JOURNAL OF COMPLEMENTARY MEDICINE RESEARCH
Journal of Complementary Medicine Research, ISSN: 2146-8397 Vol. 13, No. 3, 2022 (pp. 46-49)
RESEARCH ARTICLE
WWW.JOCMR.COM

Current State and Prospects of Telemedicine Development

[1*]Anara T. Suleymanova, [2]Sofya P. Bataeva,[3]Aglaya B. Kazumova,[4]Daria V. Shtyrts,[5]Yuri N. Dorofeev

[1]Federal State Budgetary Educational Institution of Higher Education Astrakhan State Medical University of the Ministry of Healthcare of the Russion Federation,414000 , Astrakhan . Bakinskaya str.121

[2]Pavlov First Saint Petersburg State Medical University. L'va Tolstogo street 6-8 Saint Petersburg, Russia 197022

[3]Federal State Autonomous Educational Institution of Higher Education I.M. Sechenov First Moscow State Medical University of the Ministry of Health of the Russian Federation (Sechenov University),8-2 Trubetskaya str.Moscow, Russian Federation 119991

[4]Federal state budgetary educational institution of higher education Kemerovo State Medical University,Russia, Kemerovo , Voroshilov street 22A650056

[5]Tyumen State Medical University, Tyumen, Russia

ABSTRACT

The article examines the current state and prospects of telemedicine development. Telemedicine allows remote clinical services to be provided through real-time two-way communication between a patient and a healthcare provider using electronic audio and visual means. In primary health care, telemedicine is usually carried out in the form of telephone calls, when a patient goes to a doctor for advice on non-emergency medical problems that do not require a doctor to visit the patient. Telemedicine does not replace face-to-face consultation, when necessary, but complements it.

The real role of telemedicine currently lies in the convenience it offers to patients and practitioners, eliminating the need for a direct visit to receive medical advice or treatment. It is also cost-effective compared to the process of waiting for an appointment with a doctor or other healthcare provider.

The purpose of the work is to consider the features of the organization of the provision of telemedicine services, as well as the directions of its application in medical practice.

Corresponding Author: anatyt77tgr@ya.ru

How to cite this article: Suleymanova AT, Bataeva SP, Kazumova AB, Shtyrts DV,Dorofeev YN. Current State and Prospects of Telemedicine Development. Journal of Complementary Medicine Research, Vol. 13, No. 3, 2022 (pp. 46-49).

INTRODUCTION

Telemedicine involves the use of telephone or any other form of digital communication for remote clinical services. This allows the use of telecommunication technologies for the assessment, diagnosis and treatment of patients at a distance. Telemedicine is not a new technology; it aroused the interest of specialists in the last century.

Using video communication and remote monitoring in medicine dates back to the late 1950s. The roots of video telecommunications are connected with the development of space technologies and human spaceflight.[1]

In modern conditions, telemedicine is very widely used due to the fact, that for the last two years there has been an urgent need to provide remote medical services and consultations due to distancing in the context of the development of coronavirus infection. Today telemedicine is also widely used in medical practice, as it expands the boundaries of medical cooperation, reduces transportation costs and time for obtaining consultations and the necessary visual data, etc.[2]

The purpose of the work is to consider the features of the provision of telemedicine services, as well as the directions of its application in medical practice.

Materials and methods of research. The paper analyzes the features of the organization of biomedical services reflected in modern literature, as well as the areas of its application illustrated by specialists from various medical fields. Comparative and analytical methods were used to analyze the literary material.

Results. Even before the COVID-19 pandemic, telemedicine applications and its various forms (for example, teleconsultations and telemedicine education) were used in various fields of healthcare and

KEYWORDS:
Consultations, Communication, Remote assistance, Remote diagnostics Telemedicine.

ARTICLE HISTORY:
Received : Feb 12, 2022
Accepted: mar 09, 2022
Published: jun 03, 2022

DOI:
10.5455/jcmr.2022.13.03.09

have been steadily growing since the 1900s. These applications were used intentionally to increase equity of access to medical care, improve the quality of medical care and integrate alternative means of effective medical care.

Teleconsultations for diagnostic purposes or therapeutic interventions have been studied in several specialties, especially between general practitioners and specialists, for a better understanding of the patient's health status or better decision-making.[3] For example, this has been the case in cardiology for consultations on diagnostic services such as electrocardiography, or in psychiatry to support primary psychiatric care teams with complex patients. This method was also used to establish telecommunication links with developing countries, for example, in Bangladesh, where local doctors could get help from colleagues from abroad using digital images and an e-mail system to improve medical care.[4] Thus, as telemedicine develops, it gradually transcends medical fields and borders around the world.

In addition to the widespread use of telemedicine in health education and diagnostics, it can also be used for therapeutic interventions and to avoid wasting resources on unnecessary patient transportation.

Telemedicine allows you to optimize communication between a doctor and a patient. In the treatment of chronic diseases, visits to the polyclinic are traditionally planned by a doctor and often depend on his employment. If symptoms appear, patients can make an appointment, which will be scheduled depending on the urgency of the examination and the availability of a doctor. This usually happens within a few days or weeks, during which there is usually no medical care, and patients are left to themselves. The consequence of this is the appeal of such patients to emergency care, and the treatment of such patients in the future will be more expensive than it could be at the initial stage of diagnosis and treatment.

Since telemedicine services may not depend on the location of both the doctor and the patient, a global network of doctors could facilitate the availability of on-demand medical care for 24 hours a day. In non-acute situations, telemedicine has the advantage of providing asynchronous medical care, which can be provided by the patient's own medical specialist.[5].

Communication between doctors through telemedicine also eliminates geographical barriers to interaction. Real-time consultations can be conducted via videoconference, and similarly peer training can be conducted via videoconference. In addition, with the use of online education technologies, asynchronous learning using online platforms is becoming more accessible.

Telemedicine also makes it possible to optimize the diagnosis of the patient's health status. The smartphone camera can be used for diagnostic purposes, ranging from using photographs for remote assessment of dermatological lesions to using the camera to interpret laboratory tests.

Self-testing can be used either for self-control, or even for self-help in the case of a chronic illness. The patient is trained to use the device at the place of medical care to test a certain marker. Under self-monitoring conditions, this information is transmitted to a medical professional who interprets the test results and adjusts the treatment plan accordingly. In a self-help setting, the patient interprets the results and adjusts the treatment plan accordingly without the intervention of a practitioner.

Many companies have already developed devices for weight control, electrocardiogram (ECG), blood pressure, blood glucose levels or monitoring symptoms of diseases. Such devices can transmit these results to the practitioner for further treatment. These devices facilitate care, but still require the active participation of the patient. Ideally, monitoring should switch from active to passive, in which the patient is tracked automatically, which can increase the consistency and reliability of his health data.[6]

Implants offer another possibility. For example, for cardiac patients with pacemakers and implantable cardioverter-defibrillator, several companies already offer options for home health monitoring.[7]

It is also important to educate patients in the field of assessing their health using telemedicine methods. As more and more information has become available on the Internet, patients have much more opportunities to get more detailed information about their disease.[8]

The success of the treatment of chronic diseases largely depends on the behavior of the patient with the disease. Therefore, behavioral interventions are considered to be of great importance in the treatment of chronic diseases. However, social, institutional and cultural conditions are of great importance for the adaptation of changes in behavior.

Education is more effective when it is presented in a personalized, contextual and interactive form, rather than as a unidirectional message. It is believed that artificial intelligence (AI) methods increase the effectiveness of communication in the field of healthcare and improve patient engagement and participation. This includes providing timely, relevant, effective and patient-specific information.

Dynamic information can be displayed depending on the specific interests of patients. It is also believed that adding gamification elements to online education has a beneficial effect. Gamification includes the use of trophies, leaderboards, points and levels, tasks and cycles of social interaction. In a recent study in rheumatoid arthritis, it was shown that patients who had access to educational content with gamification functions spent more time on the website than patients with access to educational content without gamification. Physical activity also increased in these patients.

The inclusion of all components of artificial intelligence, personalization and gamification in educational materials will contribute to the creation of a more effective patient-centered learning environment. Empowering patients and knowledge about diseases is likely to lead to improved disease behavior and increased commitment to receiving professional medical care, which in turn will lead to improved disease control and improved quality of life for patients. This is a truly organic approach to the treatment of chronic diseases.

Telemedicine capabilities also find application in various areas of medical knowledge. In particular, vascular surgery specialists

studied the use of telemedicine before the COVID-19 pandemic, although widespread adoption was not observed until 2020.[9]

The COVID-19 pandemic has put an unprecedented strain on health systems and has caused stress to health workers. Local, county and state governments in the United States, as well as international government mandates, have implemented policies requiring the general public to stay at home, except for essential activities during the first waves of the pandemic; this has affected not only patients, but in many cases the well-being of health workers and support staff.

Many healthcare systems and clinics have transformed outpatient clinic visits into virtual visits. Experts demonstrated that virtual telemedicine communications in vascular surgery were effective for providing remote medical care with high patient satisfaction during COVID-19, offering support to vulnerable patients without the need for travel and personal consultations in the hospital; at the same time, it was possible to avoid COVID-19 transmission and the risk of infection.

In addition, the use of virtual visits in vascular surgery allowed us to maintain contact with our patients during isolation, separating those who can be monitored from those who may need personal visits, additional diagnostic tests or quick interventions. The ability to stay in touch with a vascular specialist during a crisis should not be underestimated, as this ensures continuity of care and provides confidence and intervention when needed.

The use of telemedicine in aortopathies is absent in the modern literature. Telemedicine is an ideal complement to the clinical treatment of aortopathies, since these patients require visualization of their aorta, and they rarely make important clinical decisions based on a physical examination that must be performed in person. It is imperative that the international community of aorta specialists work together to reach consensus on how best to prioritize appropriate comprehensive care for patients with aortopathy and preserve the health system's ability to cope with the crisis caused by COVID-19.[10]

The researchers published their experience of using a regional service model for teleconsultations in complex thoracoabdominal diseases. The authors noted an increase in the frequency of surgical planning using this model; surgeons attached great importance to these teleconsultations and believed that this approach contributes to medical education through knowledge sharing. Patients also reported greater satisfaction due to the numerous surgical findings offered without increasing costs to themselves.[11-13] However, there were also potential pitfalls, which included the cost of teleconsultations (for example, communication devices, file sharing and hosting software), as well as the potential compromise of protected medical information.

DISCUSSION

The COVID-19 pandemic has led to a number of social restrictions that came into effect in early 2020, ushering in a new era in the use of telemedicine. It has become a very popular tool for providing patients with high-quality medical care instead of personal visits, while protecting health workers and vulnerable populations from an increased risk of transmission and infection of COVID-19. Previously complicated by regulatory and reimbursement barriers, the onset of the COVID-19 pandemic has intensified policy changes by increasing telemedicine throughput as the U.S. government temporarily relaxed licensing, location, and reimbursement rules.

The benefits of wider use of telemedicine are numerous. Patients can make an appointment without leaving home and according to their schedule, avoiding the costs associated with the absence of a significant part of work, travel time, transport, and potential babysitters for children or elderly people in their care, accommodation, food, etc. In the context of the pandemic, these allowed patients, health care providers and hospital/clinic staff receive an additional level of protection from COVID-19 infection. He eliminated geographical coverage restrictions that could have existed earlier, thereby opening up many new centers and service providers for patients.[14]

One study showed benefits from the point of view of doctors, including an increase in the time spent with patients for counseling and an increase in the number of contacts with patients in their home settings. Satisfaction with these visits may vary, but however, individual studies indicate that both patients and surgeons did not notice a difference in satisfaction between personal visits and visits to orthopedic care using telemedicine; other authors note that no differences were found in the satisfaction rates of patients with low visual acuity for treatment in the emergency department.

Several studies have shown that the degree of patient satisfaction with telemedicine in areas such as psychiatry, spinal surgery, allergology, and immunology and rehabilitation therapy is > 80%, which, however, does not indicate that telemedicine is preferable to personal visits.

Studies have also shown that telemedicine reduces significant barriers to getting help, such as geographical constraints (e.g. travel, including interstate travel and service providers outside of their coverage area/state), economic issues, and time-related issues. The findings of the study included proposals to make an exception for access to telemedicine in the case of rare diseases, regardless of whether full coverage continues after the end of the pandemic, and to use hybrid-visiting models depending on the circumstances/needs of the patient.[15]

Despite the benefits of telemedicine, including improved patient care and sustainable patient relationships during the pandemic, some groups have not been able to take advantage of these benefits. Many studies have shown that people who had limited access to the Internet, had low digital literacy skills to navigate telemedicine communication platforms, were elderly or had hearing impairments, considered telemedicine a problem and preferred personal visits.

Many of these limitations remained a problem during the pandemic, when telemedicine appointments could be the best way to get medical care, especially for the elderly population, who were already vulnerable to the effects of the virus.

During most telemedicine consultations, physical examinations are significantly reduced or absent, which limits the collection of clinical information for the proper quality of treatment. This problem persisted during the pandemic, as the nature of telemedicine remained unchanged. In the past, many doctors

considered physical examination to be an important part of any patient visit, which could lead to a better understanding of the patient's problems or help in diagnosis and treatment.

Physical examinations are also a means of strengthening the relationship between the patient and the doctor. Physical touch is a powerful tool of nonverbal communication for the embodiment of empathy to strengthen the relationship between the patient and the doctor, which, as noted by doctors, hinders doctors when using telemedicine.[16]

Digital literacy of mainly elderly and vulnerable groups of the population is at a low level, which also reduces the effectiveness of the use of advances in telemedicine

CONCLUSION

Successful implementation of telemedicine technologies with long-term sustainability can be initially focused on human-centered design. The increased use of telemedicine worldwide caused by the COVID-19 pandemic has led to significant changes in the access and provision of patient care services, surgical practice and workflow. In the future, these technologies will only be improved, but specialists need to take into account that the widespread use of telemedicine cannot always give positive results, for this reason, it is necessary to carefully study the possible negative aspects of the application of the technology in question, based on theoretical and practical data reflected in the literature.

AUTHOR CONTRIBUTIONS

All authors contributed in reviewing the final version of this paper.

REFERENCES

1. Laksanasopin T, Guo TW, Nayak S, Sridhara AA, Xie S, Olowookere OO, et al. A smartphone dongle for diagnosis of infectious diseases at the point of care. Sci Transl Med. 2015;7(273)
2. Reinhard C, Weber J, Niederberger C, Perretta F. P452. Usability study of a smartphonebased patient monitoring system measuring Calprotectin for therapy follow-up. J Crohns Colitis. 2015;9 (Suppl 1): S306.
3. Weber J, Ueberschlag M-E, Prica M, Kräuchi S, Reinhard C, Jermann T. P273. Validation of a smartphone-based patient monitoring system measuring Calprotectin as the therapy followup marker. J Crohns Colitis. 2015;:S212–223.
4. Falvey JD, Hoskin T, Meijer B, Ashcroft A, Walmsley R, Day AS, et al. Disease activity assessment in IBD: clinical indices and biomarkers fail to predict endoscopic remission. Inflamm Bowel Dis. 2015;21(4):824–831
5. N.M. Mohr, K.K. Harland, E.A. Chrischilles, A. Bell, D.M. Shane, M .M. Ward, R.T. Griffey Emergency Department Telemedicine Is Used for More Severely Injured Rural Trauma Patients, but Does Not Decrease Transfer: A Cohort Study Acad. Emerg. Med., 24 (2) (2017), pp. 177-185
6. N. Natafgi, N.M. Mohr, A. Wittrock, A. Bell, M.M. Ward The Association Between Telemedicine and Emergency Department (ED) Disposition: A Stepped Wedge Design of an ED-Based Telemedicine Program in Critical Access Hospitals J Rural Health., 36 (3) (2020), pp. 360-370.
7. Nenasheva, E. V., Larina, A. O., Achmad, H., Timokhina, T., & Markov, A. Bioelectronic Implants and Their Role in Modern Medicine. Journal of Pharmaceutical Research International. 2020; 32(33), 23-31.
8. Malyutin, V. G., Sevagina, V. O., Kokotov, V. A., Goncharov, V. V., Markov, A., & Shalneva, K. N. Improvement of Biomedical Structural Polymers by Synthetic Biology Methods. Journal of Pharmaceutical Research International. 2021; 33(17), 31-38.
9. H. Hsu, P.W. Greenwald, S. Clark, K. Gogia, M.R. Laghezza. Hafeez, R. Sharma Telemedicine Evaluations for Low-Acuity Patients Presenting to the Emergency Department: Implications for Safety and Patient Satisfaction Telemed E-Health., 26 (8) (2020), pp. 1010-1015
10. S. Vilendrer, B. Patel, W. Chadwick, M. Hwa, S. Asch, N. Pageler, R. Ramdeo, E.A. Saliba-Gustafsson, P. Strong, C. Sharp Rapid Deployment of Inpatient Telemedicine In Response to COVID-19 Across Three Health Systems J. Am. Med. Inform. Assoc., 27 (7) (2020), pp. 1102-1109
11. Markov A, Soloviev G, Petrov I, Khamchiyev K, Shandaulov A, Ibrayeva S, et al. Scientific Approaches to the Creation of Biocompatible Implant Materials. JBBBE 2021;53:11–9. https://doi.org/10.4028/www.scientific.net/jbbbe.53.11.
12. Markov A. Results of the Experimental Research and Clinical Application of Cannulated Screw with Bioactive Coverage on the Basis of Natural Hydroxiapatite during Osteosynthesis of Medial Fractures of Femur's Neck. JBBBE 2020; 46:52–9.
13. Markov A, Ponomarev A, Zavatskij M, Stepanova K, Krylov S, Naumov M. Preservation of Bone Tissue Quality during the Usage of Synthetic Bioactive Calcium Phosphate Mineral Coating for Prevention of Metallic Construction Migration. JBBBE 2020; 46:67–74.
14. S. Chhabra, D. Eagles, E.S.H. Kwok, J.J. Perry Interventions to reduce emergency department door-to- electrocardiogram times: A systematic review CJEM., 21 (5) (2019), pp. 607-617
15. K.A. Wittbold, J.J. Baugh, B.J. Yun, A.S. Raja, B.A. White iPad deployment for virtual evaluation in the emergency department during the COVID-19 pandemic Am. J. Emerg. Med., 38 (12) (2020), pp. 2733-2734
16. J.F. Hemingway, N. Singh, B.W. Starnes Emerging practice patterns in vascular surgery during the COVID-19 pandemic J. Vasc. Surg., 72 (2) (2020), pp. 396-402