

Original Research Article

Views and Perceptions on Telemedicine by consumers in Delhi

Abstract

Telemedicine, also known as telehealth, has been around for decades, but despite its many perceived benefits, its adoption has remained low. The objective our study was to know how consumers felt about telemedicine service during COVID -19 and to find out factors influencing consumers' perceptions of telemedicine services, a survey was done using a questionnaire. Social media and e-mail were used to inform people about the research due to onset of pandemic. An e online survey was done from the period of April 1st to June 30th, 2021 in India's capital Delhi and adjoining areas, 122 service users were sampled for the survey. A 10-item scale was used to assess telemedicine satisfaction, revealing that all participants were satisfied with their telemedicine experience(s) in general. The elements of perception were studied using factor analysis. The results of the analysis revealed that an individual's intention to utilize a system or technology may be influenced not only by factors affecting the user's direct encounter with the system or technology but also by factors affecting the service provider. Patients place a high value on these qualities, thus service providers can design their interface, appointment procedure, and consultation process around them.

Keywords: Telemedicine, Perceptions, Medicine, healthcare, India

Introduction

Telemedicine is one field that has succeeded in invoking the business sector's attention and encouraged them to participate actively in public health management [1]. Patients' perception of quality care refers to patients' view of services received and the results of the treatment, while patient experiences are a reflection of what happened during the caregiving process. Improving the quality of health care delivery is to ensure patient safety, improve clinical effectiveness, and promote public accountability.

However, there has never been a global epidemic of this magnitude in last hundred years so the existence of telemedicine prompted widespread usage of these services during the pandemic. Furthermore, to reduce the risks of transmitting the virus, health care providers have been increasingly scheduling and seeing patients through telemedicine [2].

Many health care providers are exclusively seeing patients via telemedicine as a result of the pandemic [3]. However, the current COVID-19 pandemic has put telemedicine into the

spotlight, particularly in a country like India which is densely populated and has a low number of medical practitioners.

The World Health Organization (WHO) recommends a doctor-to-population ratio of 1:1000. According to the country's population estimate of 135 crore people, there was one doctor for every 1,445 people, which was lower than the WHO's recommended ratio of one doctor for 1,000 people. Majority of doctors in India work in large cities, where they have more career growth opportunities.

In contrast to the gloomy healthcare situation, India's digital literacy is rapidly increasing. Telemedicine is already being viewed as a new avatar for healthcare providers [4].

India has an excellent digital infrastructure that allows for fast and cost-effective data sharing. As a result, the country is an excellent breeding ground for telehealth care providers.

The technical infrastructure requirements vary depending on the type of telehealth services one intends to seek, but nearly all telehealth programs necessitate access to broadband internet, imaging technology, or peripherals and access to technical support staff [5].

In March 2020 by Medical Council of India came out with "Telemedicine Practice Guidelines"

It listed the type of medicines that can be prescribed via teleconsultation which provided clarity to both patients and providers [6].

While telemedicine appears to be possible and satisfactory for a physician's patients, concerns about confidentiality, quality of care, and health inequities remain unresolved [7].

As the general population becomes more comfortable with new technologies in daily life, new applications in health care are changing when, when, and how patients and clinicians interact with other [8].

Patient perception is a crucial part of the evaluation of telemedicine services, as patient satisfaction and experience are important factors in any possible expansion and are regularly used criteria for assessing healthcare delivery [9].

Telemedicine may provide a potential solution to the low-intensity medical care needs of many communities, particularly those in low socioeconomic communities, with the advent of prevalent smartphone availability, fast and widely available internet access, and pressing needs for healthcare services [10]. The benefits of reducing geographical constraints between patients and clinicians are also being leveraged to promote access to high-level critical care in places that are otherwise neglected by medical services [11].

A significant deal of studies done in field of telemedicine has shown that patients are very happy with the various type of medical care they receive via telemedicine. Patients in nations such as Italy, Scotland, South Korea, India, and Finland have expressed inclination to use telemedicine. Patients have stated that they would utilize telemedicine again after having an initial experience. However, this has not been always the case as several studies have also

found that patients are not always comfortable with telemedicine, sometimes due to difficulties in operating the technology [12].

Healthcare systems must be provided with the necessary technology to establish telemedicine or should partner with e-health providers who have already developed accessible technologies to provide telemedicine to patients and their families [13].

Through the availability of self-monitoring tools, telehealth can specifically assist patients in becoming more aware of their health issues and improving self health management. [14].

Governments are becoming more interested in developing telemedicine techniques, resulting in a gradual but steady increase in their use in public health. Telemedicine procedures will, hopefully, attain their full potential in a few years [15].

In certain circumstances, an organized telephone consultation looks to be an effective technique to replace routine visits [16]. Telemedicine can be used to overcome healthcare inequities in underprivileged areas, while it is not a replacement for traditional treatment [17].

The pandemic of Covid-19 in 2020 gave the nation's health services an unparalleled chance to enhance access and coverage [18].

Despite the new technology's significant ability to address various difficulties in the Chinese healthcare system, users of technology providers which provided a telehealth services platform expressed worries about the efficacy and expenses connected with the supply of telemedicine and eHealth, among other things. [19]

In Romania, a survey done with physicians showed optimism towards the use of telemedicine in the coming years [20].

In Bangladesh, a developing country like India findings of a survey done by Quadery et. al (2021) to know the perception showed that one-third of them used telemedicine during the COVID-19 pandemic and were satisfied with both the cost and efficacy of consultation [21].

In another survey done in India in 2016 to know patient perception in India highlighted the benefit of telemedicine in reaching patients in remote and rural areas [22].

Another study done with both providers and patients concluded that telemedicine may be a viable answer to limited medical care needs, given widespread access to cell phones with internet access and increasing demand for quality healthcare. [23].

Literature Review

The telemedicine service acceptance has experienced tremendous growth in recent years especially due to COVID-19. The literature references various research models that attempt to explain telemedicine perception, adoption, and use. The existing literature also suggests that an individual's intention to use a system or technology may result not only from the factors on the part of service taker with the direct interaction with the system or technology but can also be influenced by the factors on the part of the service providers. The majority of articles are related to the perception and attitude of individuals towards the adoption and usage of telemedicine services. This research study is positioned to explore the factor which

affects the usage of telemedicine service by individuals. It looks at technology acceptance through the higher-level lens of application benefit acceptance, rather than through the product-attribute acceptance, or product development lens.

The literature on Telemedicine, Telehealth, and patients has discussed topics including difficulties faced and adoption issues, consumption patterns, factors for service providers, social commerce, and lifestyle implications. Literature review shows that there have been many studies that have demonstrated potential barriers and challenges for the use of telemedicine, by both providers and patients [24,25,26]. But many of these studies have been done before the pandemic. Few studies have been done during the pandemic period. The purpose of this study is to determine the factors that impact the consumer's perceptions about telemedicine. The important studies we went through are shown in the table below:

Table 1: Research Papers on Telemedicine

Author	Title	Year
Dasgupta A, Deb S	Telemedicine: A new horizon in public health in India. Indian J Community Med.	2008
Saxena G, Singh JP	E-Medicine in India: Hurdles and Future Prospects,	2003
Mehta KG, Chavda P.	Telemedicine: A boon and the promise to rural India. J Rev Prog	2013
Bree E. Holtz 2020	Patients Perceptions of Telemedicine Visits Before and After the Coronavirus Disease 2019 Pandemic	2020
Doarn CR, Merrell RC.	The day the earth stood still: COVID-19.	2020
Whitten P, Holtz B	Series of papers for those yearning to propel telehealth to new heights.	2008
Whitten P, Holtz B. Provider	Utilization of telemedicine: The elephant in the room	2008
Whitten P, Holtz B, Meyer E	Nazione S. Telehospice: Reasons for slow adoption in-home hospice care	2009

Bergquist TF, Thompson K, Gehl C, Pineda JM.	Satisfaction ratings after receiving internet-based cognitive rehabilitation in persons with memory impairments after severe acquired brain injury.	2010
Bashshur R, Doarn CR, Frenk JM, Kvedar JC, Woolliscroft JO	Telemedicine and the COVID-19 pandemic, lessons for the future	2020
Barney A, Buckelew S, Mesheriakova V, Raymond-Flesch M. J Adolesc Health.	The COVID-19 pandemic and rapid implementation of adolescent and young adult telemedicine: challenges and opportunities for innovation	2020
Chaet D, Clearfield R, Sabin JE, Skimming K. J Gen Intern Med	Council on Ethical and Judicial Affairs American Medical Association. Ethical practice in telehealth and telemedicine	2017
Hollander JE, Carr BG. N Engl J Med.	Virtually perfect? Telemedicine for Covid-19	2020
American Medical Association.	Ethical Practice in Telemedicine	2020
Claudio Dario, Elena Luisotto, Enrico Dal Pozzo, Silvia Mancin, Vassilis Aletras, Stanton Newman, Lorenz oGubian, and Cla udio Saccavini	Assessment of Patients' Perception of Telemedicine Services Using the Service User Technology Acceptability Questionnaire	2016

Ricky Leung et al	Social Media Users' Perception of Telemedicine and mHealth in China: Exploratory Study	2018
Calin Poenaru et al.	Current Perception of Telemedicine in an EU Country	2014
SEU Quadery et al.	Consumer side economic perception of telemedicine during COVID-19 era: A survey on Bangladesh's perspective	2021
E Sechrist et al.	Patients' perception of telemedicine in a large urban inner-city emergency department: a cross-sectional survey	2020
Rajesh V. Acharya et al.	Evaluation of patient and doctor perception toward the use of telemedicine in Apollo TeleHealth Services, India	2016

Methods

The objective of the study was to answer factors that influence the perception of patients while using telemedicine services

A questionnaire was designed for data collection based on the literature review for content validity. The questionnaire included 21 questions and including rating opinions and attitudes of patients on a five-point scale with options to rate from “strongly agree” to “strongly disagree” and the questionnaire also contained questions to collect demographic data of the respondents which were very essential to study. The questionnaire was based on the study by

B.E. Holtz, (2021) titled Patients perceptions of telemedicine visits before and after the coronavirus disease 2019 pandemic.

The survey was administered online using social media and emails, this channel of collecting was chosen as Covid 19 pandemic was at its peak and face to face interviews with respondents were not possible. To provide proper context and knowledge to the participants before answering the questions, the survey started with a brief introduction to the research and goals, scope, process, and functionality of Telemedicine. The option to participate in the survey was kept open for 30 days.

The target population was individuals from the Delhi-NCR location of individuals with ages 18 to 39 years. The sampling frame was composed of people from different educational backgrounds who usually seek medical consultations. This group had a fitment with the targeted population profile. The questionnaire contained a question which about awareness of telemedicine and the respondents who were not aware were not included. So there were a total of 220 respondents out of which 108 were not aware of the telemedicine so the final data analysis was done on 112 respondent's data who mentioned that they were aware of telemedicine and therefore the sample size was deemed appropriate.

Key findings and discussion

Table 2: Socio-demographic data of the participants

Socio-demographic data of participants (n=112)

	Gender	Age	Education	Employment status	Insurance Status
N	112	112	112	112	112
Mean	1.419643	1.116071	2	1.410714286	2.071428571
Median	1	1	2	1	2
Skewness	0.330099	2.429892	1.415992	1.387848488	0.492945594
Std. Error of Skewness	0.228434	0.228434	0.228434	0.228434472	0.228434472
Kurtosis	-1.92575	3.975048	2.025603	0.569951906	-1.312180792
Std. Error of Kurtosis	0.453092	0.453092	0.453092	0.453091764	0.453091764

Table 3: Frequency table of preference of telemedicine provider

Frequency Tables

	If you have used telemedicine or wants to use telemedicine in the future, which provider do you choose/will choose	Frequency	Percent	Valid Percent
Valid	1mg	32	28.57142	28.57142
	DocOnline	9	8.035714	8.035714
	eSanjeevani	9	8.035714	8.035714
	Practo	22	19.642851	19.642851
	Any other	10	8.92857	8.92857
	Not applicable	30	26.78571	26.78571
	Total	112	100	100

Table 3 illustrates that 28.57% of the respondents use or would like to use 1mg, 8.03% of the respondents use or would like to use DocOnline and eSanjeevani, 19.64% of the respondents use or would like to use Practo, 8.92% of the respondents use or would like to use any other platform which option was not provided in the questionnaire and 26.78% of the respondents do not use or would not be using telemedicine for any medical consultation.

Figure 1: Choice of telehealth technology provider intended usage and intended by respondents %

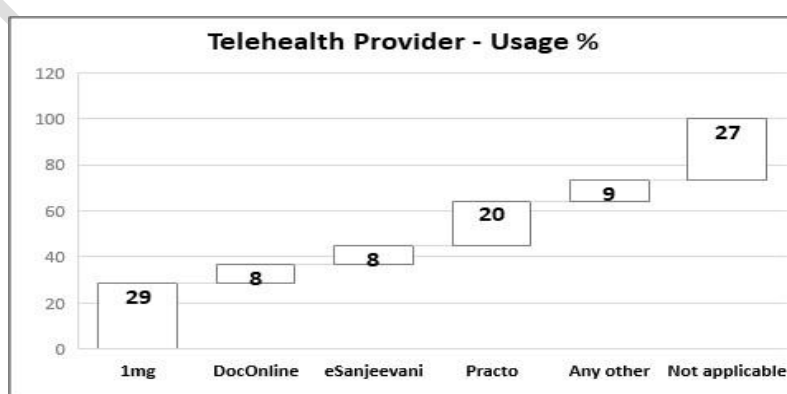


Table 4: Frequency table of Usage of Telemedicine

	Have you used Telemedicine	Frequency	Percent	Valid Percent
Valid	Yes	37	33.03571	33.03571
	No	75	66.96428	66.96428
	Total	112	100	100

Table 4 shows that 33.04% of the respondents have used telemedicine and 66.96% of the respondents have not used telemedicine.

Table 5: Frequency table of Education

	Education	Frequency	Percent	Valid Percent
Valid	Bachelor Degree	31	27.67857	27.67857
	Master Degree	66	58.92857	58.92857
	PhD	2	1.78571	1.78571
	Professional degree	10	8.92857	8.92857
	Prefer not to answer	3	2.67857	2.67857
	Total	112	100	100

Table 5 shows that 27.67% of the respondents hold Bachelor's Degree, 58.92% of the respondents hold a Master's Degree, 1.78% of the respondents were Ph.D., 8.92 of the respondents hold Professional Degree and 2.67% of the respondents prefer no answer.

Table 6: Frequency table of Age

	Age Group	Frequency	Percent	Valid Percent
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Valid	18-29	99	88.39285	88.39285
	30-39	13	11.60714	11.60714
	Total	112	100	100

Table 5 shows that there were 88.39% of the respondents from the age group 18-29 and 11.60% of the respondents from the age group 30-39

Factor Analysis

Table 7: KMO and Bartlett's test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.74533539
Bartlett's Test of Sphericity	Approx. Chi-Square	1211.86431
	df	210
	Sig.	.000

The Kaiser-Meyer-Olkin (KMO) test is used in this research to determine the sampling adequacy of data that are used for Factor Analysis, it indicates the proportion of variance in your variables that might be caused by underlying factors. And when this test was applied to the data set then it was found that there was sampling adequacy of the provided data.

Table 8: Survey Items, Means, and Standard Deviations

Descriptive Table

Descriptive Statistics		
Questions	Mean	Std. Deviation
Q1)) I had/ will have difficulty hearing the health care provider over the computer/mobile system	3.66964286	0.998994
Q2) I had/ will have difficulty seeing the health care provider over the computer/mobile system	3.60714286	1.0341654
Q3) I would have gotten/ will get better care if I had seen the health care provider in person	2.38392857	1.14093
Q4) The next time I would/will prefer to see a health care provider in person despite the possible inconvenience	2.99107143	1.1816581
Q5) It was/will be easy to arrange an appointment	2.72321429	1.1167022
Q6) The health care provider dominated/will dominate the conversation	3.1875	1.0269455
Q7) The health care provider spent/will spend little time taking my medical history	3.14285714	1.0893187
Q8) There was/will be less communication with the provider (than I normally receive in person) using telemedicine	2.82142857	1.1086416
Q9) The health care provider who provided/will provide me care genuinely seemed to care about me	2.89285714	0.9712734
Q10) I felt/feel like my privacy was/will be invaded during the telemedicine visit	3.38392857	1.1250268
Q11) I am/will be worried about the confidentiality of my private information being exchanged through the telemedicine visit	3.01785714	1.3150696
Q12) I am/will be worried about the continuity of care (i.e., I do not see my same provider every time)	2.69642857	1.0974113
Q13) I was/will be concerned that my primary care provider would/will not get my visit information	3.08035714	1.0495678
Q14) I was/will be concerned that my insurance would/will not cover my telemedicine visit	2.91071429	1.2269759
Q15) I generally/will use telemedicine when my provider is not open (after hours, holidays, etc.)	2.52678571	1.1227365

Q16) I generally/will use telemedicine when I feel too sick to leave the house	2.65178571	1.205915
Q17) I have used/will use telemedicine because I did/may not feel like my condition was/will be too urgent	2.67857143	0.9416708
Q18) I did/will not want to infect (cold, flu, etc.) other people in a waiting room	2.45535714	1.0474198
Q19) I did/will not want to get infected in the waiting room by other people (cold, flu, etc.)	2.53571429	1.1619227
Q20) It is/will be easy to get into my primary care provider	2.67857143	0.9416708
Q21) I am/will be worried about the accuracy of the information from the telemedicine health care provider	2.89285714	1.0599774

Factor Loading

Table 9: Component Matrix

Component Matrix		
	Component	
	1	2
	Factors from Service Provider	Factors from Service Taker
Q1) I had/ will have difficulty hearing the health care provider over the computer/mobile system	0.26386014	0.7651884
Q2) I had/ will have difficulty seeing the health care provider over the computer/mobile system	0.2368044	0.7511094
Q3) I would have gotten/ will get better care if I had seen	0.6911238	0.0479747

the health care provider in person		
Q4) The next time I would/will prefer to see a health care provider in person despite the possible inconvenience	0.66931249	0.0879913
Q5) It was/will be easy to arrange an appointment	0.37225786	-0.565213
Q6) The health care provider dominated/will dominate the conversation	0.31270765	0.2839717
Q7) The health care provider spent/will spend little time taking my medical history	0.56416726	0.307719
Q8) There was/will be less communication with the provider (than I normally receive in person) using telemedicine	0.47931639	0.5046623
Q9) The health care provider who provided/will provide me care genuinely seemed to care about me	0.38002229	-0.145973
Q10) I felt/feel like my privacy was/will be invaded during the telemedicine visit	0.39395197	0.5685342
Q11) I am/will be worried about the confidentiality of my private information being exchanged through the telemedicine visit	0.2988704	0.54076656
Q12) I am/will be worried about the continuity of care (i.e., I do not see my same provider every time)	0.64977248	-0.045481
Q13) I was/will be concerned that my primary care provider would/will not get my visit information	0.3033678	0.58603058
Q14) I was/will be concerned that my insurance would/will not cover my telemedicine visit	0.59970782	0.0529066
Q15) I generally/will use telemedicine when my provider is not open (after hours, holidays, etc.)	-0.421974	0.51061452
Q16) I generally/will use telemedicine when I feel too sick to leave the house	-0.444759	0.59846903
Q17) I have used/will use telemedicine because I did/may not feel like my condition was/will be too urgent	-0.402311	0.5445577
Q18) I did/will not want to infect (cold, flu, etc.) other people in a waiting room	-0.395881	0.64620424
Q19) I did/will not want to get infected in the waiting room by other people (cold, flu, etc.)	-0.361954	0.72255654

Q20) It is/will be easy to get into my primary care provider	-0.353312	0.6179665
Q21) I am/will be worried about the accuracy of the information from the telemedicine health care provider	0.63396847	0.2533514

Extraction Method: Principal Component Analysis (2 components extracted)

Two components obtained from Principal component analysis with a total of 21 items (after deletion of one low factor loading item) explain the perception of individuals reported as follows:

Factor 1: Provider Side: The factors are perceptions of quality of in-person care, continuity of care, little time spent, and technical issues.

Questions that were loaded on component 1

Q3 I would have gotten/ will get better care if I had seen the health care provider in person

Q4 The next time I would/will prefer to see a health care provider in person despite the possible inconvenience

Q5 It was/will be easy to arrange an appointment

Q6 The health care provider dominated/will dominate the conversation

Q7 The health care provider spent/will spend little time taking my medical history

Q9 The health care provider who provided/will provide me care genuinely seemed to care about me

Q12 I am/will be worried about the continuity of care (i.e., I do not see my same provider every time)

Q14 I was/will be concerned that my insurance would/will not cover my telemedicine visit

Q21 I am/will be worried about the accuracy of the information from the telemedicine health care provider

Factor 2: User Side: The factors include technology issues, less communication, less attention, etc.

Questions that were loaded on component 2

Q1 I had/ will have difficulty hearing the health care provider over the computer/mobile system

Q2 I had/ will have difficulty seeing the health care provider over the computer/mobile system

Q8 There was/will be less communication with the provider (than I normally receive in person) using telemedicine

Q10 I felt/feel like my privacy was/will be invaded during the telemedicine visit

Q11 I am/will be worried about the confidentiality of my private information being exchanged through the telemedicine visit

Q13 I was/will be concerned that my primary care provider would/will not get my visit information

Q15 I generally/will use telemedicine when my provider is not open (after hours, holidays, etc.)

Q16 I generally/will use telemedicine when I feel too sick to leave the house

Q17 I have used/will use telemedicine because I did/may not feel like my condition was/will be too urgent

Q18 I did/will not want to infect (cold, flu, etc.) other people in a waiting room

Q19 I did/will not want to get infected in the waiting room by other people (cold, flu, etc.)

Q20 It is/will be easy to get into my primary care provider

Now from the factor analysis and loading in the component matrix it can be concluded and inferred that the questions that are loaded in every component must fall under the common category of nature of perception and behavioral aspects like:

Component 1 intends to deduce the Factors from Service Provider from the respondents.

Component 2 intends to deduce the Factors from Service Taker from the respondents.

In Component Matrix, we can see that there is factor loading that has taken place i.e. in each component a set of questions get loaded. The interpretation of the analysis suggests that the individual's intention to use a system or technology may result not only from the factors as a service taker with the direct interaction with the system or technology but can also be influenced by the factors on the part of the service provider.

As this study was done from a patient point of view so the telemedicine service providers who are providing such a service in the Indian market must consider these factors as they play a very important role in adoption of any new technology and service. Service providers can also design their interface, appointment process, and consultation process by considering these aspects as patients give very importance to these factors.

Conclusion

The research clearly shows that out of 112 respondents, 75 have never used telemedicine even during the lockdown situation during pandemic. Demographic profiling based on age,

gender, education, and insurance status shows a lack of telemedicine usage culture among the group. The result divided the factors among the provider and the takers of the services. There is a need to create awareness among the users to make more use of telemedicine services. Service providers like hospitals and doctors need to take care of user's sentiments by giving them more time and clear communication while providing telemedicine services.

However, it is important to mention here that telemedicine services cannot be the answer to all problems and surely cannot replace an in-person medical consultation or emergency medicine. However, it can make a substantial contribution to cope and emerge with the current pandemic of COVID-19. Furthermore, its wider acceptance and implementation will help us prepare better for any future pandemics. Telemedicine is not a substitute for human consultation; rather, it is a supplement to it. India's healthcare needs to be based on a hybrid format, with physical consults and telemedicine working in tandem to provide multichannel treatment.

This study's participants were predominately consumers from NCR than the general public. Further study can explore a more diverse population to examine whether differences in perceptions between those who have used telemedicine and those who have not are similar to these findings.

The study revealed that, the satisfaction component is mostly ambiguous and uncertain. Even with these constraints in mind, the study's findings suggest that patient happiness will not be a barrier to telemedicine adoption, but provider satisfaction warrants more investigation.

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