Concept, Usability and Reliability of Telemedicine's Application in The Modern Era of Patient Treatment

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Abstract: Telemedicine is a field that has truly spread its branches in the past decade. The concept of Telemedicine might be new for many in recent years but in the technological field, it is a concept that was introduced many years ago. It has only evolved in recent years. Teledentistry is one such branch out of many that have impacted the community in a big way. Teledentistry is a recent and major concept propagated from the field of Telemedicine. Many countries in the world are still unaware of Telemedicine uses. This script would provide an insight into the benefits provided by Telemedicine and in turn, promote Tele-dentistry to treat patients at large. In recent years the scope of telemedicine has spread across various spheres of life. After the pandemic, the need for telemedicine arose especially when people/masses were unable to reach the doctors physically. The challenges faced by the doctors without seeing the minute details of the structure of a small organ of the body like a tooth, only had to rely on the symptoms of the patient. This paper will also assess the current situation and future aspects. This research article includes the upcoming concept of Teledentistry, and it is present as well as future prospects. The primary data was collected by direct survey through the Questionnaire method from the hospitals while Secondary data was collected through various sources. The patient response was positive and more than seventy-five percent (75%) of the patients expressed a genuine need for telemedicine and teledentistry. The patient data showed that Telemedicine and its branch of Teledentistry has huge potential and the study shows that Private sector hospitals can avail maximum benefits at present and soon.

Keywords: information technology • telehealth • tele-consultation • tele-diagnosis • patient treatment.

Introduction

States now face a wide range of challenging medical services issues prompted by changing socioeconomics, a growing burden of chronic illness, rising medical care prices, more informed patients, and swiftly advancing medical service technologies. Medical care frameworks are progressively stressed and are battling with how to extend access and convey top-notch medical care administrations. Telemedicine is the utilization of data-based advancements and interchange frameworks to convey medical services across geographic distances (Gray et al 2000). It utilizes electronic data to impart advancements to give and support medical services when distances separate the patients (Dasgupta and Deb 2008). Telemedicine is essential for a more extensive interaction or chain of care. It can work on this chain and accordingly upgrade the quality and productivity of medical services (Roine et al 2001). Dental consideration is continually changed by the open doors that are given by innovation and telecom. Teledentistry is a blend of broadcast communications and dentistry. Teledentistry is a combination of telecommunications and dentistry involving the exchange of clinical information and images over remote distances for dental consultation and treatment planning (Jampani et al 2011). Technological advancements in the field of dentistry have been broad lately (Aziz and Ziccardi 2009). In this study investigation of patients was done using a sample of 100. The importance of

Teledentistry as a branch of Telemedicine was analyzed.

Methodology

A survey was conducted through the Questionnaire method and a sample of 100 was taken. The study was conducted using Primary and Secondary methods. The concept, usability and reliability test regarding Telemedicine were conducted. Teleconsultation through teledentistry can take place in either of the following ways- "Real-Time Consultation" and "Store-and Forward Method" (Reddy 2011). Real-Time Consultation involves a video conference in which dental professionals and their patients, at different locations, may see, hear, and communicate with one another (Bhambal et al 2010). Store-and-Forward Method involves the exchange of clinical information and static images collected and stored by the dental practitioner, who forwards them for consultation and treatment planning (Chang et al 2003). The patient is not present during the "consultation" (Golder et al. 2000). Dentists can share patient information, radiographs, graphical representations of periodontal and hard tissues, therapies applied lab results, tests, remarks, photographs, and other information transportable through multiple providers. This data sharing can be of extreme importance for patients, especially those in need of specialist consultation (Mihailovic et al 2011). A third method has also been described, known as the "Remote Monitoring Method", in which patients are monitored at a distance and can either be hospital-based or home-based. (Weerasinghe 2010)

Results and Discussion

In a survey conducted to see the usability and response of Telehealth services like Teledentistry, the responses received were quite positive and encouraging, which shows the potential scope of Telehealth services among the masses. A pilot study graph sample has been drawn below through a bar graph showing the responses of the people to a set of questions based on a particular scale (Figure 1,2,3,4). A total sample of 400 patients was taken for further studies. The result clearly depicts the investigation conducted on the concept, usability, and reliability of Telemedicine (Teledentistry) in Private-sector hospitals.

The data mentioned here after investigation depicts that on average more than 75 % of patients are happy to use and avail the services of teledentistry (Table 1, Figure 5). Table 1, 2, 3, and 4 reflect the usability, reliability, and importance in healthcare services to provide reliable interface quality. More than 80% of average patients are satisfied with the Teledentistry field of Telemedicine. More than 80% of people find this technological system to have good reliability. It also shows that the existing dental services has a wide scope of expansion. Teledentistry adds a new dimension not only for Telemedicine but also for the dental field. The fields like Orthodontics, Periodontics, Prosthodontics, Pediatric and Preventive dentistry and Endodontics can be utilized for a new level of treatment and reach remote areas if this field of Teledentistry is mingled and used by these streams of the dental area. In continents like Asia and Africa where there is a huge difference between Rural and Urban area infrastructure, this specialized field of Telemedicine can have a huge impact on the population and work as a bridge to remove geographical barriers.

This will result in improved patient treatment, and accessibility to all population areas irrespective of distance. The modern satellite system can be used for better outreach to individuals living in hilly regions or deserted areas. Those patients having multiple complications or are crippled and unable to make it physically are benefited greatly through the imbibitions of telehealth in dentistry along with other healthcare needs.
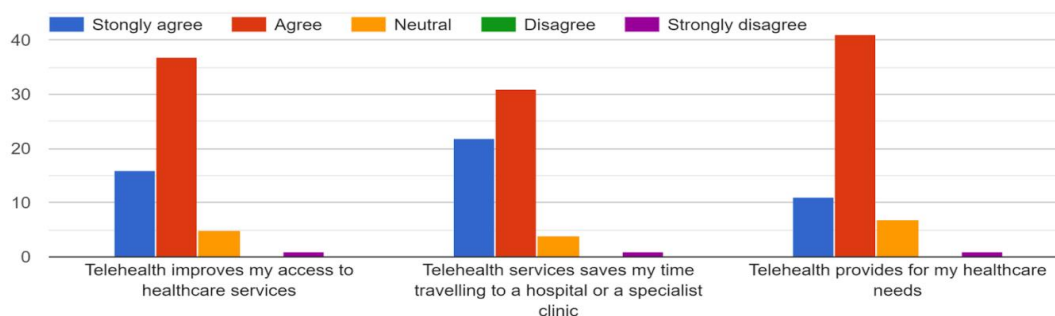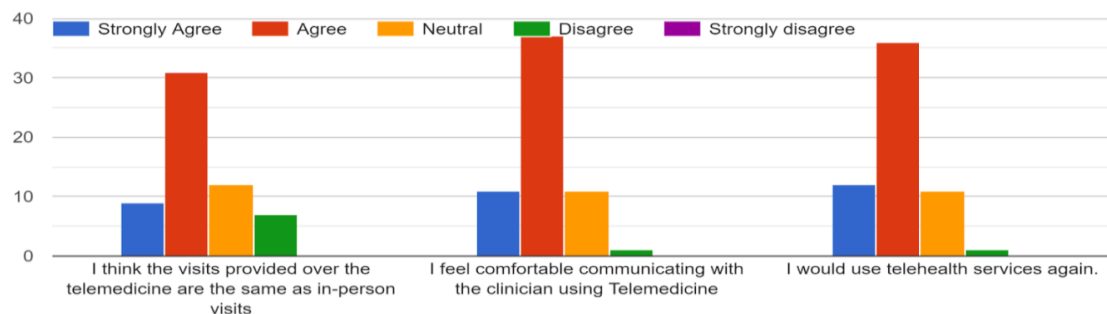
Figure 1. Telemedicine rate on a scale of 1-5 as strongly agree-1, agree-2, neutral-3, disagree-4, strongly disagree-5.
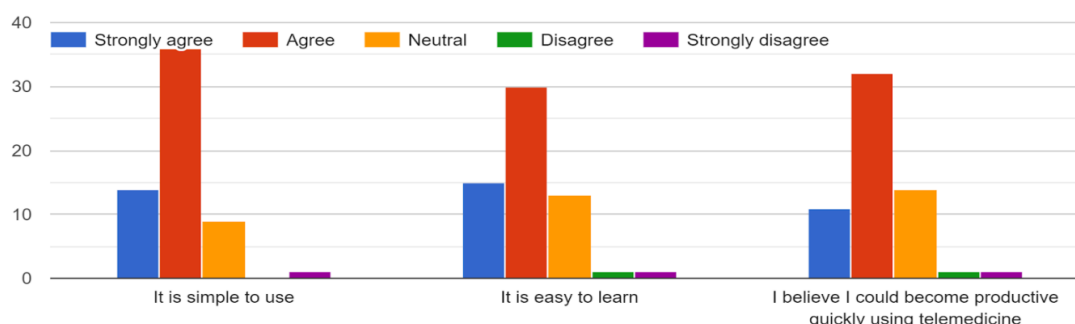
Figure 2.: Easy to use and learnability of telemedicine on a scale of 1-5 as strongly agree-1, Agree-2, neutral-3, disagree-4, strongly disagree-5.
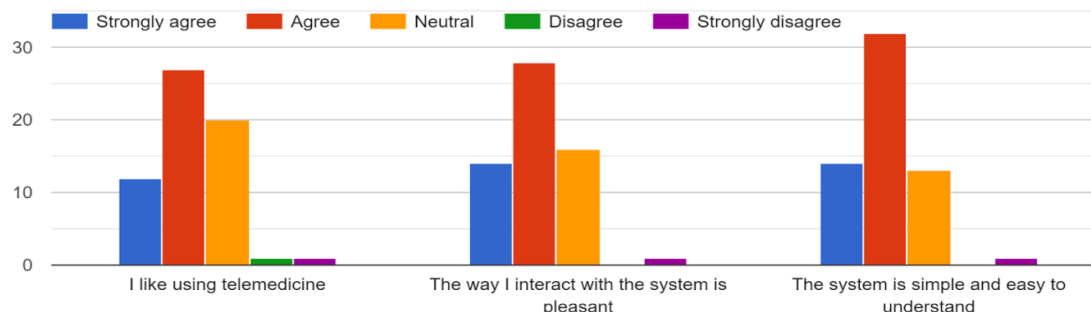
Figure 3. Interface quality of telemedicine on a scale of 1-5 as strongly agree-1, Agree-2, neutral-3, disagree-4, strongly disagree-5.


Figure 4. Reliability and satisfaction of telemedicine on a scale of 1-5 as strongly agree-1, Agree-2, neutral-3, disagree-4, strongly disagree-5.

Table 1. The data expressing the usability of telemedicine

Category	Percentage	Code(symbolic)
Time-saving	76	1
Knew Teledentistry	35	2
Provides healthcare needs	80	3
Privacy respected while using Teledentistry	90	4
Cost-effective	88	5
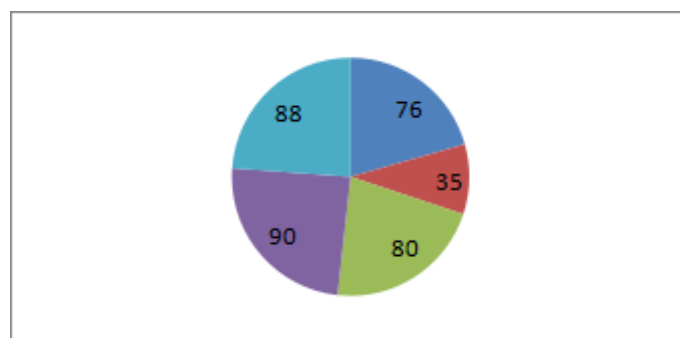
Figure 5. Percentage depiction of usability of telemedicine

Table 2. The data expressing the ease of use and learnability through telemedicine

Category	Percentage	Code(symbolic)
It was easy to learn	75	1
Productivity using Teledentistry	80	2
Open to receive appointment reminders on cellphone	80	3
Ease of use	90	4

Table 3. The data expressing the interface quality through telemedicine

Category	Percentage	Code(symbolic)
Simple and easy to understand	85	1
System's overall ability	90	2
Open to receive health information	85	3
No Technical difficulty	75 (Yes)	4
Confidentiality was taken care off	80 (Yes)	5

Table 4. The data expressing the reliability/satisfaction through telemedicine

Category	Percentage	Code(symbolic)
Online attention is same as in-person visit	80 (Yes)	1
Comfortability	85	2
Reuse Teledentistry	75	3
Reliability	80	4
Satisfaction	90	5

Even though the benefits offered through this technique of treating patients are enormous but there are a few drawbacks or shortcomings as well. People in rural areas are mostly uneducated and therefore need to be taught about this approach of treatment through personal/group training sessions, camps, and live demos (Santen et al., 2023). Many people in remote village areas are unable to afford an Android mobile phone leave alone the latest technology. The cost of setting up infrastructural facilities and mobile towers is

vast considering the initial setup. In some developed countries the concept of telemedicine and teledentistry can be and should be promoted and developed fast. This will result in the global evolution of teledentistry. The doctors especially the dentists must come forward to endorse and bring awareness among the patients regarding the use of teledentistry (Montiel-Nava et al., 2022; Pramudita et al., 2023). Schools and Colleges can contribute majorly by introducing lessons related to teledentistry and telemedicine.

Conclusion

Patient satisfaction is a must in health care services. Therefore, with the present fast-growing world and modern healthcare facilities at a global level, Tele-dentistry can benefit a lot for individuals and can penetrate even unreached areas of the world with the progress of time. The graphs obtained as per the surveys taken based on the Questionnaire bring us to the conclusion that more than 80% of the people who responded were keen to re-use or re-avail the Telehealth services. Almost the same percentage agreed that Telehealth services saved them a lot of time. More than 70% agreed that Telehealth or Telemedicine is easy to use. Moreover, the interaction and the interface quality were good. The topmost factor which is the reliability and the level of satisfaction also got maximum positive responses for Telemedicine services by the patients.

Thus, from the above study, it can be concluded that Teledentistry (Telemedicine) has the scope to include many more facilities to its modern technology soon. Also, it has the approval of the people and the patients amidst growing popularity and awareness among the common masses. As cell phones have become a household possession in the past couple of decades, Tele-dentistry being a part of Telemedicine is bound to become a common usable tool for the treatment of patients in the

coming years. With the advent of satellite systems and space missions, it will soon be covering the entire earth making the treatment accessible to people across the globe. With the addition and evolution of Artificial intelligence, it is really mind-boggling to think about the enormous potential that the world of Telemedicine including Teledentistry would carry and unleash itself very soon, sooner than we think and anticipate.

The amalgamation of AI can enhance the utility of teledentistry to help and treat patients.

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