



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 2(J), pp. 24485-24489, February, 2018

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Review Article

A REVIEW OF THE RESEARCH LITERATURE ON TELEMEDICINE SERVICES

Gagandeep Kaur*¹ and Dhiraj Sharma²

¹Multani Mal Modi College, Patiala

²School of Business Studies, Punjabi University, Patiala

DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0902.1670>

ARTICLE INFO

Article History:

Received 19th November, 2017
Received in revised form 27th
December, 2017
Accepted 4th January, 2018
Published online 28th February, 2018

Key Words:

Telemedicine, ehealth, online Health services, Information communication technology in healthcare

ABSTRACT

The fusion of information technology and medical science emerged as a Telemedicine technology. Telemedicine provides platform to communicate and exchange data between doctor and patient over the high speed internet. It is useful for providing consultation through videoconferencing to patients residing in remote areas. India among the developing country has taken various initiatives in the field of telemedicine. Various studies have been done on telemedicine services in order to access the knowledge, awareness, effectiveness, acceptability of telemedicine among the patients and doctors, access awareness and knowledge of medical staff. The present study is an attempt to access the efforts made by the researchers in the fields of telemedicine services. Critical literature review has its own important which not only find the gaps but also motive the researchers to keep working on the challenging areas. The present research is an attempt to understand the current situation of the telemedicine in India and acknowledge the research efforts.

Copyright © Gagandeep Kaur and Dhiraj Sharma, 2018, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

The term Telemedicine (TM) has been derived from the Greek word “Tele” which means distance and the Latin word “mederi” which means to heal”. It can be expressed as platform that facilitates communication and exchange of data over the high speed network, where doctor and patient can communicate their information like exchange patient’s medical history, lab reports, X-rays, MRI etc from telemedicine centre to specialty hospital for diagnosis, treatment and expert opinion. It also involves collection of relevant information about patient, storing online for future references, retrieving and transferring of information via Internet from one place to another. The main beneficiaries of such services are the rural people who visit nearby telemedicine centre and to get cost effective and time saving medical treatment.

The US President Bill Clinton inaugurated the first telemedicine centre in India Bill at Apollo Aragonda Hospital in the state of Andhra Pradesh in 2000 (Saroj et al. 2012). Gradually, more and more Telemedicine centres were started in different parts of the country. Presently, there are about 500 TM centers which are connected with nearly 50 specialist hospitals all over the country (Praveen and Syed 2013). The present study is an attempt to critically analyze the efforts made by the researchers in the fields of telemedicine in India.

Objectives

Objective of the study is to explore various research efforts being carried out in field of telemedicine in India.

LITERATURE REVIEW

The research study is based on both primary and secondary data. The respondents were made convinced about the aim of the study and it was also made clear to them that study was purely for academic purposes. The data collection was facilitated preliminary by semi structured interview questionnaire with open ended questions. The secondary data was collected from reports published by the government institutions and departments associated with Telemedicine centres. These reports consists of Government Publications, Census Reports, reports of National Health family surveys, records of Ministry of Health and family welfare, reports on telemedicine and Health services. Various research papers on Telemedicine have been reviewed to understand different concepts regarding Telemedicine activities. Following are the papers reviewed for present study:

Shilekh (2013) conducted a study on the working of telemedicine services provided by Guru Gobind Singh Medical College, Faridkot, India. The study highlighted the loopholes like shortage of doctors, number of incomplete cases and

*Corresponding author: **Gagandeep Kaur**
Multani Mal Modi College, Patiala

pending case. It was concluded that lack of motivation and low educational skills among the patients are the key elements that proved to be main obstacle in the growth of telemedicine services. The primary data for the year 2010-2012 has been collected from the hospital where total 3050 cases had undergone for telemedicine treatment. The percentage of completed cases in 2012 was 57.47%, incomplete cases were 37.93% and of proxy cases it was 4.6 % of total cases received. This data indicate that there is a necessity to improve quality and awareness of telemedicine services among rural people.

Gautham *et al.* (2014) developed the clinical guidance system with the use of mobile technology to enhance the quality of ehealth care. The developed system provides guidance to manage various diseases. The application was tested on 128 patients by 16 service provider in rural area of Tamil Nadu, India. The application was found suitable for both patients as well as for service providers.

Banerjee *et al.* (2015) pointed out the relevance of telemedicine in West Bengal (Siliguri, Bankura) and Tripura (Udaipur) by underlining the constraints like low doctor-patient ratio, illiteracy among rural masses, unqualified staff. The initiatives taken by various government bodies like Directorate of Information Technology (DIT), ISRO, Asia Heart foundation were also analyzed. The study investigated the impact of telemedicine through internet on critical cardiac patients during the process of disease management.

Subhagata *et al.* (2015) suggested a new framework for smooth working of telemedicine services in Manipal, India. To design new framework, a systematic survey exploring the feasibility at individual and organizational levels has been planned. The collected data from questionnaire was mathematically analyzed to examine the satisfaction health services. The results showed that there is lack of ICT support to provide health care services and organizational must adopted proper measures.

Sumninder *et al.* (2015) conducted a survey to examine the awareness level among people of Punjab regarding health insurance. On the basis of 600 respondents it has been observed that there is low level of awareness and willingness among people regarding health insurance. Other key factors responsible for less coverage are paucity of funds, lack of intermediaries, lack of awareness, limited policy options, less coverage and limited viability of services.

Renuka *et al.* (2013) analyzed the current position of Foreign Direct Investment (FDI) in Indian health care sector. Various opportunities and challenges regarding such investment have been identified. It has been suggested that FDI must create necessary infrastructure as well enhance awareness level to provide qualitative health care services. FDI funds can also be utilized to increase the physical capacity and development of specialty and super-specialty centers, up gradation of new technology like ehealth services.

Udita *et al.* (2014) identified critical success factors that influenced the success of ehealth services in India. These critical success factors were data warehousing and mining, decision support system, data access control, biomedical engineering technology, telecommunication infrastructure, government policies, consumer mindset, health care providers mind set, literacy level and health insurance. It has been emphasized that the success of ehealth care depends not only

on technological factors but also on psychology factors. Another study on similar telemedicine based factors has also been conducted for state Uttaranchal, India

Radha *et al.* (2014) conducted a pilot study in rural primary hospitals of India and reviewed the record keeping system. The study focused on the issues related to portability of patient's records. The records of geriatric cohort and maternal cohort of 308 participants were considered for portability during a period of nine month. The information shared among patient through short messaging service (SMS) and USB-based memory card were also supplied with information to 135 randomly selected patients. The study concluded that health data seeking behaviour as another dimension that can motivate people to adopt telemedicine services.

Nishith *et al.*(2014) underlined many positive implications of FDI. In order to expand access to health care services, develop infrastructure, avail diagnostic facilities, upgrading technology and creating employment, huge funds are required.

Shahid and Kolomeyer (2012) analyzed economical position of USA economy and addressed usefulness of telemedicine care system. The telemedicine ophthalmic remote health screenings was performed on community based groups to detect vision-threatening disease. The study concluded that the comprehensive and community-based remote screenings can provide more sensitive detection of vision-threatening disease.

Bhatia *et al.* (2014) concluded that the optimistic sway of Telemedicine services depends upon socio-political factors in addition to the accessibility, acceptance, execution, and implementation of such technologies. The study highlighted three considerable technical components of Telemedicine: Infrastructure, Human resource Readiness and Health care Readiness.

Kapoor *et al.* (2014) discussed the various problems faced while implementing Telemedicine technologies. The study revealed that these problems are not linked with technical problems but are linked with funds, behavior and attitude of doctors, lack of awareness etc. The other type of problem discussed was the availability of doctors at super specialty hospitals in remote areas.

Bhatia (2010) conducted a survey to determine the socio-political variables influencing the popularity of Telemedicine. The study was based on the data collected through questionnaire which was later analyzed and tested by applying statistical tools like reliability, validity and regression. The results of the survey concluded that collective efforts were required from the users, government, technologists, economists, physicians, clinicians, nurses and other service providers to make adoption of Telemedicine a great success.

Wani *et al.* (2013) conducted the research to examine the status, problems, quality of e health services provided in India and also compared Indian health system with other nations. The study was based on secondary data collected from different sources provided by Health care departments of India. The findings of the study revealed that Indian health care services are at infant state as compared to developed nations. There are ample of unexploited resources in India that hinders the growth and quality of e health care services.

Kumar *et al.* (2013) studied the development in telecommunication technology has given birth to modern

telemedicine, which has found its way into improving the health services for the unprivileged masses. Maharashtra has successfully implemented the telemedicine across its districts in two phases. The study concluded that telemedicine is a perfect instance where amalgamation of technology and social cause has resulted in welfare of deprived masses.

Various studies found in the literature which used to access awareness and practices of telemedicine. Some of the studies were covered financial aspect of the telemedicine services. These all studies show growth and acceptability of telemedicine among the people residing in remote and rural areas.

FINDINGS FROM LITERATURE REVIEW

From the survey of literature, various research studies have been found which have been undertaken to provide information about various Telemedicine initiatives taken by state and center government of India. The focus of these studies was informative in nature. Few studies were also found which were aimed to access the knowledge levels of staff involved in telemedicine services. These studies emphasized and recommend periodic research on awareness of patients and motivation of staff towards telemedicine services. It is clear that there are various studies which emphasized that telemedicine services in spite of various efforts from the government has not research up to the mark and are not most popular options for the treatment. There is need to find out the factors that affect the successful implementations of these services.

- Most of the studies were limited to one or two Telemedicine centres of the districts
- The major focus of the studies found in literature were to access the awareness of the patients and staff where as present study aimed to access the knowledge, awareness and effectiveness and to trace out various factors that can contribute toward the success of the telemedicine.
- Most of the research works found in literature with reference to Telemedicine services and eHealth initiatives were limited and sample size considered was small.
- There is hardly any study in Punjab, at state level, that aimed to access the government initiatives to promote telemedicine services.

CONCLUSION

It is revealed from the study that Telemedicine in Punjab is an emerging platform of health care. It provides easy accessible and economical treatment of healthcare for rural people. The main objective of the study is to identify the factors affecting the growth of Telemedicine services in Punjab. The demographic data analysis shows that the people who are availing Telemedicine services are from rural areas. It is observed that less number of cases is referred by physicians for Telemedicine consultation. The statistical analysis of various factors reveals that the Economical and Awareness factors are the dominating factors that are responsible for the growth of the Telemedicine centres.

Table 1 Summary of various research efforts made in the field of Telemedicine in India

Authors	Year	Objectives	Research methodology	Major Findings
1 Shilekh et al.	2013	Growth of telemedicine services	Survey method, frequency distribution	Improve quality and awareness of telemedicine services among rural people
2 Gautham et al.	2014	Development of mobile based application and testing	clinical guidance system with the use of mobile technology	successfully tested on 128 patients by 16 service provider in rural area
3 Banerjee et al.	2015	investigated the impact of telemedicine through internet on critical cardiac patients	principal component analysis	Identify factors having significant impact on disease management.
4 Ravin et al.	2015	awareness about ehealth service	survey method	health workers play crucial role in generating awareness
5 Subhagata et al.	2015	design new framework	Systematic survey ,mathematically analyzed	new framework for smooth working of telemedicine services in Manipal,
6 Sumninder et al	2015	awareness level	Survey sample size 600	Identify key factors responsible for low popularity
7 Renuka et al.	2015	Study current position of Foreign Direct Investment (FDI) in Indian health care sector.	Secondary data analysis	Critical analysis of health care sector in view of FDI
8 Uditia et al.	2014	identified critical success factors that influenced the success of ehealth services in India.	Portability analysis sample size 300	portability of patient's records

The literature review also reveals that factors that may influence the telemedicine services are: lack of awareness, low motivation among the staff, inadequate manpower, inadequate infrastructure, administrative lapses, starving for findings, technical issues. Following table summarized various significant studies.

Considering these factors, there is a need to access the telemedicine services in Punjab and to find out the factors that contribute to it's the success to bring the telemedicine service to the desired level. The following are the major gaps observed in literature review:

It has been observed that due to lack of awareness, inadequate infrastructure and few Telemedicine centres are the main causes of their low popularity and low success rate. The quality of Telemedicine centres services will improve only if maximum cases will be referred and treated through telemedicine centres and hence this will bring lot of awareness among patients in this regard

Reference

1. Annual Report of Ministry of Statistics & Programme Implementation, "Annual Report", from website <http://mospi.nic.in> accessed on dated 20-04-2015.
2. Athavale A. V. and Zodpey, Sanjay P., "On the Public Health Informatics in India: The Potential and the

- Challenges,” *Indian Journal of Public Health*, 54(3), pp131-136, 2010.
3. Bowonder B., Mohit Bansal, A. Sharnitha Giridhar, “A Telemedicine Platform: A Case Study of Apollo Hospitals Telemedicine Project”, from web site www.csi-india.org. accessed by 25-jan.2016.
 4. Banerjee Sudeepa, Tapati Basu(2013), “Impact of Internet on delivery of critical cardiac health care: A Case Study from India”, *The journal of community informatics*, 9(2), pp.831-837.
 5. Bashshur, R., G. Shannon, and H. Sapci. "Telemedicine Evaluation." *Telemedicine Journal and e-Health* 1,no. 3 (2005): 296-316
 6. Gulati S. and Taneja U. (2011), “The ABC of Health Communication: Critical role in the context of Speciality Healthcare in India”, *The Internet Journal of World Health and Societal Politics*. 2011 Volume 7 Number 1.
 7. K.V. Ramani, Dileep Mavalankar. "Health system in India: opportunities and challenges for *International Journal of Engineering Science Invention Research & Development*. Vol. 20(6), pp.560 – 572.2006.
 8. Kapoor L, Mishra SK, Singh K, Telemedicine: experience at SGPGIMS, Lucknow. *J Postgrad Med.*;51(4):312-5.
 9. Kataria G. Babita, Saini AK, Gupta Sangeeta: “Implementation Status of Health Care Information System: A Study of Some of the States of Northern India”. *International Journal of Soft Computing and Engineering (IJSCE)* pp.51-54, 2014.
 10. Kidus Asfaw, Mica Bumpus, Thomas Coen, “Health Service Delivery in Punjab, India”, Woodrow Wilson School of Public and International Affairs, pp.1-48. 2013.
 11. Kumar Arun, and Sartaj Ahmad. "A Review study on utilization of Telemedicine and e-Health services in Public Health." *Asian Pacific Journal of Health Sciences*, 2(1), pp. 60-68 2015.
 12. L. K. Sharma and M. Rajput, “Telemedicine: socio-ethical considerations in the Indian milieu,” *The Medico-legal journal*, vol. 77, no. 2, pp. 61–65, 2009.
 13. Lahiri, K. , “Telemedicine, e-health and health related IT enabled services: the Indian situation”, *Globsyn Management Journal*, Vol. 7 Nos 1/2, p. 1. 2013.
 14. Gautham Meenakshi, M. Sriram Iyengar Craig W. Johnson (2014), “Mobile phone based clinical guidance for rural health providers in India”, *Health Informatics Journal*.
 15. Meenu Singh, Rashmi Ranjan Das. 2010. Utility of telemedicine for children in India. *The Indian Journal of Pediatrics* 77, 73-75.
 16. Ministry of Health & Family Welfare, GoI (2014), “Annual Report”, from web site <http://nrhm.gov.in> accessed on dated 02/06/2015.
 17. Mishra S K, "Outcome of case study (project completed) on Field Telemedicine Application in Indian Setting". 2005, Busan, Korea.
 18. Mishra S.K. Kapoor, L, Singh IP (2009). Telemedicine in India: Current Scenario and the Future. *Telemedicine and e-Health*. 15, 568-75.
 19. Nassir Ul Haq Wani, Kanchan Taneja, Nidhi Adlakha, “Health System in India: Opportunities and Challenges for Enhancements”, *Journal of Business and Management*, 9(2), pp.74-82. 2013.
 20. Nishith Desai, “Investment in Healthcare Sector in India,” report published by Nishith Desai Associates, pp.1-20, 2014.
 21. Praveen Kumar, Syed Sadat Ali, “Telemedicine in Primary Health Care: The Road Ahead”, *International Journal of Preventive Medicine*, 4(3), 373-378. 2013.
 22. Radha Krishna K, Goud BR, Kasthuri A, Waghmare A, Raj T.(2014), “ Electronic health records and information portability: a pilot study in a rural primary healthcare center in India”, *Perspectives in health information Management*, pp1-22.
 23. Anupindi Ravi, “ Healthcare delivery in Rural India – ITC experience”, Annapurna Chavali, ACCESS Health International, Center for Emerging Market Solutions Indian School of Business, Hyderabad, 2012.
 24. Renuka Sagar, P.Lalitha, Praveena, “An Analytical Study Of FDI In Indian Health Care Sector”, *International Journal of Social Science and Interdisciplinary Research*, pp. 29-38. 2013.
 25. S. K. Mishra, L. Kapoor, and I. P. Singh, “Telemedicine in India: current scenario and the future,” *Telemedicine and EHealth*, vol. 15, no. 6, pp. 568-575, 2009.
 26. Saroj Kanta Mishra, Indra Pratap Singh, Repu Daman Chand(2012), “Current Status of Telemedicine Network in India and Future Perspective”, *The Asia-Pacific Advanced Network*, pp.151-163.
 27. Shahid K, Kolomeyer A M. (2012). Ocular telehealth screenings in an urban community, *Telemedicine and e-Health*, vol 18(2), 95–100.
 28. Sharma, A. and Unnikrishnan, M.K. “Healthcare inequity and physician scarcity empowering non-physician healthcare”, *Economic & Political Weekly (EPW)*, Vol. 48 No. 13, pp. 112-117., 2013,
 29. Sharma, Kalpa, “Health IT in Indian Healthcare System: a new initiative,” *Research Journal of Recent Sciences*, 1(6), pp 83-86, 2012.
 30. Shilekh Mittal, “Experience of Telemedicine at Guru Gobind Singh Medical College & Hospital, Faridkot”, from web site <http://nmcn.in/pgimer> dated 25-12-2014. 2013.
 31. Sood SP., and JS. Bhatia, “Development of telemedicine technology in India:”Sanjeevani”-An integrated telemedicine application”, *Journal of Postgraduate Medicine* 51.4(2005): 308, 2006.
 32. Sood S, Mbarika V, Jugoo S, Dookhy R, Doarn CR, Prakash N, Merrell RC. What is telemedicine? A collection of 104 peer-reviewed perspectives and theoretical underpinnings. *Telemed J E Health*, 13: 573-590, 2007.
 33. Subhagata Chattopadhyay, “A Framework for Studying Perceptions of Rural Healthcare Staff and Basic ICT Support for e-Health Use: An Indian Experience”, *Vo.16(1): 80-88, 2010.*
 34. Sumninder Kaur Bawa, Ruchita, " Awareness and Willingness to Pay for Health Insurance: An Empirical Study with Reference to Punjab India", *International Journal of Humanities and Social Science*, Vol. 1 No. 7, pp.100-109, 2011.
 35. Vatsalan D., Arunatileka, S., Chapman, K., Senaviratne, G., Sudahar, S., Wijetileka, D. and Wickramasinghe, Y., “ Mobile technologies for enhancing eHealth

- solutions in developing countries”. Second International Conference on eHealth, *Telemedicine, and Social Medicine*, pp. 84-89. 2010.
36. www.apollohealthstreet.com/atnf_press.htm(Last accessed Nov 2, 2016).
37. www.mit.gov.in/telemedicine/(Last accessed Nov 2, 2016).
38. www.onlinetelemedicine.com(Last accessed Dec 22, 2016).
39. www.sgggitelemedicine.in(Last accessed March 15, 2016).
40. www.televital.com(Last accessed May 9, 2016).

How to cite this article:

Gagandeep Kaur and Dhiraj Sharma.2018, A Review of The Research Literature on Telemedicine Service. *Int J Recent Sci Res.* 9(2), pp. 24485-24489. DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0902.1670>
