

## REVIEW

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# Application of Ethics for Providing Telemedicine Services and Information Technology

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## ABSTRACT

**Introduction:** Advanced technology has increased the use of telemedicine and Information Technology (IT) in treating or rehabilitating diseases. An increased use of technology increases the importance of the ethical issues involved. The need for keeping patients' information confidential and secure, controlling a number of therapists' inefficiency as well as raising the quality of healthcare services necessitates adequate heed to ethical issues in telemedicine provision. **Aim:** The goal of this review is gathering all articles that are published through 5 years until now (2012-2017) for detecting ethical issues for providing telemedicine services and Information technology. The reason of this time is improvement of telemedicine and technology through these years. This article is important for clinical practice and also to world, because of knowing ethical issues in telemedicine and technology are always important factors for physician and health providers. **Material and methods:** the required data in this research were derived from published electronic sources and credible academic articles published in such databases as PubMed, Scopus and Science Direct. The following key words were searched for in separation and combination: tele-health, telemedicine, ethical issues in telemedicine. A total of 503 articles were found. After excluding the duplicates (n= 93), the titles and abstracts of 410 articles were skimmed according to the inclusion criteria. Finally, 64 articles remained. They were reviewed in full text and 36 articles were excluded. At the end, 28 articles were chosen which met our eligibility criteria and were included in this study. **Results:** Ethics has been of a great significance in IT and telemedicine especially the Internet since there are more chances provided for accessing information. It is, however, accompanied by a threat to patients' personal information. Therefore, suggestions are made to investigate ethics in technology, to offer standards and guidelines to therapists. Due to the advancement in technology, access to information has become simpler than the past. This has prompted hackers to seize the opportunity. **Discussion:** This research shows that the ethical issues in telemedicine can be investigated from several aspects like technology, doctor-patient relationship, data confidentiality and security, informed consent, patient's and family's satisfaction with telemedicine services. Following ethical issues in telemedicine is a primary aspect of high quality services. In other words, if therapists abide by ethical rules, they can provide better services for patients. Attention to ethical issues in telemedicine guarantees a safer use of the services.

**Keywords:** Telemedicine, Tele-health, Ethics, Technology, Information Technology.

## 1. INTRODUCTION

Advanced technology especially IT has increased the use of telemedicine in the treatment and rehabilitation of diseases. Therefore, the ethical aspect of these attempts becomes an issue. To ensure the confidentiality of patients' information and increase data security, there is a need to monitor cases of therapists' inefficiency and improve the quality of healthcare services, which all highlight the necessity of ethical issues in telemedicine (1, 2).

As defined by the World Health Organization (WHO), telemedicine is the provision of online healthcare

services when the distance between a service provider and a patient matters (3).

On the other hand, "ethical issues in telemedicine" implies a consideration of patient's benefit or loss in receiving telemedicine services and his/her right to choose the therapy and react to dissatisfactory services (4). In fact, initial considerations of ethical issues in telemedicine began in early 1980s at the same time as the rapid growth of technology. In 2006, the American Society for Bioethics and Humanities (ASBH) was officially assigned by WHO to investigate ethical issues in telemedicine. The

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prerequisites were health-related body of knowledge and skills (5).

Development of guidelines on telemedicine services contributed greatly to the consistency of the services provided and ensuring patients of the security of the services. Standards set to this aim managed to raise the quality of healthcare services. The use of the internet system by 87% of adults on the one hand, and the increasing rate of receiving online health-related information (72%) on the other highlighted the role of ethical issues in telemedicine so as to raise the quality of healthcare services (6).

The widespread use of the internet, email, and smart phones today has further underlined the significance of ethical issues in telemedicine (7). Therefore, to ensure the security and confidentiality of patient's information, there is a severe need to set ethical rules and regulations (8). The present study reviewed and classified the body of related literature on ethical issues in telemedicine and focused on the use of telemedicine from an ethical perspective.

## 2. AIM

The End of this study is to gather all articles that are published through 5 years until now (2012-2017) for searching ethical issues for providing telemedicine services and Information Technology. This time was chosen for telemedicine and technology improvement through these years.

The ethical issues unique to telemedicine and technologies relate to the impact on the healing relationship, which go beyond the expected challenges of privacy and confidentiality. The loss of touch, the inequity when distributing the benefits of telemedicine services, and the burden that this form of new technology may impose on sick and dying patients are some of the ethical issues that should be considered, so this review can help health providers to be familiar with these issues.

## 3. MATERIAL AND METHODS

### 3.1. INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria were extracted based on the topic of study and the ethical issues in telemedicine and IT. The full text of articles needed to be available. The articles written in English language were chosen.

### 3.2. SEARCH STRATEGY

A literature review was done on 25 July 2016 using PubMed, Scopus and Science Direct in order to peruse the relevant studies published in the past five years from 2012 to 2017.

A combination of the following MESH terms and keywords was used:

((“Telemedicine” [Mesh]) or (ethics)) and ((“Telehealth”[Mesh] or (IT) or (ethical issues)).

We also set limits to our search according to the study result and language.

The present research aimed to classify the related body of literature on the ethical issues involved in telemedicine. In this study, the electronic databases including PubMed, Scopus and Science Direct were searched for

Ethical issue And references	Number of articles	Conclusion
Technology (9-16)	8	Advanced technology increased the significance of ethical issues.
Confidentiality and security (17-23)	7	Attention to ethical issues in telemedicine increased the significance of data security and confidentiality.
Doctor-patient relationship (24-29)	6	Use of telemedicine disrupted doctor-patient relationship which is an ethical issue.
Informed consent (30-36)	7	It is essential to provide the patient with sufficient information by submitting a form of informed consent.

**Table 1. Academic articles classified in terms of ethical issue consideration**

the past five years. The key terms were tele-health, telemedicine, ethical issues and a combination of them. A summary of the twenty eight articles found on the topic is presented in Table 1.

## 4. RESULTS

According to the articles found, generally speaking, ethical issues in telemedicine can be investigated from several aspects:

- technology,
- telephone,
- internet,

server list (a computer program that allows for telemedicine service provision for a group of people through the net):

- email,
- doctor-patient relationship,
- data confidentiality and security,
- informed consent,
- patient's and family's satisfaction with telemedicine services (37, 38).

In fact, using technology has grown in the past decade in health-related domains especially tele-supervision and rehabilitation. Quite many academic investigations have considered the application of these technological devices in rehabilitating and taking care of patients.

Moreover, due to the lacking security, some devices need to be analyzed and evaluated in terms of ethical issues (39). Table 1 presents a classification of academic articles which considered ethical issues in telemedicine.

### ETHICS AND TECHNOLOGY

In tele-radiology, tele-dermatology and tele-pathology, advanced technology has changed the form of diagnoses from authentic to digital. Therefore, using a digitizer technology requires a high quality which, in turn, requires a set of relevant guidelines and standards that support the ethical aspect. On the other hand, using 'save and send' option, packages and other image digitizer technologies can lead to problems such as unclear images which might cause wrong diagnoses (40). Therefore, both colleges i.e. The American College of Radiology and the U.K.'s Royal College of Radiologists provided technical guidelines and standards with this concern which

need to be complemented with ethical guidelines too (41).

A new rule was made in April 1999 for the quality of healthcare services under the supervision of Trust and Health Authorities. According to this rule, doctors are accountable for the quality of services they provide. They were supposed to report regularly to Trust and health Authorities and these reports attested to the priority of quality set by the board members (42).

To this aim, in autumn 1998, "Quality Care and Clinical Excellence" was published which mainly consisted of the following (43):

- standards,
- quality provision,
- quality control.

Some other ethical problem has to do with the security of medical devices, formerly controlled by the "National Health Services" (NHS) and now under the supervision of the "European Union Directives" (44).

Tele-consultation is a main ethical challenge in telemedicine. That is due to the fact that:

- Doctors are required to be highly competent in service provision.
- Doctors are supposed to recognize the value of virtual communications.
- Computer systems are yet unsafe even if they are supposedly privileged with high security.
- Tele-consultation provides a full access for all to new information and skills.
- Telemedicine is growing rapidly with new relevant standards (45).

#### **ETHICS AND DOCTOR-PATIENT RELATIONSHIP (the main ethical issue)**

The ethical rule set by the ethicist Edmund Pellegrino attributes three components to doctor-patient relationship (46):

- A patient who is sick and needs help.
- A doctor who feels responsible for helping the patient.
- Medical action/application of medical science.

Here, the patient is supposed to voluntarily refer to a doctor whom s/he trusts. Processing the decision making is supposed to be a mutual act which requires both doctor's and patient's decision. On the other hand, the doctor is expected to respect the patient's decisions and independence. As a consequence, both the doctor and patient are mutually communicating to think of the right therapy (47). Edmund Pellegrino's ethical rule narrows down the doctor-patient relationship (46):

- Patient's respect for doctor's comments.
- Doctor's respect for patient's choice of therapy.
- Use of telemedicine device cuts down on this relationship. besides, to abide by ethical rules, the doctor is expected to obtain patient's informed consent.

#### **ETHICS AND SECURITY AND CONFIDENTIALITY**

Using telemedicine services threatens patient's information security and confidentiality. According to the General Medical Council (GMC), clinical specialists

need to make sure of the confidentiality of patient's electronic data while receiving, storing and transferring the data. They should feel responsible for the security and confidentiality of electronic data. Newton et al. observed that the foremost concern patients have about receiving telemedicine services is with the confidentiality of the information they provide. To remove the concern just mentioned, NHS has published a guideline for the Trust Committee so as to meet legal and ethical expectations (48).

#### **ETHICS, TELEMEDICINE AND JUSTICE**

Some other ethical issue arises when:

- Several families are deprived of telemedicine services due to lacking knowledge or the required technology (the net) which has to do with the justice and equality aspect (49).

There are several countries with very limited internet band width to use the net (50).

Several other countries cannot afford to buy telemedicine equipment due to its high cost or they may lack the required number of specialists in this domain (51).

#### **ETHICS AND PATIENT'S INFORMED CONSENT**

One solution to prevent ethical problems is to obtain patient's informed consent in advance to any medical step to be taken. The basic components of this informed consent are (52):

- a full description of the therapy procedures,
- a full description of the probable problems after the therapy and the probable risks,
- a full description of the positive issues expected,
- clarification of alternative processes that can be applied for that certain patient,
- a demand that can be responsive to the emergence of any problem,
- a procedure that can be canceled by the patient upon choice.

The presence of such an informed consent not only supports patient's ethical rights but also removes any concern about the confidentiality of data. The new guidelines introduced by GMC and the British Medical Association emphasized on the essentiality of patient's informed consent so as to provide patients with adequate information. Moreover, these guidelines save patient's right to mention his/her concerns about the medical system in the letter of consent. Later on, upon the emergence of any probable problem, the patient can defend his/her rights (53).

## **5. DISCUSSION**

Basically, in many countries the quality of telemedicine services is of a great significance. Therefore, in order to raise the quality of these services by therapists and specialists, there is a need for setting certain guidelines and standards which make the therapist responsible for what s/he does. These all help patients to get ensured of the quality of telemedicine services (54).

Alexander A. Kon and et al. describes "several models for providing expert clinical ethics support to remote facilities that lack access to qualified clinical ethicists"(48). This article shows a need to provide access to qualified

clinical ethicists at a broad range of medical facilities and there are insufficient numbers of trained clinical ethicists to staff all healthcare facilities, and many facilities lack the necessary resources to hire staff clinical ethicists.

Lamas E and et al. shows assessing ethical and social issues of transtelephonic electrocardiography (TTEGG) in Chile. The aim of this study was to concentrate on the ethical issues derived from the implementation of TTEGG in the public healthcare sector in Chile, studying patients and healthcare providers' acceptance and expectations concerning: (a) effectiveness and safety; and (b) data protection issues, like confidentiality, privacy and security (18).

On the other hand, to maintain the security and confidentiality of patient's information and maintain the high quality of doctor-patient relationship, considering ethical issues is of a key importance. Therefore, using certain ethical guidelines in telemedicine can be suggested to complement the quality of healthcare services provided in this manner. The aim is to attract patients' satisfaction and trust. Moreover, these attempts help to increase the quality of healthcare services provided by the therapists (55-60).

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- **Authors contribution:** All authors participated in every step of research and gave final approval of the version to be submitted.

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