

**AWARENESS, PERCEPTION, AND READINESS OF ADULTS TOWARDS
TELEMEDICINE: A STUDY IN INDIA**

Dissertation Submitted to



The IIHMR University, Jaipur

For the partial fulfillment for award of the degree of

Master of Business Administration (MBA)

In

Hospital and Health Management

By

Baijnath Thakur

Under the Supervision and Guidance of

Dr. Prashant Sharma

2021

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled “Awareness, Perception, And Readiness of Adults Towards Telemedicine: A Study In India” is the bonafide record of my original researchwork. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished workof others has been duly acknowledged in the text.

(Signature)

BAIJNATH THAKUR

Name of Student

Date:

CERTIFICATE

This is to certify that dissertation titled “Awareness, Perception, And Readiness of Adults Towards Telemedicine: A Study in India” is a record of the research.

work undertaken by Baijnath Thakur in partial fulfillment of the requirements for the award of the degree of MBA Hospital and Health Management from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

Faculty Guide
IIHMR University, Jaipur

Date

School Dean
IIHMR University, Jaipur

Date

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Table of Contents

S.No	Contents	Pg. Number
1.	Abstract	7
2.	Introduction	8-9
3.	Review of Literature	10-18
4.	Methodology	18-22
5.	Results	22-28
6.	Discussion	29
7.	Conclusion	30
8.	References	31-32
9.	Appendix	33-38

List of figures:

Figure Number	Description
1	Percentage distribution of respondents as per age
2	Academic background of respondents
3	Chart representing responses of question asked to assess awareness.

List of Tables:

Table Number	Description
1	Codification of states
2	State-wise Percentage Distribution of Respondents.
3	Distribution of responses academic qualification wise.
4	Chi-Square test to find association between education and behavior of respondents towards opting telemedicine
5	Age wise distribution of responses
6	Chi-square test to find association between age and behavior of respondents towards opting telemedicine.

Abstract

Topic: Awareness, Perception, And Readiness of Adults Towards Telemedicine: A Study in India

Research Objectives:

1. To study awareness, perception, and readiness of Indian adults towards telemedicine.
2. To identify key factors that impacts awareness, perception, and readiness of study population.

Methodology:

Primary data was collected using online questionnaire. The primary respondents were individuals of age group [18-65] years, who can read and write english having a working internet access. Non-probability sampling methods was being used for sampling.

Responses from 28 states of the country were collected. As many as, 317 responses were received. Secondary data was mainly collected from PubMed, published articles, Official websites and google scholar.

Analysis and Interpretation of primary data collected, was done using SPSS, MS Excel and graphical representations.

Results:

This study concludes that Indian adults are highly aware of the telemedicine services. They are optimistic about its utilities in improving the healthcare service delivery and most of the young are found highly ready to use the telemedicine services if situation demands. In line with most of the previously done studies in telemedicine throughout the word, this study also shows similar trends in terms of perception. Which is highly encouraging towards the use of telemedicine. Although major barriers in the mass implementation of telemedicine are access to devices, poverty, lack of good internet connectivity.

INTRODUCTION

For many years, doctors, healthcare researchers, and others have concerned stakeholders have been searching the use of modern communications and computer technologies to improve health care. To define, Telemedicine have been used in many extreme conditions like war, natural disasters, pandemic where physical presence of doctor was next to impossible. Telemedicine started in late 1950s where telephone was primarily used. Initially it was only designed for remote population. Slowly and gradually with the advancement in technology, telemedicine keeps on improving. Now in the era of smartphones, telemedicine is more popular and easier to use.

In the COVID-19 crisis, telemedicine becomes essential components of healthcare. As physical distancing was critically important to stop the further spread of the virus. Due subsequent lockdown imposed in the nation, transport facilities came to halt and healthcare sectors were struggling with overburden of COVID-19 infected patients. Where it was very tough for those who requires attention due to other co-morbidities. To cope up with these challenges many people started looking for consultation with doctors online and telemedicine sectors have seen surge in the average number of daily consultations. Many studies have shown that higher number of people were highly satisfied with the telemedicine consultations and there are no such evident barriers in paradigm shift from traditional in-clinic visits.

Telemedicine was initially conceived to reach patients in remote areas where reach is limited. But now it attracts more people even from urban areas. because the access of this technology has become more easier than earlier. Anyone who have an Internet connection and a computer or smartphones with a camera no longer requires going into doctor's Clinic. Telemedicine is also known as "video visits," "online doctor visits," and "doctors on demand," and it can be implemented via smartphone, tablet, or computer.

This telemedicine field has shown great promise, mainly in recent years. But like many great innovations, progress has been slower. Although many patients are not able to trust this technology, implementation remains hindered by misconceptions about the technology by doctors; confusing government regulations; and unclear policies, which are a

unavoidable challenges for doctors. Insurance reimbursement guidelines are also some of the glitches that is still unclear.

Telemedicine has been growing rapidly since last decades. Some issues with government rules and reimbursement policies if insurance involved have hindered its full use into the health organizations. During the COVID-19 pandemic, this played an important role, and it shows that it could be implemented for the betterment of healthcare delivery. The following benefits of telemedicine are its less cost, ability to reach patients sitting at far and its ability to solve problem of shortage of physician. Disadvantages are lack of availability of technical resources in some parts of the nation, issues of privacy of data, and challenges in performing precise patient examination sitting at far place. It is very important that modification is to be made to fully make telemedicine services integral part of the healthcare industry to see the ease of this service in the future.

In the current industrialized era, chances are that telemedicine will continue to push healthcare delivery from the hospital or clinic to patient own convenient place. In the developing countries or in the regions with lack of proper infrastructure, telemedicine will surely be used in mobile or computer applications that will avail link based at health centers, referral and tertiary care centers. The future of telemedicine will highly depend on: (1) human behavioral factors, (2) economic status and (3) technological growth. Behaviors related to technology highly affects the individual, organizations and population level. Personnel shortcomings and decreasing reimbursement of health expenditure are significant fueler of technology based health care industries, mainly in the areas of home based care and self-care. We can assume that progress in mobile communications, sensor enabled devices and latest nanotechnology will provide a new way that health care will be delivered in the future. The massive growth and integration of information and communication technologies into health-care delivery holds new opportunities for patients, doctors, and third party payers in healthcare systems of the future. However, it is still a big question, 'When telemedicine will become the part of standard of care?'

REVIEW OF LITERATURE

Previous studies done in the area of telemedicine have shown that since many decades telemedicine is getting more popular. Initially it was assumed that telemedicine is only designed for remote population and its potential was not fully realized. Past studies done weighed the pros and cons of telemedicine in Indian context. Most of the studies were secondary data based or observation-based studies. Studies suggested that telemedicine is not that old concept in India although it is not commonly used. Telemedicine has a tremendous potential but lack of awareness and acceptance of this new technology not only by common people but professionals too, has been the main hurdle in the mass implementation.^[10]

However, it is also mentioned that this telemedicine will meet its real potential very soon in upcoming years. There was an observational study done in Kerala, India. Which was mainly focused to cancer patients. This study suggest that telemedicine could be a boon in early detection of cancer and prevent the disease before it gets more severe. It also suggests that telemedicine have huge potential and if more ways are explored it could resolve many cancer cases before it become more severe.^[11]

Some studies advocate that telemedicine is a boon for rural India as health care delivery is not as much available as compared to urban regions. As people living in the rural area have limited accessibility to healthcare, they always need to travel far to see a clinician even for a minor health issue. Internet advancement and its access to patients sitting at rural place could resolve the problem of accessibility to healthcare.^[12]

Many Authors advocated that if India want to achieve health for all by 2020 then telemedicine could work as a major catalyst and help India achieve equitable healthcare. Thus, admitting that telemedicine has huge potential and opportunity in India. Some studies even concluded that telemedicine will soon become the new way of meeting doctors. However, technological related glitches and data security are the main barriers in the mass implementation. Although growth in acceptance of new communication technology would propel the acceptance of telemedicine too.^[13]

It is an opportunity for both private and public sector to invest their interest in telemedicine. Telemedicine would help in resolving the disparities in access to healthcare to rural

population. Telehealth or mobile health could play a very vital role in building awareness, prevention of disease, early detection, and easy follow ups with clinician.^[14]

A successful design of telehealth could resolve the issues related to accessibility to healthcare. Although many clinicians have advocated that human touch is a very important elements in providing quality healthcare that may be missing in the mobile or telemedicine. Which could be the potential barriers that most of the clinician have said.^[15]

Going through previous studies it was observed that very less studies towards telemedicine in India is done covering the views of the adults throughout all states of the nation. Studies done in the past are either based on observations taken in some state or on a very small sample size. Negligible number of studies have been done across nationwide taking empirical data. Also, it was found that studies understanding the awareness, perception, and readiness level of adults to use the telemedicine, mHealth, or telehealth was not undertaken.

METHODOLOGY

I. Research Questions:

1. What is the awareness level of adults towards telemedicine in India?
2. What is the perception of adults towards telemedicine in India?
3. What is the readiness of adults towards telemedicine in India?

II. Research Objectives:

3. To study awareness, perception, and readiness of Indian adults towards telemedicine.
4. To identify key factors that impacts awareness, perception, and readiness of study population.

III. Sample Size:

Following calculation method is used to identify the sample size for the current studies:

$$N = Z^2 P(P-1) / d^2$$

Where, Z=Level of significance=1.96 (at 95 % confidence interval)

$P = \text{Expected proportion (in the population)} = 0.5$

$d = \text{Precision (Chances of error)} = 0.05$

when these values were being put in the formula it gave approximate value of 384. Although only 317 responses were being received thorough the online survey. Hence this study was based on the responses of 317 participants as this study was exclusively designed for adults, only people belong to the age group [18-65] (both extreme values were included) were being targeted for the completion of this study.

IV. Study Design:

Observational or cross-sectional study design was being used to complete this research study.

V. Hypothesis:

H0: Indian adults are aware and ready to use Telemedicine.

VI. Study Tool:

A self-administered online survey form [or google form] was used as a tool to gather the primary data from target audience. Non-probability sampling technique was done to reach the respondents. The questionnaire was being circulated by the help of the known contacts of the researcher belonging to different states of the country. E-mail and WhatsApp [a social media app] were used to share the link of the form. The forms were shared with the contacts [approximately 50 people] first and then they were further requested to share it with at least 10 of their peers or family and relatives. Thus, the form reached about 500 persons. The data used in this analysis was collected at the same time from all the states. The survey was conducted from June 19, 2021, till June 26, 2021. Each questionnaire had an information about the research objectives at the beginning. Ethical approval from all participants were taken. It took maximum 2 to 3 minutes to complete the survey. No incentives were provided to the respondents and participation was completely voluntary and anonymous. Data gathered were entirely confidential and protected at all stages of the study. All data were either computer or smart phone entered thus minimizing errors of data entry.

The online questionnaire tool used to gather data has following components:

Section A. Knowledge and Awareness Based:

This section was comprised of five questions. Here in this section those questions were added which were primarily designed to assess the knowledge and awareness of participants. Where the questions which were asked were assigned four multiple choice answers to opt from. Where only one answer was correct. Based on the number of people selected the right answer analysis was made. Further few questions were asked to get their view on the major challenges for telemedicine in Indian context and to get a glimpse of their source of awareness about telemedicine.

Section B. Perception Based:

Here in this section, questions were asked to assess the perception of respondents towards telemedicine use. Here eight different statements were made, and the respondents were asked to opt their choice answer on a scale of five, where 1 represented Strongly disagree, 2= Agree, 3= Neutral, 4= Agree and 5 represented Strongly agree. These statements were taken from past studies and questionnaire that is being used in the past to conduct the study. To analyze these statements, five-point scale was further classified into two categories where point 1, 2 were clubbed as “Bad”, Point 3 taken as “Neutral” and point 4 & 5 were clubbed as “Good”. Where Bad represents percentage of people who clearly not supporting telemedicine concept, Neutral represents people who are still not clear with their choice and Good represents those percentage of respondents who supports telemedicine concept as an option in healthcare.

Section C. Practice Based:

Practice based questions that reflects the action that respondents will choose if they are being exposed to different situations related to telemedicine were asked in this section. This section comprised statements and respondents were requested to opt one option available in the five point Likert scale. Where 1 equal to strongly disagree, 2= Agree, 3= Neutral, 4= Agree and 5 equals to strongly agree. To analyze these statements, five-point scale was further classified into three categories where point 1 & 2 were clubbed as “Bad”, Point 3 taken as “Neutral” and point 4 & 5 were clubbed as “Good”. Where Bad represents percentage of people who clearly not going to opt for telemedicine concept, Neutral represents people who are still not clear with their choice and food represents those percentage of respondents who supports practice of telemedicine concept as an option in healthcare.

Section D. Demographic Questions:

This section comprised questions related to basic demographic details of the respondents like age, gender, qualification, and state they belong to. These responses would help the analysis in more concise way to get clearer picture.

VI. Study Duration: This study is being conducted between 12 April 2021 to 30 June 2021.

VII. Analysis:

In the following way data grouping and sorting is being done.

1. To sort age related data into class interval following formula was being used: Number of class interval (Sturge's Rule) = $1+3.22\log N$

Size of class interval = Range/number of class interval

2. To create table for state-wise response coding technique was used. Where each state was allocated a number to filter the data from actual response sheet in the following manner:

Table 1. Codification of states

State	Code
Jharkhand	1
Meghalaya	2
West Bengal	3
J&K	4
Tamil Nadu	5
Bihar	6
Madhya Pradesh	7
Rajasthan	8
Gujrat	9
Odisha	10
Telangana	11
Andhra Pradesh	12
Chhattisgarh	13
Punjab	14
Arunachal Pradesh	15
Assam	16

Uttar Pradesh	17
Kerala	18
Karnataka	19
Haryana	20
Delhi	21
Goa	22
Maharashtra	23
Himachal Pradesh	24
Manipur	25
Mizoram	26
Nagaland	27
Uttarakhand	28

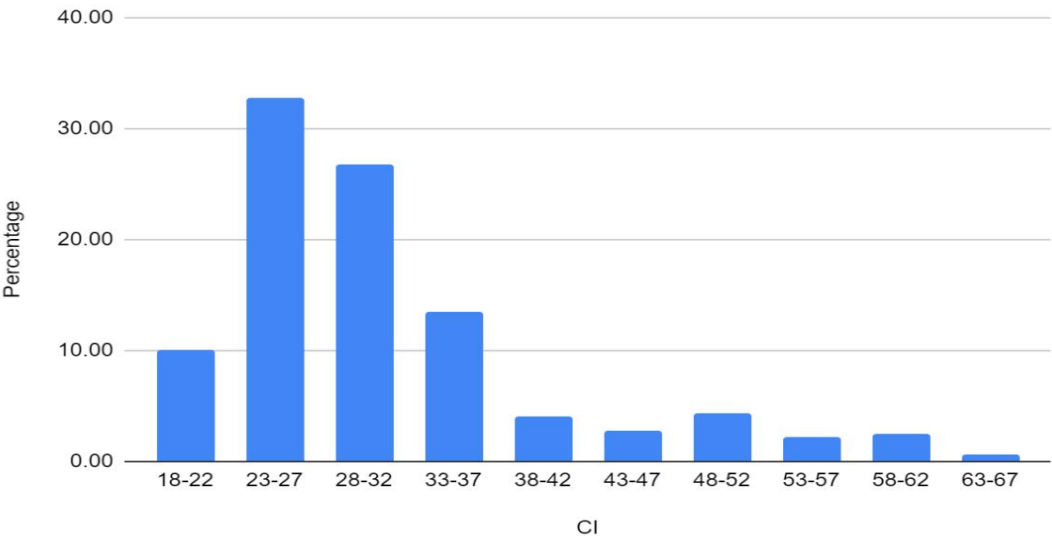
3. Data in excel sheet was codified to facilitate further analysis. All responses were further converted and assigned a unique code simplify the analysis. This simplified sheet was further imported in the SPSS software for analysis.

4. SPSS software, Graphical presentation and bar graphs was being used to represent the analysis of data conducted.

RESULTS

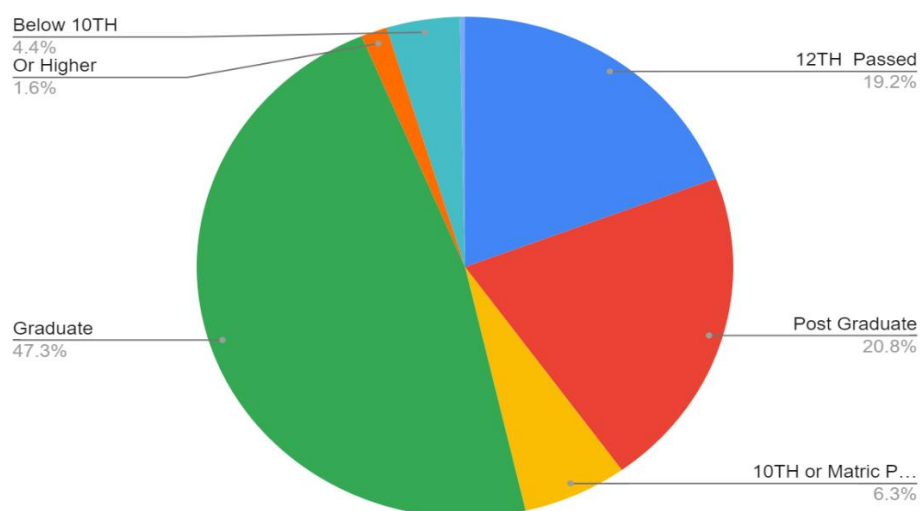
This chapter mainly shows the findings of this study. Results in the form of table and charts are being mainly attached in this section. Based on 317 responses received, approx. 65 percent of respondents were male, and 35 percent were female. Where percent distribution of respondents as per age is being shown in figure 1 below.

Figure 1. Percentage distribution of respondents as per age:



However, majority of respondents were graduate and postgraduate but significant participation from respondents who completed education below was there. Figure 2. Clearly depicts the educational backgrounds of the participants.

Figure 2. Academic background of respondents



Online survey tool reached almost 28 states of the nation. However certain states had very few responses. Table 4 below presents the overall percentage distribution of state-wise participation of respondents.

Table 2. State-wise Percentage Distribution of Respondents.

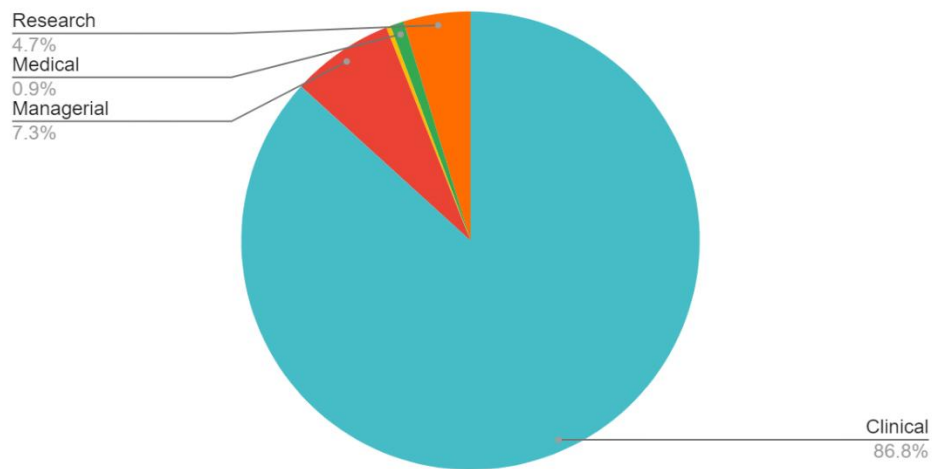
State	Percentage
Jharkhand	30.91
Meghalaya	0.63
West Begal	5.36
J&K	1.58
Tamil Nadu	1.26
Bihar	9.15
Madhya Pradesh	5.05
Rajasthan	3.47
Gujrat	6.62
Odisha	2.21

Telangana	0.32
Andhra Pradesh	1.58
Chhattisgarh	0.95
Punjab	7.89
Arunachal Pradesh	1.26
Assam	1.89
Uttar Pradesh	2.52
Kerala	2.21
Karnataka	0.95
Haryana	0.95
Delhi	5.05
Goa	1.26
Maharashtra	1.89
Himachal Pradesh	0.32
Manipur	0.32
Mizoram	0.63
Nagaland	2.84
Uttarakhand	0.95

Pie chart below represents that around 88 percent of participants have opted the correct option. Which shows they are highly aware that telemedicine is mainly designed for clinical and medical causes. Which reflects high awareness level of participants.

Fig.3. Chart representing responses of question asked to asses awareness.

Which of the following area is mainly associated with Telehealth?



However, when participants were asked to select the meaning of telemedicine from the available options significant percentage of participants made mistakes and opted for the incorrect options. Around 46 percent of the respondents mark the correct answer which shows people are aware of telemedicine, but numbers are not high.

When asked about the source of information of telemedicine. Advertisement, Media literature, Conference and friends were the top word spreaders of telemedicine found. Although advertisement was at the top.

When asked about what the main barriers of telemedicine in India are, Internet accessibility, lack of exposure to technology, poverty and lack of education were the practical barriers they answered.

Although telemedicine is new concept but still around 75 percent of the respondents feel that telemedicine is viable approach in providing healthcare. 61 percent of respondents says that telemedicine have the potential to save time and money of the people. Which was usually spent on visiting traditional clinics. 54% of participants felt that telemedicine could provide quality of care to patient however a significant number of respondents does not agree or unsure of it. From it can be clearly seen that significant percentage of study population have good image of telemedicine in their mind. In response to the question about how readily they will use the telemedicine if required if future nearly 71 % percent

respondents agrees that they will use this innovation in healthcare. Around 52 percent of participants said that they wanted to learn more about telemedicine, but significant percentage of respondents are not sure of it. 67.2 percent of participants said that they will further refer telemedicine technology to their friends and family. Telemedicine services are advertised daily through commercials and now people are aware about it. Around 71 percent of the study population accepted that they find telemedicine easy to use and it is not a complex process.

Table 4 below provides detailed number of people who agreed and disagreed with the use of telemedicine if in case required. Chi-square test performed suggested that there is a significant association between the academic qualification and choosing telemedicine. People with higher academic qualification reported that they will surely opt for telemedicine if in case required in future.

Table. 3 Distribution of responses academic qualification wise.

			Your Highest Academic Qualification:							Total
			Below 10th	Matric Pass	12th Pass	Graduate	Postgraduate	Or Higher	None	
If in case required, I would like to consult doctors via video conferencing	Disagree	Count	2	5	29	35	16	1	0	88
		Percentage	2.3%	5.7%	33.0%	39.8%	18.2%	1.1%	0.0%	100.0%
	Agree	Count	12	15	32	115	50	4	1	229
		Percentage	5.2%	6.6%	14.0%	50.2%	21.8%	1.7%	.4%	100.0%
Total		Count	14	20	61	150	66	5	1	317

Table 4. Chi-Square test to find association between education and behavior of respondents towards opting

telemedicine.

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.653 ^a	6	.016

It is also observed that people who are graduate and postgraduate were more agreed in comparison to people with other academic qualification. When it is compared with the gender, insignificant association is being found. Which means that male and female have similar behavior when it comes to opt for telemedicine services.

Table. 5 Age wise distribution of responses

			Age					Total
			18-25	26-35	36-45	46-55	56-65	
If in case required, I would like to consult doctors via video conferencing	Disagree	Count	44	24	14	3	3	88
		% within If in case required, I would like to consult doctors via video conferencing	50.0%	27.3%	15.9%	3.4%	3.4%	100.0%
	Agree	Count	69	127	18	12	3	229
		% within If in case required, I would like to consult doctors via video	30.1%	55.5%	7.9%	5.2%	1.3%	100.0%

		conferencing						
Total		Count	113	151	32	15	6	317

Table. 6 Chi-square test to find association between age and behavior of respondents towards opting telemedicine.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.653 ^a	4	.000

While very strong association between age and readiness to opt for telemedicine is found. People in younger age group were found more aware in comparison to older adults. Young adults were found more ready to use telemedicine if in case required.

DISCUSSION

Telemedicine is newly popular technology in healthcare and many people know about. This study suggest that many people are aware and heard this term but when it comes to its actual definition many people are not clearly aware of it. It is observed from the data collected that many people misunderstood telemedicine with searching health information online, use of health gadgets to enhance health and telephonic conversation with doctors.

Advertisement is found to be major word spreader about telemedicine and due to which significant cross section of the society is aware of this term. It is commendable that Indian adults are highly aware of the major challenges in the implementation of telemedicine in the mass scale. They feel that good internet accessibility is required to make this concept viable in every corner of the nation. If not, it will be the major challenge. Adding to this poverty and lack of exposure to technology is also found to be barriers in the path of telemedicine.

This study suggests that people have positive mindset towards the telemedicine concept, and they find it promising if it is integrated to standard healthcare systems. Significant cross section of Indian adults believes that telemedicine has the potential to save time, energy, and money without compromising the quality of care that is being provided to the patients. They believe that information and communication technology have the potential role in the healthcare industry. It is also observed that significant Indian adults agreed that telemedicine could solve the problem of over inflow of patients and shortage of clinicians.

Indian adults agreed that they will use telemedicine if situation demands. Studies in the past suggested that the patient satisfaction in video visits with clinician is high. Similar opinion is also being observed in Indian context too. Most Indian adults said they are keen to learn more about telemedicine and most of them assumed that it will be very easy for them to use telemedicine in the form of an application through smartphones and computers. They find telemedicine promising and they are highly confident in referring telemedicine to friends & family.

Although education and age were the significant factor found in determining the behavior to opt for telehealth. Younger people were found more inclined towards positive response comparison to older one. However, significant percentage of people above 35 years have good mindset towards the telemedicine technology.

LIMITATION OF THE STUDY:

- Due to lock-down in the nation this study was conducted without visiting to respondents in person.
- The major cross-section of the respondents was somehow associated with health industry of the nation.

- All the respondents were reached by the help of connections of researcher only.

CONCLUSION

Although telemedicine is new in India, but its potential is well realized. There are challenges in the implementation of telemedicine in mass scale. Even though Indians adults are found ready to use this as an integral part of healthcare delivery system. It is advised to publicize the benefits of telemedicine and clearly state user guidelines. Indian adults are very optimistic with this innovation in healthcare, which suggest a huge market opportunity for Telemedicine in India.

The major barriers in the implementation of telemedicine in India reported by most of the participants is lack of exposure to technology, Internet accessibility and missing of human touch. These are some real problems in the mass implementation of telemedicine in India. These problems really need to address wisely.

Despite all the barriers telemedicine have seen all time high demands of teleconsultation with doctors during COVID-19 pandemic. Which suggest a huge market for this new healthcare service delivery concept. This study suggest that significant Indian adults have good image of telemedicine in their mind and they have shown their interest to use it.

RECOMMENDATIONS:

Since, it is found that Indian adults found telemedicine as promising innovation in the healthcare delivery. They have good mindset towards the use and benefits of this technology-based healthcare. It is advised to government and private players to invest their interest more in this field and design more user-friendly techniques to connect with last mile patient.

REFERENCES: