ORIGINAL ARTICLE

FOSTERING DIGITAL HEALTH IN PAKISTAN: AN INTERVENTIONAL STUDY REGARDING AWARENESS OF TELEMEDICINE AMONG PATIENTS OF DIVERSE HEALTHCARE SETUPS IN ISLAMABAD

Shehbano Syed✉, Minal Zaman, Aiza Anwar, Muhammad Junaid Hussain, Muhammad Imad Naeem, Elyzae Rizwan, Asifa Afzal, Arshia Bilal

Fazaia Medical College, Islamabad-Pakistan

Background: Telemedicine is the provision of healthcare services at a distance. With the rapidly increasing population in Pakistan and a chronic shortage of doctors in peri-urban and rural areas, telemedicine has become the need of the time. This research was conducted to create general awareness of telemedicine using video and assess the difference between pre-and post-interventional awareness with the aim of providing suggestions for making telemedicine more accessible and thus reducing the burden of the health care system. **Methods:** We conducted a pre and post-interventional study in various health care setups, on adults aged 18 and above who have been residents of Islamabad for over 6 months. Convenient sampling was done with a sample size of 98. Both pre-and post-interventional information was collected from the sample population through a self-developed questionnaire filled out through interviews. For intervention, an awareness session was conducted using a self-made video. **Results:** Our pre & post-interventional grand mean scores were 6.89 and 9.48 respectively and this difference was highly significant statistically as *p*-value was <0.001. The knowledge of telemedicine increased from 18 percent to 31.8 percent following the awareness session and 88 percent of people after learning about telemedicine services agreed that these were more accessible than looking for a doctor. **Conclusion:** We conclude that the majority of the participants hold a favourable attitude toward telemedicine services. They have the means to access telemedicine but are unable to do so due to a lack of awareness; hence, there is a need for education and awareness through government-supported programs to encourage the utilization of telemedicine services.

Keywords: Telemedicine; Awareness of telemedicine; Willingness to use Telemedicine

Citation: Syed S, Zaman M, Anwar A, Hussain MJ, Naeem MI, Rizwan E, *et al*. Fostering Digital Health in Pakistan: An Interventional study regarding Awareness of Telemedicine among patients of diverse healthcare setups in Islamabad. J Ayub Med Coll Abbottabad 2025;37(3):280–5.

DOI: 10.55519/JAMC-03-13722

INTRODUCTION

Digital Health Interventions refer to the utilization of digital and mobile technology to support the health system in service delivery.[1] In the World Health Organization (WHO) global strategy 2020–2025, digital health is defined as "the field of knowledge and practice associated with the development and use of digital technologies to improve health.[2] Under its umbrella, digital health interventions include telemedicine".[3]

Telemedicine is an integration of technology and medicine,[4] and is defined as the Provision of health-care services at a distance[5,6]. According to WHO classification of digital health interventions, telemedicine compromises of e-consultations between remote client and healthcare provider, remote monitoring of client health or diagnostic data by provider, transmission of medical data (e.g. images, notes, and videos) to healthcare provider and consultations for case management between healthcare providers.[7] Studies concerning the effectiveness[8,9] of telemedicine clearly show that it is the next step in the development of the art of medicine.

The objectives of telemedicine is to provide equal access to medical expertise irrespective of the geographical location thus telehealth services are equally essential in rural areas, as it transcends the common barriers, which prevent people from accessing health care.[10] These include long distances to a functional health facility, lack of doctors in rural areas, and the high cumulative costs associated with a doctor's visit (cost of transportation, income lost due to time of work, and the doctor's fee).

The rapid increase in population combined with an unstructured system of healthcare has led to an uneven distribution and chronic shortage of doctors in Pakistan. In 2019, according to World Health Organization's Global Health Workforce

Statistics there were 1.1 physician per 1000 population.[11] For this reason, telemedicine has become the need of the hour. Doctors are also supportive of the benefits of telemedicine. A nation-wide survey across Pakistan was conducted in which 47% responded that almost half of the patients who visit their outpatient departments (OPDs) with minor complaints could have been handled using telemedicine consultations.[12]

However, it's no surprise that given the lack of infrastructure for telemedicine the literacy regarding telemedicine is extremely poor. A poll was conducted to assess the challenges to adoption of telemedicine during the COVID-19 outbreak. Results show that lack of awareness among patients is the biggest challenge to the adoption of telemedicine (almost 52%).[13]

The objective of this study was to evaluate the degree of awareness of the sample population about telemedicine and to highlight the common barriers faced which hinder exposure to it. An awareness session about telemedicine was conducted using video. The effectiveness of awareness session was assessed by comparing pre & post-interventional knowledge. This study was carried out with an aim to create general awareness on telemedicine among the sample population and develop suggestions for making telemedicine more accessible and thus reducing the burden of tertiary health care hospitals. It will also fill in the literature gap regarding awareness of common man on telemedicine.

MATERIAL AND METHODS

The study design was Pre and Post interventional. and was conducted in both Public and private healthcare setups of Islamabad. The sampling population included adults aged 18 years and above who have been residents of the Islamabad community for at least 6 months. It excluded those with language barriers, those who were unable to answer, and individuals who refused to give consent. Patients on panels of government/private organizations were also excluded. By using the equation "Estimating a population proportion with a specific relative precision" of WHO sample size software, Keeping a 95% confidence level, an anticipated population proportion of 50% and absolute precision of 10%.

The calculated sample size was 97 but we have taken 98 to account for potent 40 participants were from public setups and 58 from private were selected using convenient sampling. Data was collected using a self-developed questionnaire on Google form, which was initially developed in English and for ease of administration and understanding was later translated into Urdu, the national language of Pakistan. Pre -testing was done on 5% of the sample size, and internal validity be assured by Cronbach's alpha of 7.2. The data of pre-testing were not included in the result. The questionnaire was filled out by the researchers themselves through structured interviews, and collected pre and post-intervention data from the same participants. These researchers were pre-trained by their supervisors for standardized data collection. The questionnaire began with informed consent and consisted of questions focused on the patient's socio-demographic characteristics, availability of information technology, and practice of telemedicine (i.e., e-health apps, websites, etc.) along with the barriers in accessing telemedicine and their willingness to use it.

After taking informed consent, pre intervention questionnaires were filled. Then the intervention was introduced consisting of an awareness session conducted on site at the hospital on the topic of telemedicine, using a self-made video developed by researchers. The video was 20 minutes long with animations and Urdu voiceover. It included basic information on the topic its uses, benefits and the resources (apps/websites/hotlines/tele clinics) available in the country. After showing the video, one of the telemedicine app was uploaded in their cell phones. Subsequently, an interactive, one on one session was held with each participant and researchers showed them how to use telemedicine apps and platforms. The queries of participants regarding telemedicine were discussed and resolved at the end of the session. This was followed by answering the post intervention questionnaire to evaluate immediate effect on willingness and awareness.

The data collected was analyzed using SPSS version 23.0. Proportion was calculated for categorical data while mean and standard deviation were used for quantitative data. There were six questions with a total score of 13 on awareness of telemedicine in pre & post-interventional questionnaires, their mean scores were compared using paired t-test at 5% margin of error.

RESULTS

A total of 98 people participated in this study, out of which 44.9% were male. The mean age of participants was 35.8±3.6 years. Married people formed 62.2% of the participants. Majority of them (51%) were undergraduates. Private jobs (27.6%) constituted the largest group of participants followed by students (21.4%). (Table 1)

In the pre-interventional session, 45% of participants had heard of the term telemedicine and 43.9% reported accessibility (availability of service and means to access it) to telemedicine services. Only 5.1% of participants owned no gadget (either cell phone or laptop) and any internet facility to utilize telemedicine services. A total 43.9% visited both public and private healthcare setups. Most patients preferred in-person visitations (76.5) as compared to online consultation (23.5%) as shown in Table 2.

Among reasons that formed barrier in accessing telemedicine, the most common was the willingness to consult doctor in-person (41.3%) followed by not knowing how to use telemedicine services (26.9%). (Figure 1)

Before the intervention, 18% of individuals were aware of all the services offered in telemedicine. Following the intervention, this awareness increased to 31.8%. Before the session, 69.4% of participants believed that telemedicine was more accessible than visiting a doctor, while 30.6% were undecided or disagreed. After the session, 88.8% agreed that telemedicine was more accessible, with 11.2% remaining undecided or in disagreement. Post-intervention, most people agreed that telemedicine is very beneficial. (Table 3) The pre and post-awareness questions were scored for each participant by assigning different points for each answer reflecting correct knowledge and information regarding telemedicine.

Mean total score of six similar questions in both pre & post-awareness sessions were compared. Paired t-test was applied with the alpha at 5% and the result was extremely significant (*p*-value <0.001) showing a positive effect of the intervention. (Table 4)

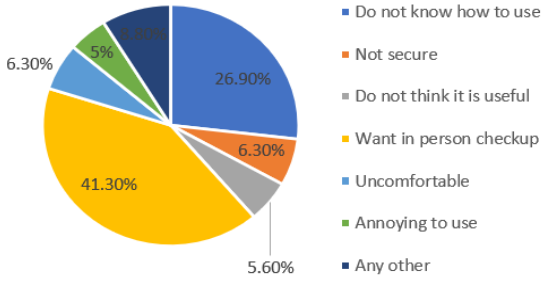

Figure-1: Barriers in Accessing Telemedicine

Table-1: Socio-demographics of participants

Variable	Categories	Frequency (n)	Percentage (%)
Age in year	Below 30	39	39.8
	31-50	40	40.8
	Above 50	19	19.4
Religion	Islam	94	95.9
	Christianity	4	4.1
Gender	Female	54	55.1
	Male	44	44.9
Profession	Housewife	19	19.4
	Student	21	21.4
	Teacher	4	4.1
	Business	7	7.1
	Private Job	27	27.6
	Government Job	9	9.2
	Domestic worker	5	5.1
	Others	6	6.1
Marital status	Single	36	36.7
	Married	61	62.2
	Widow	1	1.0
Level of Education	None	1	1.0
	Primary	3	3.1
	Secondary	4	4.1
	Matriculation	9	9.2
	Intermediate	11	11.2
	Undergraduate	50	51.0
	Post graduate	20	20.4
Monthly household Income in PKR	Below 50000	13	13.3
	50000-100000	40	40.8
	Above 100000	45	45.9
Suffering from chronic condition	None	69	70.4
	Hypertension	12	12.2
	Diabetes	9	9.2
	Others	10	10.2

Table-2: Pre interventional accessibility, knowledge and practice of telemedicine

Variable	Categories	Frequency (n)	Percentage (%)
Heard of telemedicine	No	53	54
	Yes	45	45
Accessibility of telemedicine	No	55	56.1
	Yes	43	43.9
Availability of Gadget (cellphone/Laptop)	I have none	5	5.1
	I have cell phone/laptop	38	38.8
	I have both	55	56.1
Availability of Internet services (Wi-Fi/3G,4G)	I have none	5	5.1
	I have access to Wi-Fi/3G	32	32.7
	I have both	61	62.2
Preference of healthcare setup	Public	14	14.3
	Private Hospitals	41	41.8
	Both	43	43.9
Distance from nearest healthcare provider	1-5km	46	46.9
	6-10 km	26	46.5
	Above 10 km	26	26.5
Preferred method of healthcare consultation	In-person	75	76.5
	Online	23	23.5
Use of other online services (e.g., banking)	Yes	18	18.4
	No	80	81.6

Table-3: Pre and post Interventional Awareness of Telemedicine

Variable	Categories	Pre Intervention awareness of telemedicine Frequency (%)	Post Intervention awareness of telemedicine Frequency (%)
What do Telemedicine services include? (Multiple Responses allowed)	Information about a disease	26 (16.1%)	32 (18.2%)
	Information about medicine	38 (23.6%)	39 (22.2%)
	Finding doctor	39 (24.2%)	38 (21.6%)
	Healthy lifestyle	6 (3.7%)	11 (6.3%)
	Peer support	13(8.1%)	0
	All of the above	29 (18%)	56 (31.8%)
	none of the above	10(6.2%)	0
Telemedicine is more accessible than to look for the doctor?	Disagree/Undecided	30 (30.6%)	11 (11.2%)
	Agree	68 (69.4%)	87 (88.8%)
How beneficial do you think online consultation will be?	Not Beneficial	6 (6.1%)	0
	Beneficial	40 (40.8%)	50 (51.0%)
	Very Beneficial	52 (53.1%)	48 (49.0%)
Do past patient reviews help in choosing the doctor?	No	7 (7.1%)	6 (6.1%)
	Yes	91 (92.9%)	92 (93.9%)
Will telemedicine save your cost compared to an in-person consultation?	No	16 (16.3%)	4 (4.1%)
	Yes	82 (83.7%)	94 (95.9%)
Name commonly used telemedicine app (Multiple Response allowed)	Dawaii	0	24 (21.8%)
	Oladoc	4 (30.8%)	23 (20.9%)
	Ailaj	0	1 (0.9%)
	Marham	3 (23.1%)	14 (12.7%)
	Meri sehet	0	8 (7.3%)
	Chughtai	0	4 (3.6%)
	Shifa4u	1 (7.7%)	18 (16.4%)
	Others	5 (38.5%)	18 (16.4%)

Table-4: Effect of intervention on awareness regarding telemedicine

Score	Mean	Standard deviation	p-value
Pre-awareness session	6.89	±2.20	<0.001***
Post-awareness session	9.48	±2.23	

DISCUSSION

This study compared pre- and post-interventional awareness regarding telemedicine services as mentioned by the patients visiting various health care setups of Islamabad. The intervention consists of one-on-one awareness session on telemedicine using a self-made video and a tutorial on how to use telemedicine platforms (apps, websites, telephone, and email services). The results proved the effectiveness of awareness sessions on the knowledge of telemedicine as indicated by the statistically significant difference

between mean pre-intervention (6.89) and post-intervention (9.48) scores (p<0.001).

To the best of the authors' knowledge, this was the first study that provided insight of the awareness of telemedicine among the patients of public and private healthcare setups in Islamabad. Previously published studies carried out in Pakistan were cross-sectional with a focus on the assessment of knowledge and attitude of healthcare professionals regarding telemedicine, one conducted in rural Sindh[14] and another among medical students in Karachi[15]. Studies done internationally were also mostly descriptive and cross-sectional. This interventional research focuses on patients who are the potential target population for telemedicine use and remain largely untapped as supported by the results reflecting that only 54% of the sample population had heard of the term telemedicine whereas 45% were unaware. Similar results were seen in India where 58% of the population was familiar[16] and 60% in Queensland[17] as shown in studies on awareness and perception regarding telemedicine. The findings also corroborated the findings of a national survey from a developed country, the US.[18] Despite similar trends in understanding the term telemedicine, there was a wide gap in knowledge regarding its services as 59.5% of participants in Queensland[17] knew about telemedicine services whereas in this study 18% of participants had a clear idea of telemedicine services which increased to 31.8% following the awareness session. The earlier difference was due to higher literacy rate and awareness among participants of Queensland.

Another important parameter is the availability of the Internet and gadgets, which in a cross-sectional survey (19) was 83.76% for access to the internet and 89.39% for smartphones. Similarly, in this study, the availability of the Internet and smartphones was 94.9%. However, the heightened usage of smartphones did not yield any positive correlation with the availability of telemedicine, with only 43.9% having access to telemedicine services.

Concerning the use of telemedicine services 76.5% currently preferred in-person visitation whereas 23.5% preferred online consultation, this was somewhat in line with the Indian research in which 35.3% of patients had never encountered telemedicine. However, it was dissimilar to a recent survey carried out among the general population in Egypt[20] which demonstrated the usage of telemedicine among half of the participants.

Regarding the benefits of telemedicine 56%[21] found it beneficial compared to the alternate approach, the findings of our study are that 94% of people found telemedicine beneficial initially which increased to 100% after the awareness session. The major reason for this shift was the lack of information on the service and how to use it, which improved post-session. The majority also agreed that telemedicine is cost-saving about, 83.7% of the people in pre-session which increased to 95.9% after awareness.

The majority of people (95.9%) were willing to give this method a try at the end of the session. These findings were comparable to earlier surveys carried out among general populations in Saudi Arabia[22] and Egypt[20] which showed a majority (80% & 60.8% respectively) of them were more likely to prefer telemedicine than traditional appointments. Reflecting on the participants' concerns in using telemedicine services, our study revealed that 41.3% want in-person checkups and 26.9% do not know how to use telemedicine services. These findings corresponded with other surveys as in the Indian population,[23] in which 13.7% of the participants were not aware of the process/ technology of having a telemedicine appointment and 36% of the participants were worried about the quality of healthcare.

CONCLUSION

We concluded that despite some apprehensions, the majority of the participants held a favourable approach toward telemedicine services and had the means to access telemedicine but were unable to do so due to a lack of awareness. The significant difference between the pre and post-awareness session scores further strengthens the argument that there is a dire need to develop and implement educational programs for the general population to encourage the utilization of telemedicine services available in the country. Thus, making the accessibility to health care system economical for the users and simultaneously reducing the burden of healthcare setups.

Limitations

The collection of data focusing only on one major city with a high literacy rate and convenient sampling rendered the findings of this study non-generalizable to the entire population especially people in rural settings. Another limitation was the fact that post-awareness knowledge was checked immediately due to time constraints so we could not find out how many people began using telemedicine apps in the future as well as the problems they faced in utilizing telemedicine services.

Recommendations

Further large-scale, multi-centric studies with appropriately representative samples are required to generalize the findings. However, the present study highlighted the need to develop policies, strategies, and programs regarding telemedicine in the country. The government and healthcare sector should take the initiative to spread awareness about telemedicine among the general population using various means of mass education (TV, radio, social media). Hospitals

should also integrate telemedicine into their system; setting OPD days for e-consultations and offering services online.

AUTHORS' CONTRIBUTION

SA: Data collection, drafting, editing. MJH: Data collection, analysis, interpretation. AA, AB: Revision and review. MZ: Data collection, study design, development of research questionnaire. MIN: Data collection, analysis, interpretation. AA: Data collection, concept, abstract. ER: Data collection, entry and compilation.

REFERENCES

1. Karamagi HC, Muneene D, Droti B, Jepchumba V, Okeibunor JC, Nabyonga J, *et al*. eHealth or e-Chaos: The use of digital health interventions for health systems strengthening in sub-Saharan Africa over the last 10 years: A scoping review. J Glob Health 2022;12:04090.
2. World Health Organization. Global strategy on digital health 2020–2025. Geneva: WHO; 2021.
3. Bernstein C. What is digital healthcare and why is it important? [Internet]. [cited 2024 June]. Available from: https://www.pharmaceutical-technology.com/sponsored/digital-health-consent-compliance-data-landscape/
4. Perednia DA, Allen A. Telemedicine technology and clinical applications. JAMA 1995;273(6):483–8.
5. WHO, International Telecommunication Union. National eHealth strategy toolkit. Geneva: World Health Organization /ITU; 2012.
6. WHO. Global diffusion of eHealth: making universal health coverage achievable. Report of the third global survey on eHealth. Geneva: World Health Organization; 2016.
7. WHO. Classification of digital health interventions v1.0: a shared language to describe the uses of digital technology for health. Geneva: World Health Organization; 2018.
8. Iftikhar S, Saqib A, Sarwar MR, Sarfraz M, Arafat M, Shoaib QUA. Capacity and willingness to use information technology for managing chronic diseases among patients: A cross-sectional study in Lahore, Pakistan. PLoS One 2019;14(1):e0209654.
9. Ekeland AG, Bowes A, Flottorp S. Effectiveness of telemedicine: a systematic review of reviews. Int J Med Inform 2010;79(11):736–71.
10. Mirmoeini SM, Marashi Shooshtari SS, Battineni G, Amenta F, Tayebati SK. Policies and challenges on the distribution of specialists and subspecialists in rural areas of Iran. Medicina (Kaunas) 2019;55(12):1–8.
11. World Bank. Physicians per 1000 (World Health Organization's Global Health Workforce Statistics, OECD, supplemented by country data) [Internet]. 2019. Available from: https://data.worldbank.org/indicator/SH.MED.PHYS.ZS
12. Ahmed A, Ahmed M. The telemedicine landscape in Pakistan—Why are we falling behind? J Pak Med Assoc 2018;68(12):1820–2.
13. GlobalData Healthcare, Pharmaceutical Technology. Lack of awareness among patients the biggest challenge to wider adoption of telemedicine: [Internet]. Poll. Pharm Technol 2020 Apr 22. https://www.pharmaceutical-technology.com/news/lack-of-awareness-biggest-challenge-to-telemedicine-adoption-covid-19/
14. Kumar G, Shardha HK, Tariq W, Qazi MA, Kumar K, Maheshwari C, *et al*. Assessment of knowledge and attitude of healthcare professionals regarding the use of telemedicine: A cross-sectional study from rural areas of Sindh, Pakistan. Front Public Health 2022;10:967440.
15. Kazmi S, Yasmin F, Siddiqui SA, Shah M, Tariq R, Nauman H, *et al*. Nationwide assessment of knowledge and perception in reinforcing telemedicine in the age of COVID-19 among medical students from Pakistan. Front Public Health 2022;10:845415.
16. Garg R, Singh A, Pursnani N, Agrawal P, Singh B, Gautam A. Comprehending telemedicine: An online survey amidst COVID-19 pandemic. J South Asian Fed Obstet Gynaecol 2021;12:345–7.
17. Bradford NK, Caffery LJ, Smith AC. Awareness, experiences and perceptions of telehealth in a rural Queensland community. BMC Health Serv Res 2015;15(1):427.
18. Andrews E, Berghofer K, Long J, Prescott A, Caboral-Stevens M. Satisfaction with the use of telehealth during COVID-19: An integrative review. Int J Nurs Stud Adv 2020;2:100008.
19. Oshima SM, Tait SD, Thomas SM, Fayanju OM, Ingraham K, Barrett NJ, *et al*. Association of smartphone ownership and internet use with markers of health literacy and access: Cross-sectional survey study of perspectives from Project PLACE. J Med Internet Res 2021;23(6):e24947.
20. Alboraie M, Allam MA, Youssef N, Abdalgaber M, El-Raey F, Abdeen N, *et al*. Knowledge, applicability, and barriers of telemedicine in Egypt: A national survey. Int J Telemed Appl 2021;2021:5565652.
21. Hailey D, Roine R, Ohinmaa A. Systematic review of evidence for the benefits of telemedicine. J Telemed Telecare 2002;8(Suppl 1):1–30.
22. AlGhamdi S, AlQahtani M, AlZahrani A, AlShahrani A, AlHarbi M, AlAmri A, *et al*. Perceptions, preferences and experiences of telemedicine among users of information and communication technology in Saudi Arabia. J Health Inform Dev Ctries 2019;13(1):1–10.
23. Poreddi V, Delna P, Diya G, Iyda E, Gladies S, Saiyathin J, *et al*. Perceptions, preferences and experiences of telemedicine among general population in India: An online survey. Front Public Health 2023;11:1–9.

Submitted: August 15, 2024	*Revised: April 30, 2025*	*Accepted: June 4, 2025*

Address for Correspondence:

Shehbano Syed Apartment 207 B, Mehr Apartments, opposite NUST Gate-4, Islamabad.
Cell: +92 307 530 8077
Email: shehbanosyed30@gmail.com