Telemedicine – Awareness and Attitudes among Rural People in Gujarat

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***Abstract*— Today we are in the era of globalization and Information Technology, but yet most of the global populations are living in the rural areas of the developing countries. They represent the largest patient groups who suffer from various diseases. Many rural areas have shortage of good hospital with best doctors. India is one among these countries. The technology advancement like telemedicine can play important role to overcome the shortage of expert doctors in rural areas. Although technology will have a major role to play in development like telemedicine, it is important to understand the personal attitudes of rural people towards this type of developments. This descriptive research is an attempt in that direction. The research is conducted on rural people of North Gujarat (India). From total respondents 57.5% people are aware about telemedicine while 42.5% are not aware about telemedicine. Those rural people who were aware about telemedicine agreed that telemedicine can be helpful in many ways but at the same time, some of them also believe that it can never replace the face to face consultation of doctor.**

Keywords*— *telemedicine, rural people, awareness, demographic factors, attitudes

I. INTRODUCTION

Country's bright future depends on the good health of country's population. It must be important priority of any country that best health services should reach out to every citizen at their ease.

The word 'Tele' is a Greek word meaning 'distance' and the word 'Mederi' is a Latin word meaning 'to heal'. The famous Time Magazine has called telemedicine as healing by wire. In very brief, telemedicine means the use of telecommunication and informatics in medicine.

Telemedicine is a successful integration of medical expertise, medical equipment, computer hardware and software, telecommunication infrastructure and internet into a system by which the patients can be examined, investigated, monitored and treated by medical experts from a distant place.

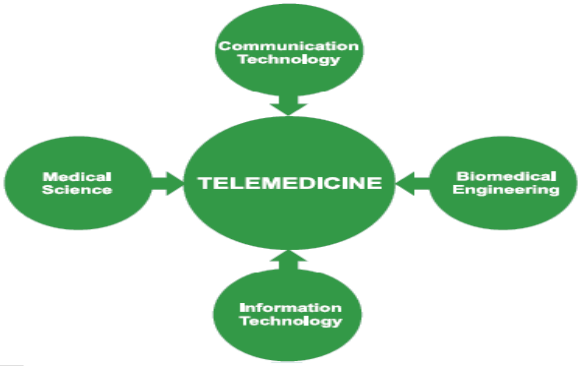

Fig. 1. Components of Telemedicine

According to **World Health Organization** telemedicine is "The delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information about diagnosis, treatment, prevention of disease, injuries, research, evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities."

A. Telemedicine in India: an option or a necessity

India is characterized by vast population. According to the survey conducted by the Medical Council of India (MCI);

- The ratio of allopathic doctors to population is 1:1722.
- 75% of doctors practice in urban areas and 23% in semi-urban areas while 70% of the patients hail from the rural areas.
- The number of hospital beds available per 1000 population is 2.2 in urban areas while it is only 0.19 in rural areas

This represents the gross inequality in the distribution of healthcare services between the urban and rural areas.

Implementing telemedicine is one of the best options for delivery of healthcare services in distant and remote areas. It is more economical and cost effective to link remote and rural places with a telecommunications than to physically send the doctors to these places.

According to Federation of Indian Chamber of Commerce and Industry (FICCI) study;

- India's healthcare industry is worth over $16 billion, and is expected to grow by 13-15 percent annually.
- Telemedicine business in India has a market potential of $500 million.

Telemedicine for sub urban and rural India heavily subsided from agencies like World Health Organization, World Bank, Asian Development Bank, Government of India, etc.

Some of the Hospitals like Apollo, Narayan Hrudalaya, All India Institute of Medical Science (AIIMS), Fortis and Sanjay Gandhi Post Graduate Institute of Medical Science (SGPGIMS) are actively involved in the development of telemedicine along with Indian Space Research Organization (ISRO) in many locations.

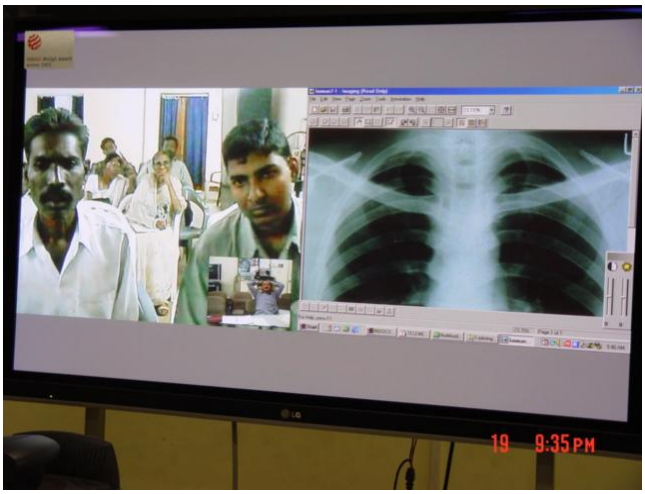

Fig. 2. Telemedicine session at SGPGIMS

B. Objectives of the Study

Although technology will have a major part to play in developments like telemedicine, it is just important to know the level of awareness and different personal attitudes of rural people towards any such development. So it can provide guidance in proper direction to make it successful. The present study attempts to achieve the following specific objectives:

- To find out the awareness of telemedicine among rural people.
- To find out attitudes of rural people towards telemedicine.

II. Reserch Methodology

The research is descriptive in nature. The secondary data has been collected from internet and references from articles, research papers, etc. The primary data has been collected directly from respondents through structured questionnaire with convenient sampling method. The sample size is 120. All the respondents were rural people living in villages of Mehsana, Patan, and Banaskantha districts of North Gujarat. To analyze the data chi square test is used with the help of SPSS and Microsoft Excel.

III. Data Analysis

TABLE I
Responddebt's Demographics Profile

Age	Frequency from 120	Percentage
Below 20 Years	15	12.5%
21-35 Years	38	31.7%
36-50 Years	42	35.0%
Above 50 years	25	20.8%
Gender		
Male	74	61.7%
Female	46	38.3%
Education		
Illiterates	14	11.7%
SSC	26	21.7%
HSC	33	27.5%
Graduate or Post Graduate	37	30.8%
Other	10	08.3%
Income (Annual in INR)		
Below 100000	53	44.2%
100001-250000	36	30.0%
250001-500000	21	17.5%
Above 500000	10	8.3%
Awareness about Tele Medicine		
Yes	69	57.5%
No	51	42.5%
Hospital Availability at Village		
Not Available	19	15.8%
Small Dispensary	41	34.2%
Government Hospital	33	27.5%
Private Hospital	27	22.5%

From above table, we can see different demographics information of respondents living in rural areas like age, gender, education, income, etc.

- Among 120 total respondents we can see that 19 respondents have no facility of hospital at their village.
- Among total 120 respondents, 69 respondents are aware about telemedicine and 51 respondents do not know about telemedicine. So we can say 57.5% people are aware about telemedicine in rural areas of North Gujarat.

- As further study is to find about attitudes of rural people towards telemedicine, we can only use those 69 respondents who know about telemedicine. And also importantly noted that **responses of only 60 respondents were complete**, so only these 60 respondents can help to find attitudes of rural people for telemedicine.

To find out attitudes of rural people towards telemedicine, chi-square test is used on the basis of demographic characteristics.

H_{01}: There is no association between Comfort of using telemedicine and Age of respondents.

TABLE II
CHI SQUARE TEST H_{01}

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.757[a]	12	.724
Likelihood Ratio	10.436	12	.578
Linear-by-Linear Association	.128	1	.720
N of Valid Cases	60		

From above table we can see that Pearson Chi-Square calculated value 0.724 is greater than 0.05. So the null hypothesis has been accepted.

Reference [Annexure, Crosstabulation1] shows below result:

Agreed + Strongly Agreed = 29

Neutral = 11

Disagreed + Strongly Disagreed = 20

Here all age groups of the respondents having their own views, which means, comfort level is not similar for any particular group of age. And as 29 respondents having positive response we can say they are ready to use telemedicine.

H_{02}: There is no association between Access of healthcare services through telemedicine and Availability of hospital in village of the respondents.

TABLE III
CHI SQUARE TEST H_{02}

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.967[a]	12	.303
Likelihood Ratio	16.588	12	.166
Linear-by-Linear Association	.051	1	.821
N of Valid Cases	60		

From above table we can see that Pearson Chi-Square calculated value 0.303 is greater than 0.05. So the null hypothesis has been accepted.

Reference [Annexure, Crosstabulation2] shows below result:

Agreed + Strongly Agreed = 27

Neutral = 19

Disagreed + Strongly Disagreed = 14

Here all respondents irrespective of hospital available at their village or not, have represented their views. Among them 29 respondents having positive response so we can say that most of them are agree upon telemedicine is good in critical condition.

H_{03}: There is no association between cost saving to get expert doctors treatment through telemedicine and Income of the respondents.

TABLE IV
CHI SQUARE TEST H_{03}

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.620[a]	16	.411
Likelihood Ratio	20.988	16	.179
Linear-by-Linear Association	.005	1	.942
N of Valid Cases	60		

From above table we can see that Pearson Chi-Square calculated value 0.411 is greater than 0.05. So the null hypothesis has been accepted.

Reference [Annexure, Crosstabulation3] shows below result:

Agreed + Strongly Agreed = 30

Neutral = 17

Disagreed + Strongly Disagreed = 13

Here all respondents irrespective of having high income or low income represented their views. Among them 29 respondents having positive response so we can say that most of them are agree that telemedicine helps to get export doctors treatment. And these attitudes are not depended on their income.

H_{04}: There is no association between thinking about implementation of Telemedicine in all villages and Education of the respondents.

TABLE V
CHI SQUARE TEST H_{04}

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.070[a]	20	.199
Likelihood Ratio	27.250	20	.128
Linear-by-Linear Association	2.441	1	.118
N of Valid Cases	60		

From TABLE V, we can see that Pearson Chi-Square calculated value 0.199 is greater than 0.05. So the null hypothesis has been accepted.

Reference [Annexure, Crosstabulation4] shows below result:

Agreed + Strongly Agreed = 32

Neutral = 15

Disagreed + Strongly Disagreed = 13

Here all respondents, highly educated or not, represented their views. Among them 32 respondents having positive response so we can say that most of them want to start telemedicine centers at their village. These attitudes are not depended on their education level.

H_{05}: There is no association between Non acceptances of telemedicine and Gender of the respondents.

TABLE VI
CHI SQUARE TEST H_{05}

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.537[a]	4	.638
Likelihood Ratio	2.655	4	.617
Linear-by-Linear Association	.245	1	.621
N of Valid Cases	60		

From above table we can see that Pearson Chi-Square calculated value 0.638 is greater than 0.05. So the null hypothesis has been accepted.

Reference [Annexure, Crosstabulation5] shows below result:

Agreed + Strongly Agreed = 26

Neutral = 14

Disagreed + Strongly Disagreed = 20

Here both, male and female respondents have represented their views. Among them 26 respondents agreed that telemedicine can never take place of face to face consultation. That means people have more trust on face to face doctor meeting to cure their health. But 20 respondents have shown their trust on technology and they believe that telemedicine can used in same manner as physical visit of doctor. These positive and negative attitudes of respondents are not depended on their gender.

IV. LIMITIONS and FURTHER SCOPE

The research is just a small step in understanding the attitudes of rural people for telemedicine with help of small sample size and the areas covered for the study are some villages of Mehsana, Patan and Banaskantha districts of North Gujarat. Therefore the results of this study cannot be generalized. The participants in this study may possess attributes and behavior that may differ from those in other parts of state and also in other states of India.

However, this study provides an opportunity for the researchers or telemedicine provider to use larger sample size and arrive at generalization. It also provides opportunity for the research on the doctors to know their awareness, readiness to give consultation through telemedicine and to identify problem areas.

V. MANAGERIAL IMPLICATION

Some rural people have neutral and some have negative opinion towards telemedicine so active participation of government, Non Government Organizations and information technology related companies can start awareness programs for telemedicine at villages. Telemedicine providers can implement centers at villages where it is possible. By doing so rural people will come to know about benefits of telemedicine and they will accept it and at the end India's rural people will get treatment of world's best expert doctors at affordable cost and at their own places.

VI. CONCLUSION

From total respondents 15.8% respondents do not have any hospital in their village while 34.2% respondents have only small dispensary where adequate facilities for healthcare are not available. From total respondents 57.5% are aware about Telemedicine while 42.5% are not aware about telemedicine. And if we consider the attitudes then it is found that all age groups of people feel comfort and ready to use telemedicine. Most of the people irrespective of availability of hospital at their village, accept that telemedicine can help the patient in critical condition because it reduces the travel time to hospital. Treatment in telemedicine centers is directly provided by expert via telecommunication technology, so most of the people with high or low income, agree that it saves money to get expert doctors treatment as travel cost and high fees of doctors is saved. Irrespective of education level, most of the rural people agree that telemedicine centers should be implemented in every village. But at the same time both male and female respondents also agree that telemedicine never replace face to face consultation.

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Annexure

Crosstabulation1

Age*Q1	Q1. I feel comfortable with treatment through telemedicine.					
Age of the respondents	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Less than 20	1	1	1	4	1	8
21 to 35	5	5	3	10	0	23
36 to 50	3	2	4	5	4	18
Above 50	1	2	3	4	1	11
Total	10	10	11	23	6	60

Crosstabulation2

Availability*Q2	Q2. Telemedicine helps rural people to get healthcare service easily without any delay in critical situation.					
Availability of Hospital	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Not available	0	0	1	1	0	2
Small Dispensary	1	2	8	7	2	20
Government Hospital	2	6	2	10	0	20
Private Hospital	1	2	8	4	3	18
Total	4	10	19	22	5	60

Crosstabulation3

Income*Q3	Q3. Telemedicine saves the cost to get the treatment of expert doctors.					
Income of the respondents (Yearly in INR)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Less than Rs.100000	1	5	11	8	6	31

Rs.100001 to Rs.250000	1	2	3	4	5	15
Rs.250001 to Rs.500000	1	0	2	0	5	8
Above Rs.500000	1	2	1	2	0	6
Total	4	9	17	14	16	60

Crosstabulation4

Education*Q4	Q4. Telemedicine centers should be implemented in all villages.					
Education of the respondents	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Illiterate	3	0	4	2	2	11
SSC	0	2	6	3	3	14
HSC	1	5	1	5	3	15
Graduate or Post Graduate	0	2	3	8	5	18
Other	0	0	1	1	0	2
Total	4	9	15	19	13	60

Crosstabulation5

Gender*Q5	Q5. Tele-medicine can never replace face to face consultation with doctor.					
Gender of the respondents	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Male	5	9	9	9	7	39
Female	4	2	5	4	6	21
Total	9	11	14	13	13	60