



Telemedicine Acceptance and User Experience: A Gap to Be Addressed?

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ABSTRACT

Introduction: Telemedicine is constantly evolving which involves the transfer of, medical information over the phone or net with the aim of consultation. Advancements and drop in the cost of information & communication technologies have boomed the interest in the application of telemedicine.

Objective: To estimate the rate of acceptance, convenience and experience of telemedicine usage among IT professionals.

Methodology: This cross-sectional study among 162 IT professionals working in 4 level V CMMI IT companies in Chengalpattu. The employee who has used telemedicine were enlisted and 162 employees were selected through simple random sampling from them. Through a semi-structured questionnaire data was collected and analyzed using SPSS software version 21.0.

RESULTS: 56 participants (35%) of 162 participants accepted using telemedicine for medical consultation. 78 participants (48.1%) found it convenient to use the telemedicine applications, depicting that the applications are not user friendly. Only 34 participants (21%) were satisfied with their experience with telemedicine usage.

Conclusion: Acceptance of telemedicine is low, despite its advantages. Most of the users find it inconvenient and are dissatisfied with it. The development of user-friendly applications can improve acceptance. Meanwhile, promotion for the application is needed to reach the public.

Keywords: Telemedicine, Acceptance, User-friendliness, Experience

INTRODUCTION

Telemedicine is a constantly evolving science. During the 1970s, healing from a distance was termed telemedicine¹. WHO defines it as the exchange of legitimate information for the diagnosis, treatment and prevention of disease and injuries by health care providers and individuals and their communities, with the help of information and communication technologies.² In the 1960s, telemedicine was used in space technology sectors and the military. With advancement and drop in the cost of information & communication technologies, have boosted the in-

terest in the application of telemedicine³. The Internet has further escalated the scope of telemedicine by introducing Web-based applications. e-mail, teleconsultations, conferences and multimedia approaches like video and digital imagery⁴.

Telemedicine utilization in India is being accomplished slowly and steadily. Indian Space Research Organization (ISRO), Ministry of External Affairs, Department of Information Technology (DIT), Ministry of Health and Family Welfare and the state governments have played a pivotal role in the evolution of telemedicine in our country⁵. Ministry of Health and

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Family Welfare and the Department of Information Technology takes care of telemedicine services in our country⁶. DIT setting of standardized telemedicine practice guidelines and the introduction of the National Telemedicine Task Force by the Health Ministry, in 2005 has marked the rise of telemedicine in India. SAARC (South Asian Association for Regional Co-operation) Telemedicine Network Projects and Pan-African eNetwork Project are international projects by our External Affairs Ministry has taken our Indian telemedicine globally. In a vision of achieving good quality health services for all Indians through the cost-effective and guaranteed use of ICTs in health and health-related fields the e-health wing of the National Health Portal (NHP), has created the National Digital Health Authority of India (NDHAI)/ National e-health authority (NeHA) which is a major milestone of telemedicine in India⁷. Telemedicine usage in our country has also extended to the fields of traditional medicine. To promote the benefit of traditional methods of healing to a larger population through telemedicine National Rural AYUSH Telemedicine Network is initiated. All of these depict the interest and current scenario of telemedicine in our country⁸.

Our world is facing the biggest ever threat, the pandemic Covid-19. The highly contagious nature of the virus and its virulence has posed an unpredictable challenge to the world's healthcare systems. It is even more challenging in our country. One doctor per thousand population is being recommended by WHO⁹. But there are only 0.62 doctors per 1000 population in India¹⁰. And this poor doctor population ratio becomes, even more, intimidating during the pandemic. The active usage of telemedicine has been said to make up this deficit partially. Telemedicine has become safe and alternative care for those who are suffering from chronic diseases and who are constantly in need of health care but are at high risk for COVID-19. The most required psychological support for COVID-19 patients and their family members is being provided without getting exposed to the infection only with the help of telemedicine⁶. Though telemedicine has several pros, it also has drawbacks that also pose a problem in expanding. There are also several challenges in implementing telemedicine in developing countries like India¹¹. When some things are introduced newly, problems arise from the acceptance itself. The fruit of success can only be had if the programme is being accepted. Hence this study is done to know the rate of acceptance of telemedicine among IT professionals. It also aims to find convenience and satisfaction among those who use it, to improve it.

MATERIALS AND METHODS

This community based cross-sectional study was conducted for three months among the IT Professionals working in the Chengalpattu district of Tamil Nadu to determine the acceptance, user-friendliness

and satisfaction of telemedicine during the COVID-19 Pandemic. Capability Maturity Model Integration (CMMI) was used to select the IT companies in the Chengalpattu district. Members from industry, government and the Carnegie Mellon Software Engineering Institute (SEI) developed CMMI which provides a comprehensive integrated set of guidelines for developing products and services. It has five maturity levels: Initial, Managed, Defined, Quantitatively Managed and Optimizing. An organization that continually improves its processes by the quantitative understanding of its business objectives and performance needs are said to have level 5 CMMI.¹² Those level 5 CMMI companies were enlisted and 4 companies were selected by a simple random method using a lottery technique. Ullas. S et al¹³ in their study amongst patients with non-communicable diseases (NCD) in a quaternary care centre in south India found 38.63% have adapted telemedicine for their regular check-ups during the pandemic. Considering its prevalence with a 95% confidence interval, allowable error of 7% and non-response rate of 10%, the sample size was estimated to be 162.

After obtaining institutional ethical committee approval and permission from the IT companies, the employee who has used telemedicine services were listed from all four companies and included in the study. Those who were doing internships were excluded. From the list, 162 employees were selected through probability proportional to size sampling. They have explained the study, informed consent was obtained and required data was collected using a semi-structured questionnaire through interview methods, following proper precautions and safety measures.

The semi-structured questionnaire used to assess the acceptance of telemedicine during the COVID-19 pandemic was framed with the help of literature from similar articles. It had four sections. Section A had questions on general information and demographic data of the employee. Section B consisted of questions related to telemedicine acceptance. They were yes or no types of questions. A score of one was given to those who have answered yes and no score was given to those who answered no. User-friendliness of the application is one important determinant of acceptance. Hence section C was developed to access the user-friendliness of the application used for telemedicine. The responses were on a Likert scale and each response had a score from 1 to 5, the participants with scores of 60 and above were considered to perceive that the application is user friendly. Section D was created to access satisfaction. The responses in this section were also on the Likert scale and scores were assigned from 1 to 5. Those participants with a score of more than 36 were considered satisfied with using telemedicine.

The collected data was entered in Microsoft Excel and analyzed with the help of SPSS software version 21.0. Qualitative variables will be expressed in proportions and Quantitative variables in Mean (SD) /

Median (IQR). The Chi-square test was applied to find the determinants of acceptance. All statistical analyses were performed using IBM-SPSS v21.0.

RESULTS

The study was conducted among 162 IT professionals in various positions. About half of the participants were less than 35 years, 55.6%.

Table 1: Demographic profile of participants

Characteristics	Participants (n=162) (%)
Age	
<35 years	90 (55.6)
>35 years	72 (44.4)
Gender	
Male	83 (51.2)
Female	79 (48.8)
Type of family	
Nuclear	124 (76.5)
Joint	38 (23.5)
Religion	
Hindu	122 (75.3)
Others	40 (24.7)
Socioeconomic class	
Upper class	106 (65.4)
Upper middle class	56 (34.6)

Table 2: Association between sociodemographic profile and acceptance of telemedicine among IT professionals (n=162)

Characteristics	Acceptance		p-value
	Yes (n=56)	No (n=106)	
Age			
<35 years	34(60.7)	56(52.8)	0.406
>35 years	22(39.3)	50(47.2)	
Gender			
Male	29(51.8)	52(49.1)	1
Female	27(48.2)	54(50.9)	
Type of family			
Nuclear	40(71.4)	84(79.2)	0.33
Joint	16(28.6)	22(20.8)	
Religion			
Hindu	38(67.9)	84(79.2)	0.127
Others	18(32.1)	22(20.8)	
Socioeconomic class			
Upper class	44(78.6)	62(58.5)	0.015
Upper middle class	12(21.4)	44(41.5)	

Figures in parenthesis indicate percentages.

Table 3: Distribution of participants' convenience in using telemedicine (n=162)

Variables	Disagree	Neutral	Agree
Simple to use	26 (16.2)	78 (48.1)	58 (35.7)
Easy to learn	8(4.9)	58(35.8)	96(59)
AV was clear	12 (7.3)	44 (27.2)	106 (65.5)
Rectification of error	12 (7.4)	74 (45.7)	76 (46.9)
Service assistance	12 (7.4)	74 (45.7)	76 (46.9)

Figures in parenthesis indicate percentages.

Male and female participation among the participants were almost equal with 51.2% and 48.8% distribution respectively. 76.5% of the participants are living in a nuclear family. Hindu participants constituted three fourth of the total participants. Socioeconomic status was calculated based on the modified BG Prasad classification. Participants were in either upper class or upper-middle class, 65.4% and 34.615 respectively. These socio-demographic data of the participants are depicted in Table 1.

Acceptance of telemedicine:

Only 56 participants (35%) accepted using telemedicine. Table 2 shows the association between the sociodemographic profile of participants and acceptance of telemedicine. The socioeconomic status of the participant is found to be associated with the acceptance of telemedicine with a p-value of 0.015.

Only 78 participants (48.1%) found it convenient to use telemedicine, depicting that they are not user friendly. Table 3 shows the distribution of participants' convenience while using telemedicine. Most of the participants neither agreed nor disagreed indicating that they need some improvements to the existing system.

Table 4 demonstrates the association between the sociodemographic profile of participants and the user-friendly nature of the telemedicine application. A significant association was observed with the family type and religion of the participant ($p < 0.05$).

Experience with telemedicine usage

Table 5 depicts the experience of the participant with telemedicine usage. It is found that they are not satisfied with their experience with their consultation using telemedicine, as only 34 participants (21%) were satisfied.

Association between the sociodemographic profile of the participants and their experience with telemedicine is depicted in table4. Religion and experience are found to be associated with a p-value of 0.046.

DISCUSSION

With the outbreak of COVID-19, the practice of telemedicine has gained extreme importance. When medical information is transferred over the phone or net to consult is telemedicine. It can be as simple as discussing over phone calls or messages, or as advanced as exploiting satellite technology and video-conferencing instrument to conduct a consultation between medical specialists and patients in different countries. This cross-sectional study was carried out among 162 IT professionals to determine acceptance of telemedicine. It also assessed the user-friendliness and the experience of the user.

The usage of telemedicine was expected to be high during the pandemic. There was a national wide lockdown to curb the transmission of the disease.

Table 4: Association between sociodemographic profile and user-friendly nature of telemedicine application among IT professionals (n=162)

Characteristics	Usability		p-value
	Convenient (n=78)(%)	Inconvenient (n=84)(%)	
Age			
<35 years	48(61.5)	42(50.0)	0.157
>35 years	30(38.5)	42(50.0)	
Gender			
Male	43(55.1)	40(47.6)	0.35
Female	35(44.9)	44(52.4)	
Type of family			
Nuclear	50(64.1)	74(88.1)	0.001
Joint	28(35.9)	10(11.9)	
Religion			
Hindu	52(66.7)	70(83.3)	0.018
Others	26(33.3)	14(16.7)	
Socioeconomic class			
Upper class	54(69.2)	52(61.9)	0.409
Upper middle class	24(30.8)	32(38.1)	

Table 5 Participants' experience with telemedicine usage (n=162)

Variables	Dissatisfied	Neutral	Satisfied
Fixing an appointment with the consultant	14(8.7)	122(75.3)	26(16)
Duration of consultation	16(9.9)	113(69.8)	33(20.4)
Explanation of treatment by a specialist	8(4.9)	119(73.5)	35(21.6)
Privacy	8(4.9)	119(73.5)	35(21.6)
Overall experience	16(9.9)	116(71.6)	30(18.5)

Figures in parenthesis indicate percentages.

Table 6: Association between Sociodemographic profiles among IT professionals and their experience with telemedicine (n=162)

Characteristics	Satisfaction		p-value
	Yes (%)	No (%)	
n	34	128	
Age			
<35 years	19(55.9)	71(55.5)	1
>35 years	15(44.1)	57(44.5)	
Total	34(21.0)	128(79.0)	
Gender			
Male	19(55.9)	64(50.0)	0.871
Female	15(44.1)	64(50.0)	
Total	34(21.0)	128(79.0)	
Type of family			
Nuclear	23 (67.6)	101(78.9)	0.178
Joint	11(32.4)	27(21.1)	
Total	34(21.0)	128(79.0)	
Religion			
Hindu	21(61.8)	101(78.9)	0.046
Others	13(38.2)	27(21.1)	
Total	34(21.0)	128(79.0)	
Socioeconomic class			
Upper class	22(64.7)	84(65.6)	1
Upper middle class	12(35.3)	44(34.4)	

These days patients suffering from chronic disease suffered a lot due to a lack of health care services to manage their disease. As they also formed the high-risk group, the risk of being infected with COVID-19 was also high during their visit. Telemedicine was a boon during this time. But the usage of telemedicine during the pandemic estimated by Novi Sulistia Wati et al¹⁴ among diabetics in Jakarta was only 19.7%. This indicates the lack of acceptance among the public. Sisira Ullas et al¹³ in their study to find the acceptance rates of telemedicine amongst NCD cases in a quaternary care centre in South India, found that only 38.63% of patients accepted telemedicine. The rest preferred in-person consultation. Our study results were also similar to his observation. 35% of our participants accepted to use telemedicine.

Participants had their reason to choose in-patient consultation over telemedicine. One among them is the user-friendly nature of the application used to deliver the service. Suck Ju Cho et al¹⁵ while evaluate telemedicine-assisted direct medical control in the Korean emergency medical service system also said that user-friendly applications can help in the successful implementation of telemedicine. Singh A et al¹⁶ also noted the same in their study. When the participants of the study were questioned about the user-friendly nature, half of the participants i.e., 52% had difficulty with the application. If user-friendly applications are developed acceptance and usage of telemedicine would improve.

When the participants were enquired about their experience with consultation through telemedicine, only 21% of the participants were satisfied. Satin Aet al¹⁷ in their study during the pandemic in the United States has showed 45% acceptance of telemedicine which was close to our study result but the satisfaction rate was 87.7% which is much higher than our value. Singh A et al¹⁶ in their study to assess the impact of telemedicine on health care services in Delhi also determined the patient satisfaction and barriers to telemedicine usage. He noted a satisfaction rate of 22% which is almost the same as our results. Hence it is observed that there is a difference in satisfaction rates in developed and developing countries. This difference is because of the lag in information and communication technologies and economy between the countries.

This study was carried out among literate, professional and semi-professionals. Participants were belonging to the upper class of society. This act is a major limitation of this study as most of the Indian population were belonging to the lower socio-economic class, was illiterate and employed in semi-skilled or unskilled jobs. As the study was carried out during a pandemic only a limited population was included.

CONCLUSION

Acceptance of telemedicine is low, despite its advantages. Most of the users find it inconvenient to

use and are dissatisfied with it. The non-availability of user-friendly applications is attributed to the inconvenience. This has emphasized the need for the development of user-friendly applications with proper assistance. As people are accustomed to the face-to-face visits, they feel dissatisfied with telemedicine. This stigma can be dealt with through promotion. When the doctors they trust promote the application and consult the patients through the application the acceptance as well as satisfaction among the users will improve.

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