding errors and the preference of some participants for in-person visits for better communication. Notwithstanding these concerns, most of the participants held a favorable view of telehealth, suggesting that this technology has the potential to enhance healthcare delivery and patient results.

Outlined in Table 3, the chi-square analysis investigates the association between sociodemographic factors and primary profession. The findings show statistically significant findings between gender and dominant occupation ($p = 0.001$) and between experience as a licensed practitioner and primary occupation ($p = 0.001$).

In Figure 1, the most significant obstacle identified is poor internet service in the country, with 92% of respondents affirming its impact. Insufficient financial resources to support telehealth services follow closely, with 54% of respondents citing this as a barrier. Legal concerns also pose a challenge, with 49% of respondents expressing reservations, and lastly the presence of specific diseases that cannot be treated effectively using telehealth (78%).

Discussion

Health innovations are becoming progressively relevant to the healthcare sector. Digital health and telehealth programs possess the capacity to enhance the quality of medical care, diminish hospital visits, and lower treatment costs.[18] Previously, healthcare practitioners possessed minimal or no awareness of telemedicine.[19] Additionally, telemedicine is necessary since underdeveloped countries lack developed health infrastructure and inadequate health-care facilities, necessitating the use of remote medical professionals to treat patients.[20]

The study's findings reveal that the usability of telehealth among health professionals in Karachi, Pakistan, was substantially associated with professional categories, age, gender, and adjustments in telehealth consumption post-COVID-19 pandemic. The present study revealed

Table 2. TUQ score categories and mean scores.

Categories	Categories: n (%)							
	Strongly disagree	Disagree	Somewhat disagree	Neither Agree nor disagree	Somewhat agree	Agree	Strongly agree	Mean
Telehealth improves my patients' access to healthcare services.	25 (6.4)	3 (0.8)	3 (0.8)	10 (2.6)	44 (11.3)	174 (44.8)	129 (33.2)	5.79 (1.5)
Telehealth saves my patients' time traveling to a hospital or specialist clinic.	20 (5.2)	2 (0.5)	2 (0.5)	6 (1.5)	35 (9.0)	157 (40.5)	166 (42.8)	6.01 (1.4)
Telehealth improves my delivery of healthcare services.	14 (3.6)	2 (0.5)	8 (2.1)	18 (4.6)	51 (13.1)	178 (45.9)	117 (30.2)	5.81 (1.3)
It was simple to use this system.	8 (2.1)	6 (1.5)	6 (1.5)	10 (2.6)	44 (11.3)	204 (52.6)	110 (28.4)	5.91 (1.1)
It was easy to learn to use the system.	8 (2.1)	3 (0.8)	8 (2.1)	5 (1.3)	32 (8.2)	210 (54.1)	122 (31.4)	6.01 (1.1)
I believe I could become productive quickly using this system.	6 (1.5)	6 (1.5)	0 (0.0)	8 (2.1)	39 (10.1)	195 (50.3)	134 (34.5)	6.06 (1)
The way I interact with this system is pleasant.	8 (2.1)	1 (0.3)	1 (0.3)	14 (3.6)	50 (12.9)	203 (52.3)	111 (28.6)	5.96 (1)
I like using the system.	7 (1.8)	4 (1.0)	2 (0.5)	10 (2.6)	37 (9.5)	204 (52.6)	124 (32.0)	6.03 (1)
The system is simple and easy to understand.	7 (1.8)	1 (0.3)	4 (1.0)	4 (1.0)	42 (10.8)	201 (51.8)	129 (33.2)	6.07 (1)
This system is able to do everything I would want it to be able to do.	9 (2.3)	12 (3.1)	17 (4.4)	18 (4.6)	104 (26.8)	153 (39.4)	75 (19.3)	5.46 (1.3)
I can easily talk to others using the telehealth system.	7 (1.8)	6 (1.5)	7 (1.8)	17 (4.4)	74 (19.1)	193 (49.7)	84 (21.6)	5.73 (1.1)
I can hear others clearly using the telehealth system.	6 (1.5)	8 (2.1)	20 (5.2)	27 (7.0)	88 (22.7)	175 (45.1)	64 (16.5)	5.48 (1.2)
I felt I was able to express myself effectively.	5 (1.3)	3 (0.8)	7 (1.8)	23 (5.9)	73 (18.8)	202 (52.1)	75 (19.3)	5.74 (1)
Using the telehealth system, I can see others as well as if we met in person.	9 (2.3)	11 (2.8)	16 (4.1)	37 (9.5)	97 (25.0)	158 (40.7)	60 (15.5)	5.36 (1.3)
I think the visits provided over the telehealth system are the same as in-person visits.	9 (2.3)	41 (10.6)	51 (13.1)	36 (9.3)	103 (26.5)	112 (28.9)	36 (9.3)	4.7 (1.5)
Whenever I made a mistake using the system, I could recover easily and quickly.	7 (1.8)	11 (2.8)	27 (7.0)	38 (9.8)	73 (18.8)	175 (45.1)	57 (14.7)	5.35 (1.3)
The system gave error messages that clearly told me how to fix problems.	16 (4.1)	41 (10.6)	38 (9.8)	48 (12.4)	83 (21.4)	126 (32.5)	36 (9.3)	4.71 (1.6)
I feel comfortable communicating with others using the telehealth system.	6 (1.5)	3 (0.8)	6 (1.5)	12 (3.1)	62 (16.0)	220 (56.7)	79 (20.4)	5.83 (1)
Telehealth is an acceptable way to deliver healthcare services.	5 (1.3)	0 (0.0)	2 (0.5)	12 (3.1)	50 (12.9)	205 (52.8)	114 (29.4)	6.02 (0.9)
I would use telehealth services again.	5 (1.3)	1 (0.3)	2 (0.5)	4 (1.0)	24 (6.2)	191 (49.2)	161 (41.5)	6.24 (0.9)
Overall, I am satisfied with this telehealth system.	6 (1.5)	2 (0.5)	5 (1.3)	8 (2.1)	35 (9.0)	198 (51.0)	134 (34.5)	6.08 (1)
Overall mean (± SD) of the respondents								5.73 (0.4)

TUQ: Telehealth Usability Questionnaire.

Table 3. The association between sociodemographic factors and primary profession.

Variables	Responses	Primary Profession n (%)		Chi-Square Analysis (P-value)
		Specialist	General Physician/Clinician	
Physician registration based on country	No (Pakistani Citizen)	178 (86.4)	156 (85.7)	0.844
	Yes (Non-Pakistani Citizen)	28 (13.6)	26 (14.3)	
Gender of the participants	Female	173 (84)	176 (96.7)	0.001*
	Male	33 (16)	6 (3.3)	
Age of the participant (yrs)	25–35	101 (49)	94 (51.6)	0.253
	36–46	87 (42.2)	67 (36.8)	
	47–57	17 (8.3)	16 (8.8)	
	57+	1 (0.5)	5 (2.7)	
Approximate number of patients treated per day	~1–5	68 (33)	62 (34.1)	0.943
	~6–10	61 (29.6)	55 (30.2)	
	~10+	77 (37.4)	65 (35.7)	
Experience as a licensed provider (yrs)	1–5	40 (19.4)	64 (35.2)	0.001*
	6–10	94 (45.6)	89 (48.9)	
	10+	72 (35)	29 (15.9)	

*: statistically significant.

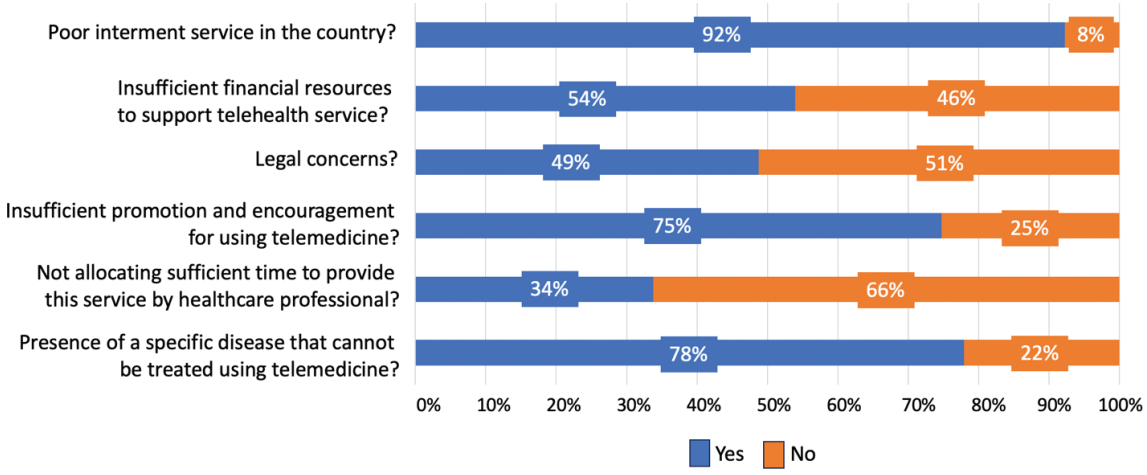

Fig. 1. Obstacles in the widespread adoption of telemedicine.

that the majority of participants were female (89.9%). In contrast, a study conducted in Iraq identified males as the predominant providers of telehealth services (62.5%)[15], while a study in Florida[16] reported 78% female participation, suggesting a greater propensity for females to utilize telehealth platforms. The results of this investigation reveals that nearly 90% of participants using the Sehat Kahani platform are aged 25-46, with 47.2% possessing 6-10 years of experience. In comparison, a similar study conducted in Pakistan indicated that approximately 72.1% of participants were aged 30-49, with 35% having 5-10 years of work experience.[20]

Subsequently, it was noted that the overall mean scores of the Telehealth Usability Questionnaire (TUQ) in the current study were higher at 5.73 (± 0.4) compared to the results from the first study conducted in Iraq, which were lower at 4.8 (± 0.88). The average score of the second research done in Florida[16] was 4.21. This suggests that healthcare providers utilising the platform possess favourable scores, suggesting a rather positive attitude. Telehealth service providers identified the following obstacles in the study conducted in Iraq[15] in the previous study, poor Internet service was reported at 51.7%, insufficient financial resources at 35%, legal worries at 22.1%, and the presence of specific diseases at 46.8%. In the current study, these figures have altered to poor Internet service at 92% identified post government elections, insufficient financial resources at 54%, legal concerns at 49%, and the

presence of specific diseases at 78% these were the challenges that were faced by people providing telemedicine services in Pakistan.

This study was undertaken to gain a comprehensive grasp of the necessity and operational methodology of this innovation. To enhance the adoption of these novel technologies, it is essential to develop user-centric advanced technologies that take into account the perspectives of health professionals as potential users on the other side of the screen. The study findings indicated that clinicians had concerns regarding certain challenges that may impede their telemedicine performance during online consultations which have been highlighted in the study.

Conclusion

This study indicates that telehealth has emerged as a promising instrument for healthcare delivery among professionals in Karachi, Pakistan. The majority of participants conveyed favourable perceptions on the platform's usability, efficacy, and convenience. Nonetheless, obstacles such as inadequate internet connectivity, budgetary limitations, and legal issues persist as substantial impediments to extensive adoption. To fully harness the promise of telehealth, it is essential to confront these challenges and invest in infrastructural enhancements. Moreover, further investigation is required to examine the long-term effects of telehealth on patient outcomes and the efficiency of healthcare systems. By tackling these challenges, telehealth can significantly enhance access to healthcare services, particularly in underdeveloped regions.

Recommendations

Future studies should strive to include a more diverse sample of healthcare professionals, considering factors such as age, gender, specialty, and geographic location. This will enhance the generalizability of the findings.

Policymakers should consider implementing supportive policies, such as reimbursement for telehealth services, which will encourage wider adoption and usage of telehealth. Additionally, investments in digital infrastructure, particularly in rural areas, are crucial to address the challenges of poor internet connectivity.

Limitations

The study's sample, primarily composed of female physicians, reflects the platform's appeal to this demographic. While this underscores the potential of telehealth to empower female physicians, it may limit the generalizability of the findings to male physicians. The absence of explicit race or ethnicity data collection in this study is due to the platform's primary focus on addressing healthcare access and quality.

The cross-sectional design of the study limits the ability to draw causal inferences. Longitudinal studies could provide insights into the long-term impact of telehealth on healthcare professionals' practices and patient outcomes.

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The authors affirm that they have no known financial or interpersonal conflicts that would have appeared to impact the research presented in this study.

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Sara Saeed Khurram, Iffat Zafar Aga, Muhammad Muzzamil, Mahek Karim, and Shahkamal Hashmi conceptualized the research. All authors contributed to the design, development, and approval of the final manuscript.

Data Availability Statement (DAS), Data Sharing, Reproducibility, and Data Repositories.

Contact Sara Saeed Khurram.

Application of AI-Generated Text or Related Technology

None used.

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