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Reflections on Telemedicine with an Emphasis on Ethical Aspects: A Review

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Abstract

Telemedicine refers to a kind of treatment in which all medical interventions, diagnoses, treatment decisions, and recommendations are made using the patient's data, documents, and other information transmitted through telecommunication systems. Telemedicine might run between one patient and one physician or one patient and several physicians, including other healthcare specialists. Telemedicine and E-Health have brought about great advantages to the current healthcare systems. Healthcare services are provided comprehensively through these innovative technologies. However, there are plenty of legal, ethical, security, and confidentiality concerns regarding a patient's medical information. These concerns cause a series of complications for the patient, the medical team, and healthcare service providing systems, among which the disclosure of medical records can be mentioned, which might result in all types of discriminations, accusations, and violation of the patient's basic rights. The present study reviews some ethical issues in the field of telemedicine.

Key Words: Benefits, Telemedicine, Ethics, Review.

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1- INTRODUCTION

Telemedicine refers to the application of information and communication technologies (ICT) for the provision of healthcare services and patient support in cases where there is the geographical distance between the healthcare service receivers and providers. Although there is not a universal agreement on the definition of telemedicine and its distinction from E-Health, most experts consider it to be a subset of E-Health (1-3). According to World Health Organization (WHO), telemedicine is defined as, "The provision of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for the diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and for continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities" (4, 5).

Telemedicine is the use of telecommunication and information technologies to provide clinical health care at a distance. These technologies allow communications between patient and medical staff using both convenience and the transmission of medical, imaging, and health informatics data from one site to another. It is also used to save lives in critical care and emergencies. Telemedicine and E-Health have brought about great advantages to the current healthcare systems. Healthcare services are provided comprehensively through these innovative technologies. However, there are numerous legal, ethical, security, and confidentiality concerns regarding a patient's medical information. These concerns cause a series of complications for the patient, the medical team, and healthcare service providing systems, among which the disclosure of medical records can be mentioned, which might result in all types of discriminations, accusations, and violation of the patient's basic rights (5-9). The present study aimed to review some ethical issues in the field of telemedicine.

2- MATERIALS AND METHODS

The present study aimed to review Telemedicine benefits, studies, and challenges with an emphasis on ethical aspects. The search was carried out according to the keywords Telemedicine, Benefits, Advantages, Disadvantages, Challenge, or Ethics. Similar keywords were extracted from MeSH. Moreover, a manual search was carried out by reviewing the titles and the abstracts of the articles. After the determination of keywords, two separate researchers searched the electronic databases Scopus, Web of Science, EMBASE, and Medline via PubMed with no language or time restrictions until April 2020. The references of other articles were reviewed by manual searching to access extra refferences. Moreover, the Google and Google Scholar search engines were also reviewed for more assurance.

3- RESULTS

3-1. Telemedicine objectives briefly include:

- Better care for the patient.
- Improving accessibility and medical care for rural and disadvantaged areas.
- Improving access to physicians for consultation.
- Providing physicians with facilities to perform automatic examinations.
- Reducing the costs of medical care.
- Providing medical care services (in a wide demographic and geographical range).
- Reducing the costs of transferring patients to medical centers.

- Providing a supervised healthcare space in hospitals and medical centers (2, 3, 5).

3-2. Telemedicine can be studied in three different aspects:

3-2-1. Decision-making aid

The simplest advantages of telemedicine are enabling specialists to use the databases of medical centers to make the right decisions, which is the first application of telemedicine. This function provides the physicians with research results and different treatment approaches using the search engines.

3-2-2. Sensation transfer

Sensation transfer refers to the transfer of the patient's information from one medical center to another. Information such as the vital signals –specifically digital radiology images and even the patient's appearance- can be sent through telemedicine systems.

3-2-3. Real-time cooperation for patient management

The most significant and innovative application of telemedicine is sending patient's videos, which helps various physicians manage the medical procedures of treatment such as operation or long-term procedures. In addition to videos of the patient's appearances, information on various devices such as ophthalmoscope, otoscope, and dermatoscope can also be sent (3, 10, 11).

3-3. The levels of telemedicine systems include:

3-3-1. Telemedicine for emergency care systems

In this level of services, the emergency patients first go through initial evaluations by the experienced physicians in the medical centers. Afterward, the patient's vital signals (such as heartbeat, lung sounds, and electrocardiogram [ECG]) are immediately sent to the physicians through video and audio communication in case there is a need for further consultation (12).

3-3-2. Telemedicine for primary healthcare systems

A wide variety of patients suffering from level 1 medical complications ranging from cold to blood pressure issues are visited simultaneously by a physician far from the medical centers. By observing and talking to the patient, the doctor simultaneously receives the patient's vital signs and conditions and provides the medical assistant with the required consultation for treatment after diagnosis. Many activities regarding basic healthcare services and training can be considered at this level (6, 13-15).

3-3-3. Telemedicine for consulting systems

Some patients who have been visited by the physician using telemedicine at the first level of healthcare services require specialized medical services. This system can maintain a three-dimensional relationship between the specialized physician(s) in a specialized medical center, the physician, and the patients being treated at medical assistance centers. In this method, the specialized physician has direct communication with both the patient and the physician using video and audio transmission technologies and the respective medical devices, while receiving the vital signs and other required information for the diagnosis and provide the physician with the required consultations for treating the patient. This system can be employed to provide a great population scattered in various geographical areas with their required medical services by using the specialized physicians of a remote medical center. The system can be used to reduce the dispatch of patients from different counties to specialized medical centers and, hence,

help patients save a huge amount of money and time (11, 16-19).

3-3-4. Tele education

Various training courses can be available to medical assistants or the general population. Various medical centers can provide these courses through video and audio communication facilities connecting medical assistance centers, telemedicine system physicians, and training centers (3, 13, 20, 21, 22).

3-4. Advantages of Telemedicine

3-4-1. No charges for transportation

It is possible to save your cash on public transport and parking by visiting your physician on your computer or mobile gadget. No wasting of time in a traffic jam in the most important advantage, which can make you late for the appointment with the physician.

3-4-2. No need to sacrifice your job

Visiting your medical practitioner on your computer or mobile gadget assists you in performing your job from comfort and will also guarantee your privacy. It will be possible to follow your physician's follow-up instructions while maintaining your health without the need of sacrificing your job or even wasting your valuable time.

3-4-3. Get rid of elder or child care issues

Many individuals are required to care for their children as well as elderlies. It can be quite expensive and also difficult to find alternative care so that you can visit the physician. Luckily, this particular issue has been solved by telemedicine, which enables you to visit your physician while upholding your household obligations.

3-4-4. On-demand choices

Telemedicine is being offered by an increasing number of practices by the physicians, and therefore, it is feasible to visit your medical practitioner through video. In case it is not possible to do so, you will come across several online on-demand options. Although they might not be able to treat every disorder, they can guarantee you of tackling an array of conditions.

3-4-5. Access to experts

While visiting specialists, one has to travel long distances and invest a significant amount of time. However, telemedicine has made it possible for your primary care physician to leverage the proficiency of professionals who do not stay nearby. You would like assistance from competent experts, not the closest when it comes to health problems.

3-4-6. Less possibility of getting affected by a new disease

We all know that the maximum number of patients will be found at the physician's office. Although everyone makes a genuine effort to prevent any other person from getting affected by his or her disease, it is always not possible. Fortunately, you can avoid this problem by staying at your residence and taking the help of your physician via video.

3-4-7. Better health

The capability to visit your physician frequently virtually will allow you to take care of your lifestyle and also manage any chronic conditions (3, 6, 16, 23-26).

3-5. Disadvantages of Telemedicine

3-5-1. Requires additional training

It is expected that the health facilities providing telemedicine options must spend additional time as well as money for training the experts to enrich them with the required technical knowledge. This might imply a total reconstruction of the IT employee, and it might also depict additional staffing requirements, thus making healthcare recruitment a challenging task.

3-5-2. Reduce care continuity

Several telemedicine events help the patients to continuously change their physicians, which results in reduced care continuity. Moreover, these random physicians will not be able to gain access to the full historical backgrounds of their patients resulting in erratic treatment in the long-term.

3-5-3. Licensing issues

Sometimes providers training telemedicine is required by certain states to possess a valid license in the case the patient is located.

3-5-4. Technological restrictions

Although there have been lots of innovative programs recently, telemedicine continues to be technologically limited. It is possible for the broadband connections to malfunction, video chatting gadgets to function improperly (27-30).

3-6. Challenges in implementing telemedicine

The hospitals and health centers are implementing telemedicine programs. Virtual health coaches, web consults with specialists, telemedicine hospital rooms, and cloud-based physicians are increasingly common. Telemedicine and telehealth have the potential to increase access to care, improve quality of care, and decrease costs. Hospitals and health centers in rural areas have observed the majority of telemedicine implementation due to the needs of the population and area constraints. Travel times, lack of specialists, and smaller hospitals witness a vast improvement in the quality of care thanks to telemedicine. However, telemedicine could significantly influence the entire healthcare system in urban, community, international, and even global scale. Despite the advantages of increased access to care, quality improvements, and cost controls, telemedicine is not simple to implement. There are various challenges and obstacles that the hospitals face. The present study covered four common challenges to telemedicine and methods to address those challenges:

Challenge 1: Administrative engagement

Not every member of the executive or administration team may see the value in the expensive, possibly arduous, process of telemedicine implementation. When talking to C-suite executives, it helps if they can see telemedicine value in two ways. First, they need to understand that the consumer of the electronic market has already armed physicians with the required tools. Physicians and patients know how to use cell phones, video chat, and text messages. Secondly, framing telemedicine value in terms of what the hospital stands to gain could be persuasive. A few questions should be answered: Are you getting more cases for your specialists? Are you decreasing readmission rates? Are you building a team of specialists?

Challenge 2: Physician engagement

While physicians use electronic devices in their personal lives, they may not want to incorporate technology into their practice. They may not want to be dependent on technology, they may be overworked, or they merely do not want to train on the equipment. One way to address the issue is to remind physicians that telemedicine is bringing medicine back to its roots, to the communities, and individual houses. Remind physicians that telemedicine aids healthcare. Telemedicine is what the patient wants; it is the future of healthcare. That should be mentioned to physicians.

Challenge 3: Infrastructure

Concerns of the infrastructure of telemedicine for a hospital are justly founded. No physician wants to deal with a malpractice lawsuit after a disconnected virtual consult leads a patient to follow the wrong treatment regimen. With

telemedicine, you have options to buy the necessary technology that can sustain your telemedicine requirements. That technology is a strong platform and requires an internet connection.

Challenge 4: Sustainability

The sustainability issues derive from whether a hospital is capable of maintaining telemedicine services once implemented. Discussing implementation processes with successful telemedicine practitioners is a best practice that could determine the difference between a sustainable and a failed program. Although there are challenges to successful telemedicine implementation, the benefits of this technology to the healthcare industry are well worth the time and effort. Telemedicine can help physicians consult and treat patients from miles away. Telemedicine can assist hospitals to offer specialists that do not live or work in the area. Telemedicine can transcend physical limits to offer better access to better care (3, 6, 9, 11, 24, 27).

3-7. Telemedicine and moral dilemmas

Along with the expansion of telemedicine, numerous questions have arisen regarding the moral consideration of this method. Telemedicine requires advanced accessibility to patients' clinical records and must ensure patients' security and the confidentiality of their information. Moreover, medical error responsibility is another one of the ambiguities in this method since the physicians and the patient might not be residing in the same country, and medical obligations do not present clear definitions in this regard. The use of this innovative technology, which transforms the traditional treatment structure, requires new ethical codes and medical commitments. In this regard, the following points must be considered:

3-7-1. Principles

Physicians must follow the following ethical codes during visits:

1. The physician-patient relationship must be according to personal examination and adequate awareness of the patient's medical records. In the first step, telemedicine must be used in cases where a physician cannot be physically present during an acceptable and safe period. It can also be used for managing chronic conditions or follow-ups after the initial treatment ensuring that the remote visit is safe and effective.
2. The physician-patient relationship must be according to mutual respect and trust. Therefore, the physician and the patient must be able to identify each other to be trustworthy while the remote visit is being carried out. In case of consultation with specialists in different fields or with legal experts, the main physician is in charge of coordinating the patient with the remote medical and team and caring for him.
3. The physician must assure the patient about his records being kept confidential, his privacy is respected, and data integration. The data obtained through consultation must be protected through proper and updated security measures according to the local regulations to prevent unauthorized access and violation of the patient's identified information. Electronic data transmission must also be protected from unauthorized access.
4. Proper informed consent entails that all the required information regarding the primary remote medical visit be explained to the patients, and includes but is not confined to- the following:
    - Explaining how the remote visit would be carried out.

- How appointments are made.
- Private space concerns.
- Possibility of technical failures such as confidentiality violation.
- Communication protocol during the virtual visits.
- Explanation of the policies and coordination with other healthcare specialists clearly and understandably, without influencing the patient's decisions.

5. The physicians must be aware that specific technologies through medicine are not comprehensible and controllable for the patients and, therefore, restrict their accessibility. Unjust accessibility to remote medical services can aggravate the health results gap between the wealthy and the poor.

3-7-2. The physician's responsibilities

1. The physician must provide the patient with remote medical services and beneficial information, save the information he has received and sent, and make sure that the aforementioned is carried out to ensure traceability.
2. In case a decision is made to make a remote appointment, it must be ensured that the users (the patients and the healthcare specialists) are capable of using the required communication systems.
3. The physician must pay efforts to ensure that the patient has followed the medical recommendations as much as possible to improve the continuity of medical care.
4. The physician who has requested the recommendations or ideas of another physician is responsible for the treatment and other decisions and recommendations delivered to the patient.
5. The physician must be aware of the particular issues and ambiguities that might arise during the remote contact with the patient and respect them. The physician must believe that remote communication is in favor of the patient and ensure him.
6. Physicians must only provide remote services in countries/legal districts in which they are licensed to practice medicine. Consultations regarding the legal districts must only be made between the authorized physicians.
7. Physicians must make sure that their medical claim coverage covers telemedicine.

3-7-3. The quality of care

1. Healthcare quality evaluation measures must be implemented periodically to safeguard patient security and propose the best diagnosis and treatment measures through remote treatment. Telemedicine services must follow instructions based on evidence to ensure their security, care quality, and patients' health consequences. All remote healthcare interventions must be evaluated from medical, efficiency, effectiveness, safety, feasibility, and cost convenience points of view.
2. Telemedicine's weaknesses and possibilities in urgent cases must be properly identified. Medical recommendations are affected by the patient's medical condition and the capability of those at his bedside in cases where there is a need to use telemedicine in emergency conditions. Those who provide telemedicine services must develop protocols for referring to emergency services.

3-7-4. Suggestions

1. Telemedicine must be properly adjusted to local monitoring frameworks that might include telemedicine licenses in favor of the patients.
2. National medical associations must support the physician-patient relationship, encouraging medical care quality and confidentiality, the advancement of ethical norms, practical instructions, national regulations, and international agreements regarding remote treatment.
3. Telemedicine must not be considered as a substitute for in-person medical care, an incentive for patients' cost reduction, or an obvious motive for physicians' overtime and increased income.
4. Telemedicine requires the medical profession to identify and manage the negative consequences in textual communications and reference patterns.
5. Novel technologies and appointment integration methods might require new standards and instructions.
6. Physicians must pay efforts to take ethical telemedicine measures in favor of the patient (3, 6, 32-34).

3-8. Telemedicine barriers

Numerous telemedicine projects have been discontinued due to communication technology limitations. Regular phone lines cannot provide the required bandwidth for a majority of telemedicine projects. Various remote areas are also deprived of telecommunication due to their distinct geographical location and have no access to telemedicine services. Several barriers are also present due to international communication issues. Three points of view can be adopted to categorize telemedicine expansion barriers:

3-8-1. Communicational barriers:

- Variety of technical standards.
- Communicational infrastructure weakness.
- Distinctions between national and international communication systems.

3-8-2. Medical barriers:

- Cultural differences of the physicians.
- Differences in terms of treatment methods.
- Differences in terms of medical standards.
- Different medical devices and technologies.

3-8-3. Socioeconomic barriers:

- Political and administrative barriers
- Differences in terms of language and literacy level
- Cultural differences in terms of physicians' acceptability
- Differences in the available resources for medical care (27, 28, 35-40).

3-9. Security in telemedicine

Since credit cards are being used to pay for telemedicine services, the required security measures regarding financial transactions must be taken like e-commerce and electronic businesses. Digital signatures, firewalls, data encryption, and decryption must be provided to secure the patient's information confidentiality, especially in the case of military groups. Therefore, information security experts must be employed to ensure the required considerations. This issue is specifically real in the case of wireless telemedicine since electromagnetic waves are used to transmit data which can be eavesdropped

by nature. In case of the use of the global internet network for providing telemedicine and telehealth services, the required security against hackers' attacks to databases must be ensured.

5- CONCLUSION

The usage of telemedicine gives more advantages compared to disadvantages, especially in this era where technologies are one of the important aspects of communicating to the outside world. Telemedicine can fit perfectly into our lifestyles. Furthermore, everyone can use it, both in the rural and also urban areas. It should become simpler and more widely approved in the future with the fast development of technology. Telemedicine, on the one hand, requires advanced access to the patient's clinical records, and the patient's security must be ensured as well as his/her information confidentiality. Besides, medical error responsibility is among the other ambiguities since the physician might not be present in the same country as the patient. In this regard, medical obligations have not presented clear definitions in terms of these responsibilities. Employing this novel technology, which transforms the traditional treatment structure, requires the development of new medical commitments and ethical codes.

6- CONFLICT OF INTEREST: None.

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