UNIVERSITÀ DEGLI STUDI DI CAMERINO

School of Advanced Studies

DOCTORAL COURSE IN

LIFE AND HEALTH SCIENCES-ONE HEALTH

XXXII cycle

Report on Establishing Telemedicine Services in Iran

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Introduction

The speed of technological changes, the advent of new innovations, and the increasing competition have made the use of new technologies as the focus of the business firms and government. Information technology has had a great impact on health as one of the areas in human social life by forming the information societies. Currently, all the health care processes are highly depending on technology. Whereas its management, transmission, the distance elimination, the diagnosis speed, and the disease treatment are necessary issues. These two major subjects have led to the formation of a new branch in medical sciences called telemedicine technology. Considering numerous advantages of telemedicine technology, the necessity of applying this technology in developing countries, including our country- Iran- is inevitable (1).

Providing telemedicine healthcare services essentially involves extensive implications in both ICT and medical services. The range of these concepts is so broad that it may be probable to consider telemedicine as a cultural issue applying the features of communication concepts in health care offer, beyond considering it as a service. It is necessary to a simple telephone communication to establish a psychotherapeutic service, to use smart agents in a trans-continental relationship, using vital signs and various medical images to identify and even treat a patient (2). Remote patient monitoring or telemedicine provides appropriate solutions in urgent medical assistance, long distance monitoring, the management and logistics, the quality assurance and supervision, as well as preparation and training of health care professionals. Telemedicine plays an important role even in the fight against communicable diseases, as well as in helping injured people in disasters and accidents (2,5).

Telemedicine has been most beneficial to various healthcare services in some countries, particularly in developing countries such as Iran which faces unbalanced distribution of resources and specialists in various fields of medical sciences, and to make it available in all over the country. Telemedicine services provide the opportunity to improve both the quality and the availability of health care services regardless of the geographical limitations. These services also present numerous socio-economic benefits considering the significant return of resources to investors, service providers and equipment providers can be highly effective in optimizing the use of existing financial and human facilities and resources (7,6). Telemedicine

requires careful planning and precise management to perform and develop the goals. Therefore, to achieve the above-mentioned objectives and using telemedicine in a large scale, it is required to evaluate the problems and the performance of this system periodically by planning and making useful changes to overcome them and thereby improve the status quo.

Although remote patient monitoring or telemedicine services have great potentials and provide significant long-term benefits to the healthcare system, especially in a country such as Iran that it's not possible to uniformly distribute power and health services in all areas, the optimal use of this system requires the provision of resources and essential infrastructures in addition to resolve the problems and eliminating the shortcomings. It is also worth noting that for the useful and continuous application of this system, the geographical facilities and limitations of each satellite center should be considered as the reference when deciding to provide the necessary infrastructure. To increase the efficiency and purpose of this system, it is better to first investigate the requirements and shortages of each region in the fields of medical specialties as well as the prevalent diseases and health problems of the region, considering which disease and consultation with which of the specialized and technical services are considered. Besides, due to the recent advent of telemedicine consultation system in our country's health care system and its failure to implement routinely as a result of the inadequate acceptance by physicians, and the consulting hospitals' personnel, it is better to select the satellite centers ensured that there were sufficient psychological acceptance and the willingness to cooperate in the project and to prevent the imposition of this system on recipient counseling centers, which has a deterrent role in helping physicians and nurses work together to advance this plan. In the end, it is necessary to spend sufficient funds and using experiences obtained from the present plan, increasing the number and quality of this type of counseling to be more accurate than the evaluation of the medical consulting system, especially in terms of cost-effectiveness.

Iran

This section provides useful information about Iran for further reading:

Iran, officially known as the Islamic Republic of Iran, is a country in south-west Asia and the Middle East with an area of 1,648,195 square kilometers (17th worldwide),

and according to the 2010 census, it has 79,926,270 inhabitants (18th worldwide). Iran is bordered to the north by the Caspian Sea, and to the south by the Persian Gulf and the Oman Sea, including the world's largest natural gas supply and the second-largest proven oil reserves worldwide. The capital, the largest, the most populous city, the cultural, economic, political and administrative center of Iran, is the city of Tehran, which is also the country's most important medical center. Iran is an important regional power in the Middle East and a country with moderate incomes and a plurality of ethnic groups that communicate at least in tens languages and numerous dialects. More than half of Iran is desert or desert-like. About one-third of Iran covers by mountainous and a small portion of this country (including the coastal plain of the Caspian Sea and the province of Khuzestan) is composed of fertile plains. According to the latest divisions in 2014, Iran is made up of 31 provinces. (Fig. 1, 2, 3).

Country divisions in Iran 1393 (31 states)

Current status of telemedicine in Iran

Usually, informal and often non-governmental companies in Iran provide medical services and consultations in the form of telemedicine. Recently, these companies emerged in the Start-up format and, usually, provide medical consultations by developing software. Therefore, most of the medical consultations in various medical fields are accomplished. But these efforts are often stopped at this point,

while infrastructure is usually the Internet. Precise access to the number of Start-ups is almost impossible because there is not yet a reference and formal organization for monitoring such activities. Formal telemedicine activity in Iran still lacks a standard in various areas such as legal, technical and financial. Therefore, there is no specific tariff for such services. Another problem regards the lack of recognition by the general public and the lack of acceptance in the country's clinical community. So, considering the lack of adequate infrastructure in all parts of Iran, there is virtually no telemedicine in the country for the general public. However, at the government level and for organizations, long-term care has been addressed, and a few points are needed to describe the current state of the country, as follows:

Academic Research

Telemedicine research in the country is still in the necessity of feasibility and need assessment. A literature evaluation on PubMed, Scopus, Web of Science and four national scientific databases by considering telemedicine studies in Iran revealed that the number of telemedicine theses discussed in Iran ranged under forty items by the end of 2018 and almost all of them are accomplished at the master's level and in a limited geographical area. They addressed the feasibility or need assessment of one or more specialized medical domains. The same search found 34 articles in Persian and English, while most of these studies have only been subject to telemedicine as a side method of medical interventions, and they don't mention the practice of telemedicine. The results of these studies addressed issues such as lack of sufficient knowledge, lack of resources and equipment, lack of adequate funds, poor software and infrastructure, poor privacy protection methods as problems, and the need to reconsider the structure and develop specific guidelines for implementation of this technology are required.

The findings of an organized analysis focusing on the same goal, also, indicates that 21% of studies in the field of telemedicine have reported on the experiences of implementation and the role of culture. In this regard, the lack of sufficient knowledge of health professionals, lack of facilities and equipment, and lack of sufficient budget allocation were cited as problems in the implementation of this technology. Also, the implementation of this technology improved service quality, patients outcome, cost reduction and service availability in deprived areas where there was inadequate access to specialists. (8).

Telemedicine at National Iranian Oil Company

The foremost telemedicine centers started operating in Markazi and Lorestan provinces alongside the eight centers in 2008. Here and now, 28 telemedicine centers are equipped in four major oil industry companies that present those services on land and sea (oil rigs).

The Iranian Petroleum and Telecommunications Company establishes the communications of this system via the internet, intranet, and satellite. Due to the strong and independent telecommunications industry in the country, telemedicine currently uses an intranet and fiber broadband connection with a bandwidth of 2 Mbps for each center.

This option is only available for remote areas where access to the health center is low to reduce frequent referrals and dispatches to Tehran and other medical centers. This system primarily needs to be tested on land and at sea by implementing at least 4 to 5 daily visits during the treatment and a total of about 20 to 30 daily interventions with this method in the form of visits, nutritional, psychological, and psychiatric consultations. Some training programs for doctors and nurses are similarly done at these centers. Plans for the development of telemedicine in the field of industrial medicine, communication with neighboring countries, telecommunications and telecommunications are also under study. Telemedicine ambulance services are also being provided to industry personnel. The oil industry will increase the number of these centers to 100 in a multi-year plan (9).

Telemedicine in the Army

Unfortunately, due to the confidentiality of information in the military domain, access to telemedicine information in the Iranian military is difficult. But according to reports, it is obvious that medical services in the Iranian army are in the context of electronic health records, the transmission of patients' medical images, telemedicine equipped ambulance, and the use of supporting software (10 and 11).

Telemedicine in Academic Jihad

Academic Jihad has three telemedicine service centers in Qom, Qazvin, and Zanjan that offer limited services. In Qom and Qazvin, software for infertility treatment is designed to send all medical records, record data in an online system, and perform an ultrasound that is considered as one of the most important profits and features of this software (12, 13). Moreover, there are also related reports on the number of services being provided in remote villages around Zanjan (14).

Telemedicine at the Barekat (literally means blessing) Tel Institute

The institute has recently begun using some of its in-house equipment or importing some of its telemedicine services, especially in natural disasters' occasions, and it is active in various areas of electronic health. More information can be found on the company's website (15).

Carried out activities

According to the limitations of the country's resources and the necessity of making right decisions just over a few phases, activities for the start of medical services were carried out, especially managers ' training for conceptual readiness and accepting the necessity of this kind of service:

Human Resources Training

1.Training of managers and faculty members of medical sciences universities

First, to make the acquaintance of most managers and faculty members of the Universities of Medical Sciences, a joint program was defined between Tehran University of Medical Sciences and Camerino University. By signing a memo of understanding, the two universities agreed on exchanging professors and students and establishing joint courses, which resulted in the signing of this agreement. In a letter to all medical universities in the country, the addressees were asked to have at least one representative in this virtual course. The course called Advanced Qualification Course in Telemedicine and Telephamacy included comprehensive telemedicine training benefits that have been completed at weekly intervals in employees' leisure hours, with a total of 86 managers and university employees which was held from August 2017 to March 2018. Appendix 2 contains the syllabus for this course.

Holding joint sessions of Tehran University of Medical Sciences and Camerino University of Italy

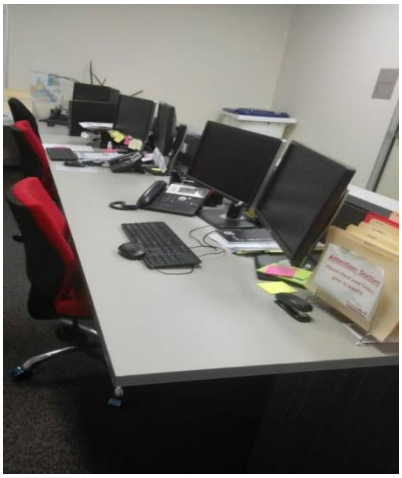
2. Teaching human resources through the creation of a master's degree in telemedicine

Given the existence of the close academic disciplines in Iran such as medical informatics and health information management, it was decided to establish a "telemedicine" field that was renamed to 'Telehealth' after consultation. Thus, with the definition of health, the mission of this discipline will become more general and inclusive. Several sessions and specialized panels of Curriculum Remote Health were written in a master's degree and approved in two stages at Tehran University of Medical Sciences at two stages at the Ministry of Health in Iran. According to the curriculum approved by this discipline, all medical science graduates can educate in this field and take comprehensive education in the public, technical, legal, ethical and entrepreneurial fields. Appendix 3 is a curriculum.

Visiting telemedicine facilities in Australia

The research team attended SFT-17 Seminar at the University of Queensland, Australia, participating with two oral presentations and two posters. During the visit the participants visited the University of Queensland online heath center, and the Princess Alexandra Hospital Telehealth Centre to learn about their experiences. These experiences ranged from technical factors, organizational-managerial factors, cultural and sociology factors, financial and economic factors and their thical

considerations. The most important challenges in setting up a telemedicine service Australia were resistance to change, uncertainty about the service providers, and uncertainty about the continuity of the service availability and the most important success factors were existence of good and reliable technical infrastructure, supportive managers, economically feasibility, selecting a model that has the ability of progress, good staff coordination, and active follow-up of the patients.



Technical infrastructure review

According to a survey of telecommunication agencies in the country, three mobile operators in Iran provide Internet services throughout the country. This fact has been investigated by researchers in the trips to different parts of the country, and the result

reveals that almost all other internet access is stable except for situations that the internet is cut off from the operator center for some security reasons.

Although there has not been set a national standard for telemedicine equipment and software yet, , but because of Iran's well-developed nationwide health network in almost all parts of the country, healthcare centers are providing comprehensive PHC services based on an internet based planform named SIB and the healthcare providers register every single service to their patients in the platform This platform, given its integration at the national level and covering the vast majority of the Iranian population, can be a good platform for telemedicine services in the first and second level of health care services.

Integrated Health System Apple (literally means Sib)

Investigation and interventions in financial infrastructure

As mentioned, there is still no state funding for telemedicine programs in the country. During sessions attended by representatives of the Iranian Medical System, the CPT codes for remote consulting services were reviewed. During the observations, there are about 80 codes for remote specialized consulting only, but there are complexities in the definitions of these codes that are not practically feasible and applicable to Iranian services. For this reason, the decision was made to define the study, the results of which would provide the necessary evidence for a variety of telemedicine services.

Based on the above information and different types of telecommunications services, ten remote business scenarios were designed and defined in different financial aspects. In the process of implementing the plan and negotiating with officials in the Ministry of Health under Iranian Health Services Laws, the Executive Board was

required to formally standardize this type of service as a standard type of treatment in Iran that is completing its forms. Once the service is standardized, it will be easier for the consultants to precisely determine the cost of it. After the tariffs are set, the approval process at the Iranian Ministry of Health will continue.

Legal Infrastructure

The legal and ethical aspects of electronic health, particularly telemedicine, were addressed in some studies (16, 17). Besides, a document entitled Electronic Health Information Exchange Document was adopted after an important discussion around the European legal model during a meeting at the Iranian Ministry of Health. Therefore, the European model was reviewed, implemented, and adapted to Iranian law and Iranian culture. This document must be approved by the Iranian parliament after testing and correcting in due course to become a national law, which it seems to take a long time.
(http://it.behdasht.gov.ir/uploads/Inpatient_DI_Guideline_v.4.64.pdf)

Telemedicine Pilot in TUMS

Tehran University of Medical Sciences (TUMS) has established Virtual School in 2010, to educate students in e-learning and e-health fields. The e-health department of the Virtual School's main mission is dissemination of electronic health technology by focusing on telemedicine among physicians and healthcare staff through academic courses and research projects. One the projects was a trial to provide telemedicine service to rural healthcare centers affiliated to TUMS.
In the phase one, the service was provided to
children under the age of 5 with consultations from specialists from the Pediatric Medical Center, the main teaching hospital in pediatric medicine. The participating healthcare centers were Al-Ghadir Comprehensive Health Service Center (Eslamshahr Health Network) and the Beris Comprehensive Health Service Center (Chabahar Health Network). We had also a trial phase for patients with internal medicine, diabetes and nephrological problems from other affiliated healthcare centers from Eslamshahr and Shar-e-Rey health network with specialists in Internal medicine from TUMS.
The pilot project follows a joint virtual telemedicine course hosted by Tehran University of Medical Sciences and the University of Camerino, Italy, based on

principles and knowledge gained by experts in the context of the integrated 'apple' health care system.
The Brees Health Care Center is located at 2 km east of Chabahar, behind the Cones Mountains, along the Oman Sea to the Indian Ocean close to Brees Port. The height of the Brees is 3 meters above sea level and the minimum depth of water is 2 meters. The brace is in the Negor district of the Dashtiari district of Chabahar city and is 5 km from the center of the Negor district.

At 24 kilometers far from Tehran, it is localized Eslamshahr. Al-Ghadir Health Care Center located there in Imam Mohammad Bagher Street.


Hassan Abad Fashafuyeh Health Center located 30 kilometers from Ray-Qom Road after Imam Khomeini Airport. It covers a population of about 26,000 Iranians and Afghans.


At the beginning of each session, before check-in and starting the communication with the consulting center, the procedure protocol and checklist (Appendix 7) were given to the practitioners to prepare them for before- and after- communication processes. A patient informed consent form (Appendix 8) was given to all patients before receiving the consultation from the remote specialist. The session was conducted by a general practitioner physician from the healthcare center that was presenting the patient to the remote specialist. to endure treatment strategies. Some patients were referred to related specialist centers as needed.

Lesson learned from the pilot project:

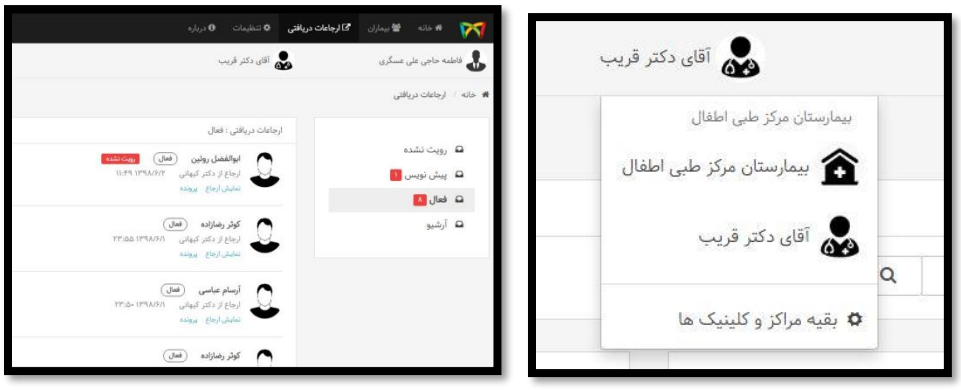
- Telemedicine service can be established with very simple equipment and basic technical skills to provide healthcare services such as teleconsultation to district and rural areas.
- The simplicity of service delivery was one of the strengths of this scenario for implementation of telemedicine (we were not involved in sophisticated technical issues or using advanced telemedicine hardware. We did it by only basic communication methods (in the form of a telephone, voice and video call, and all data were exchanged through internet).
- It was showed that both healthcare center staff and consulting physicians could use existing nationwide- health system platform (SIB) for exchanging patients' medical data and registering provided services.

Current problems

- Lack of sufficient knowledge of physicians with telemedicine experience
- Technical weakness of equipment
- Appropriate bandwidth
- The internet disconnection
- Power connections and disconnections
- Absence of ups
- Absence of law

Implementing patient software and telemedicine registration

Conducting these pilot studies highlighted the need to create and implement telemedicine registration software. This software is created and applicable now, covering the ability to register based on regular physician consultation, as well as the ability to transfer audio, video, and necessary files. This software is also used to train national residents.

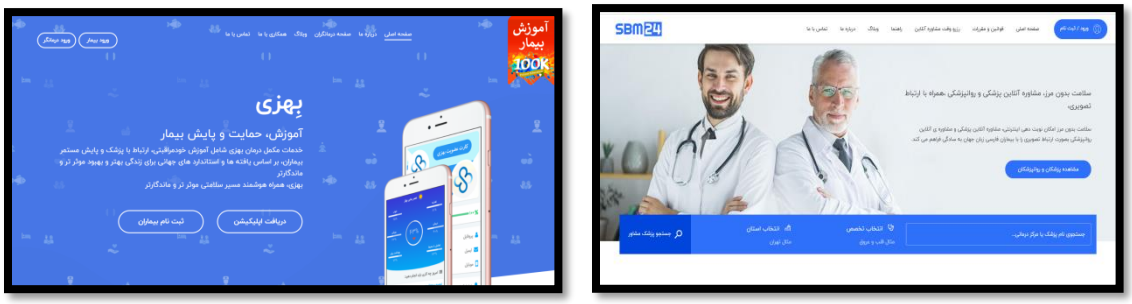


Patient Tracking Software and Telemedicine Registration

Identifying start-ups and making cooperation agreements

Along with activities previously mentioned, steps were taken to identify startup businesses in Iran in the area of electronic health, including holding a startup and forming sessions with other startups in the field. Being familiarized with the trend

of the telemedicine market in Iran and the entrance into an agreement with the emerging centers of electronic health services is the main result of these meetings.



An overview of the best startups and sbm24

A systematic review on Telecare and Telemedicine services in Iran

Introduction

In this chapter, to become more familiar with the research and create a good understanding of it, issues such as a statement of the problem and the significance of the study, as well as telecare as a branch of e-health, and its effects are discussed. In the following, the objectives of the research, including general purposes, specific objectives, applications, and research questions are mentioned. Finally, words definitions are given.

Statement of the problem and the significance of the study

In general, the growth and development of diverse communities can be seen because of increasing the share of services in their gross domestic product (GDP). Worldwide, the health sector is one of the main service sectors (1). In this regard, statistics show that EU member states in 2019, on average, spent 8.3% of their GDP on health. However, it should be noted that the share of the health sector in GDP in developing countries is lower than in high-income countries, belonging to the Organization for Economic Co-operation and Development (OECD) (4). However, health can be considered as one of the basic components of community development today (5). Health is recognized as the right of all people, and the promotion of human health is the goal of all service providers in this field (5, 6). According to the definition of the World Health Organization (WHO), the main purpose of any health system must be to promote, restore, or maintain health. Health systems in different eras have always faced many challenges, some of the most important of which in recent years are significant changes and development of information and communication technology (7), rising expectations of people from health systems (8), The growth of health care system costs (9), and the increase in the burden of non-communicable diseases and population aging (1, 10). The growing population of the elderly is one of the main challenges of the 21st century in various social, economic, and health dimensions (11).

On one hand, increasing costs in the health system and on the other hand increasing the burden of chronic diseases that require a follow-up system (12) has led healthcare organizations to take innovative approaches and use modern technologies in service delivery. One of these approaches is the use of information and communication technology in healthcare. In other words, the result of the information and communication technology and the health sector interdisciplinary manifests a concept called 'e-health' (8). According to the World Health Organization, e-health is the safe and cost-effective use of information and communication technologies to support health and related fields, such as health care services, health monitoring, health studies, medical education, knowledge, and health research (13). The term e-health has been used since 1999 and has ten characteristics such as efficiency, enhancing quality, evidence-based, empowering consumers and patients, encouraging a new relationship between patient and health professionals towards a true partnership, the decisions are made jointly, the education of physicians, the information exchange and communication in a standardized way between health care establishments, the extension of the scope of health care beyond its conventions (Eisenach, 2001). A 20-year vision document of the Islamic Republic of Iran was prepared in 2003, where sufficient attention has been paid to the issue of health and its factors (14, 15). This document has been the basis for the development of four national 5-year plans, in line with Article 88 of the Fourth National Plan, “The Ministry of Health and Medical Education is responsible for the continuous improvement of the quality of services, health, and the performance of clinical services increase productivity, and make optimal use of the country's health, medical and treatment facilities, take measures such as designing and establishing an information society, health, and citizenship system for Iranian citizens" (14, 16).

Reference to the Fifth and Sixth Plans (Article 74)

The range of e-health activities includes such as electronic health records (8), telemedicine (17), e-counseling (18), electronic queuing systems (8), and telecare (18). Telecare is referred to the provision of services to the elderly and less physically capable and the provision of care and reassurance for living in their own homes. The use of sensors may be part of a package that can support people with diseases such as dementia or people at risk of falling (19). Health issues, such as

nosocomial infections and other dangers that people should face due to attending medical centers, has led to the adoption of new medical treatment strategies. This reduces the length of stay of patients in medical centers, and their condition (such as regular use of medications and monitoring of activities) should be controlled at home and will be continued with telecare. In addition, the use of these methods can be economically effective (20). Concepts such as long-term communication between the patient and health professionals and the possibility of providing services in non-specialist environments and domestic are manifested in telecare (20). The positive effects of providing telecare services in cases such as improving the quality of life (20), reducing the rate of readmission (21), and improving patient satisfaction are noteworthy. Johannessen et al. also found in a study that the use of telecare plays an effective role in preventing injury and creating a sense of security, especially in the elderly (22). Studies in Iran indicate the existence of factors such as population dispersion in a wide geographical area, the existence of low-income and deprived areas, and the lack of specialized personnel and the lack of proper distribution of these personnel in these areas that overshadow fair access to health care (23, 24).
All these factors emphasize the efficient telecare system that can address these challenges and take steps to improve the health status of people in the community (25-27). Thus, due to the importance of this issue, the study conducted to investigate the challenges and requirements and the general establishment of the telecare system in Iran. Moreover, the present study aims to establish telecare and managers in the field of the health system and transparent and clarify various aspects of this issue, including its requirements and challenges, as well as creating a clear picture of the current state of care. Telecommunications in Iran emphasizes the importance of this technology for the country and assist officials in future planning and setting appropriate policies on this issue. Therefore, by considering these cases and making the appropriate decisions, the path of service delivery using this technology is paved and leads to improve the quality of care, increasing justice in providing health services, easy and low-cost access to care services, and finally improving the performance of the Iranian health system.

Theoretical and conceptual foundations of research

This section includes an introduction to e-health, e-health in Iran, upstream documents and related laws in Iran, the concept of telemedicine, differences in telemedicine concepts, telemedicine, telecare, the background of telecare, and a variety of telecare systems.

Electronic health:

In 2005, all WHO member states were required to take steps to achieve universal health coverage. One way to achieve universal health coverage is to use e-health (28). According to the World Health Organization, e-health means 'the use of information and communication technologies (ICT) in health support and related areas, including health services, health care, health literacy, and education, health knowledge and research (29). This broad concept includes services such as computer decision support systems (CDSS), electronic medical records (EMR), and electronic prescribing (30).

Based on WHA (the World Health Assembly) 58.28 resolution on e-health, it is mandatory that member states make a long-term strategic plan for the development and implementation of e-health services to develop information and communication technology infrastructures for health, to promote equitable access to their benefits cost-effectively and universally. Moreover, with the adoption of WHA66.24 in 2013 by the Health Assembly, member states were required to formulate policies and legal mechanisms linked to an overall national e-health strategy (31).

The use of ICT technology in different parts of the world is different, so the use of this technology in the field of health in developed countries is more than in developing countries. In other words, the results of studies show that there is a direct relationship between the economic conditions of each country and e-health acceptance (32). Items such as improving access, improving efficiency, and increasing the quality of care are some of the positive effects of using e-health. In addition, reducing system time, improving patient satisfaction, and increasing the efficiency of health care workers have been cited as benefits of these systems (33). The results of a report on the state of e-health in the European Region of the World Health Organization indicates that 70% or 30 member countries have a national e-health policy or strategy. According to the report, 31 member states also have financial support specifically available to implement their national e-health policy

or strategy (34). Another WHO report states that more than half of the WHO member countries have e-health strategies (28).

Electronic health in Iran

Electronic health in Iran is about three decades old. Initially, electronic health in this field began with the creation of mechanization of the country's hospitals in the early nineties, which was done by several private sectors IT companies based solely on professional interests and needs of the country. The purpose of the systems produced in the first decade was to meet the most tenacious information and documentation needs of hospitals, especially after the implementation of the new treatment system. During this period, about 10% of the country's hospitals were mechanized. The presence and effectiveness of the executive organs of the country in the field of hospital information systems, which is referred to as the system (HIS), as one of the e-health approaches began with the issuance of Circular No. 11260 dated November 16, 1998. After a few years, from the middle of 2002, the issue of electronic health was raised by forming the Takfab plan in the form of the approvals of the High Information Council and citing the approval of the Cabinet. With the introduction of this plan and the allocation of specific budget sources, the 'Takfab Steering Council' in the field of research and technology of the Ministry of Health, Treatment and, Medical Education started working on information technology projects in the country. During the years 1381 and 1382, this collection studied and conducted basic studies in e-health, which resulted in the development of a 6-year plan with the slogan of information for health. An examination of the measures taken in Takfab over the past four years from 2002 to 2006 shows that some of these measures were at the national level, and some were provincial or regional. Although overall regional projects have made good progress, most of the national projects that have been initiated are incomplete for reasons such as major policy changes in this area (35).

Upstream documents and laws in Iran

In the following, some important upstream laws and documents in the field of health information technology are described, which are:

1. Article 35 of the Fifth Development Plan Law states; in order to maintain integrity in the management of knowledge and information in the field of health, the following measures are taken:

A. The Ministry of Health, Treatment, and Medical Education to provide electronic health services to establish an electronic health record system of Iranians and information systems of health centers in coordination with the national database of the Statistics Center of Iran and based on information classified by family physician program and referral system acts. All health centers, both governmental and non-governmental, are obliged to cooperate in this field.

B. The Ministry of Welfare and Social Security, in cooperation with organizations and centers of health and insurance services, within the first two years of the program, organizes health insurance services in an integrated manner and based on information technology and in interaction with the Iranian electronic health record system. All relevant units, both governmental and non-governmental, are obliged to cooperate in this field.

2. 20-year vision document; 'Achieving the vision of 2026 will be possible with the use of new tools and technologies. So that by relying on the ability of domestic experts and monitoring the situation in the region, always try to gain first place in various fields.'

3. Note e Article 88 of the Fourth Development Plan Law states, “The Ministry of Health and Medical Education is obliged to take the following measures to continuously improve the quality of health services and the excellence of clinical services, increase productivity and optimal use of the country's health facilities.”

Designing and establishing a comprehensive health information system for Iranian citizens

Referring to the fifth and sixth development plans

4. The strategic document of the comprehensive information technology system states; by progressing in the e-government, governments seek to improve the quality and speed of continuous services by reducing the cost of interaction among themselves and citizen groups (such as individuals, companies, and urban communities). Key benefactors in this regard are:

- Citizens
- Governmental organizations and institutions
- Companies

- Non-profit organizations
- NGOs
- Municipal service companies
- Legislature and judiciary
- Electronic health

Electronic health is considered as the development of the use and application of information and communication technologies to promote health. This term is also defined by Eisenach in 2001 as one of the pioneers of e-health. He states:

"Electronic health is the provision of health services and information through the Internet and related technologies. This term refers not only to technical specifications but also to the way of thinking, considering, and committing to the improvement of health care at the national, regional, and global levels using information technology."

The other three related concepts that help to explain the related concepts are:

1. Telemedicine provides treatment to people who do not have access to counseling centers and are in remote areas.

2. Online services, web-based application systems through which citizens can apply for these services without having to go to public health service offices.

3- Patient management systems and records as a collection of databases created to manage and use patient records. This database covers patients' personal information, medical records, and test results (35).

Telecare

What is called telecare corresponds to the concept of using communication and information technologies to provide social and health care to individuals. The introduction of these systems since the early 1990s has been aimed at removing barriers to access and justice as well as supporting self-care (36). One of the purposes of using telecare systems is to maintain the independence of the service recipient (37) so that they can continue to live independently. On the other hand, each person's home is becoming a key environment for providing health services (38). Also, the possibility of telemonitoring of patients with chronic diseases even from home can be one of the reasons for the tendency of health care organizations to telecare

systems (36). Chronic disease is a long-term disease that causes physical changes in the body. It creates and limits the patients' functions. Chronic disease is usually incurable, and its treatment period is long, and its recovery stages are difficult. In some cases, the disease is incurable and there is no definitive treatment for it. In addition, given that there is at least one chronic disease in most older people and the cost and duration of treatment for these diseases is 20 to 30 times more than the acute diseases (39). Therefore, the need to pay attention to these diseases and adopt new approaches in providing services to people with chronic diseases becomes more apparent.

One common type of telecare service is the use of sensors attached to a person's home or wearable sensors that are connected to a call center. These sensors make it possible to monitor the daily activities of individuals and their vital signs, as well as to control and manage the risks associated with care outside of formal care settings. The development of existing social alert services can also be mentioned in the forms and types of active monitoring in telecare systems (40).

Differences between the concepts of tele medicine, tele health, and tele care

Because the terms telehealth, telemedicine, and telecare are similar, and some are sometimes used interchangeably, they are described below.

Telemedicine: Telemedicine uses ICT to transmit medical information for the diagnosis, treatment, and education. In other words, performing all medical processes between physician and patient, provided there is a geographical distance between them that accelerates medical services, is called telemedicine. In this method, via the Internet, satellite networks, video conferencing system, and other means of communication, medical diagnoses tests about a patient are sent to the relevant doctor in different parts of the world, and he is consulted on how to treat. In general, telemedicine can range from a doctor-patient consultation to robotic surgery using satellite videoconferencing technology.

Medical information may include live images, video and audio, audio and video records, patient medical records, and data output from medical devices. Transmission may involve interactive video and audio communication between patients and medical professionals or between medical professionals without patient participation. On the other hand, it may simply describe the transmission of patient data through monitoring devices (telemetry) or from medical history (electronic

patient record). The people involved in the transfer may be in a general surgery situation, a hospital clinic, or another setting, if it is an emergency.
Telehealth: Telehealth is the use of information and communication technologies to transmit healthcare information to provide clinical, administrative, and educational services. In other words, 'telecommunication health' means the distribution of health-related services and information through electronic information and telecommunication technologies, enabling contact, care, counseling, reminders, training, intervention, monitoring, and hospitalization. It provides patient and physician telecommunications. It also refers to a wide range of technologies and electronic services and telecommunications that support telecommunications services.

The difference between telemedicine and telehealth:
While telemedicine specifically refers to medical services from a distance, telehealth can be linked to non-clinical services such as provider training, office meetings, and continuing medical education in addition to clinical services, according to the World Health Organization. Telehealth includes monitoring, health promotion, and general health performance.
In contrast, the term telecare is often used to describe the use of telemedicine to provide medical services to patients in their own homes or institutions.
Telecare: Telecare, using information and communication technologies, transmits medical information for the diagnosis and treatment of patients in their place of residence (41, 42).

Telecare background:

Home health care has a long history. For example, an article in Lancet in 1879 discussed the use of the telephone to reduce unnecessary office visits. When the National Aeronautics and Space Administration (NASA) began remote physiological surveillance, home monitoring was fully developed in the Mercury space program. Chronic illness is most needed in-home and community care. One hundred million Americans with a chronic illness make up about 75 percent of health care costs. Traditionally, the use of chronic care management technologies has been associated with a reduction in hospitalization, rehospitalization, length of stay, and

costs. The use of this technology can also lead to improvements in some physiological measures; High satisfaction and better loyalty to the use of medicine (43).

More precisely, telemedicine technology is said to have gone through three generations. The first generation of responsive telecare systems focuses primarily on social alerts. For example, users can use a pendant to indicate a call center for assistance or contact support staff. The second generation of preventive remote surveillance systems allows for more automated responses based on sensor information. For example, a crash tracker can automatically report alert conditions without the need for user intervention. Therefore, this generation of telemonitoring systems aims to create an alert without the need for the user to create it. Second-generation systems enable active user monitoring. The third generation of integrated systems aims to increase the quality of life of the user. For example, virtual forums can connect the user to a wider surveillance network and can provide access to teleservices for communication and advertising (44, 45).

Types of tele care systems:

Telecare systems can be classified into three groups. The first of these systems are commonly used in personal care at home. This system provides basic functions by measuring and recording physiological signals. Daily health data can be measured using wired or wireless sensors and transmitted to a care center or end organization via cable TV, bandwidth, or mobile connections. The second type of remote monitoring system offers smarter functions such as real-time diagnosis and prediction of the disease or emergency alarm notification. The third type of these systems provides interactive functions. Users can view their personal health status and consult with physicians via the Internet using a web application (46).

On the other hand, telemedicine can be divided into two types of online and offline communication modes. The offline approach is the simplest method that requires sophisticated equipment and less technical facilities. Basically, in this approach, the system first records only the patient's data and then transmits it to the beneficiary. For a teleconsultation system, medical data such as images, audio, and text are collected and stored and then sent to a medical professional. The specialist then detects the data at the appropriate time and, of course, within the time allowed. Generally, the offline approach can only be used for non-critical conditions such as

minor skin problems. In addition, this method is used to obtain the opinions of other experts to reinforce the first physician diagnosis. Examples of common offline communication media include social networks and social email messaging, multimedia messaging service (MMS), and text messaging service (SMS) that do not require a telepointer system in place.

In contrast to the offline method, the online approach includes two communication channels simultaneously sending and receiving instant feedback. This method provides more comfort and satisfaction due to the greater sense of presence and is typically used for critical cases (heart disease, diabetes) that require face-to-face communication. The most common method of online communication is video conferencing technology. The requirements for setting up an online approach are more detailed due to the additional technical equipment, required such as camcorders, video conferencing equipment, computers, and high-speed networks (47).

Review of studies (articles)

Review of clauses related to health technologies in upstream documents of the country

E-health and telemedicine is a new term that we use to describe a combination of information technology and electronic communications in the field of health and treatment. The upstream documents do not contain the exact names of the related words, but in a detailed study, the field of electronic health or telemedicine can be considered as an example or sample of some of the materials of these documents: In the following collected materials from the upstream documents, some from these applications, new technologies in the field of health were obtained:

Full text of the law of the Sixth Development Plan

Article 64 Note 2 of the sixth development program

To develop, disseminate and apply technology, the executive bodies are allowed to transfer the intellectual property, technical knowledge, and equipment that has been created and obtained within the framework of contracts with universities and government research and technology institutes to the mentioned universities and institutes.

Article 74 of the Sixth Development Plan Law

The Ministry of Health and Medical Education, to provide electronic health services, is obliged to establish an electronic health record system for Iranians and information systems of health centers within the first two years of implementation of the law in coordination with the National Statistics Center of Iran and the Civil Registration Organization. Private and subject to their permission and confidentiality of data and with the priority of starting the family doctor program and referral system.

The Ministry of Health, Treatment, and Medical Education is obliged to cooperate with organizations and centers of health services and health insurance within six months after the full establishment of the above system. Health insurance services in an integrated manner should be organized through information technology in interaction with the electronic health record system of Iranians.

Law of the Fifth Development Plan of the Islamic Republic of Iran:

Article 32 Note 1

All health care providers in the country, both governmental and non-governmental, are required to follow the policy of the Ministry of Health and Medical Education. Non-governmental health care providers who do not wish to cooperate with the comprehensive and public health system are not parties to the contract of the basic and supplementary insurance system and do not benefit from subsidies and public resources related to health matters.

Article 35

A) The Ministry of Health, Treatment and Medical Education to provide electronic health services to establish an electronic health record system of Iranians and information systems of health centers in coordination with the national database of the Statistics Center of Iran, the Civil Registration Organization while maintaining privacy and confidentiality of data and prioritize the family physician program and referral system. All health centers, both governmental and non-governmental, are obliged to cooperate in this field.

B) The Ministry of Welfare and Social Security, in cooperation with organizations and centers of health and insurance services, within the first two years at the latest, organizes the health insurance services program in an integrated manner and based on information technology in interaction with the Iranian electronic health record system.

All relevant units, both governmental and non-governmental, are obliged to cooperate in this field.

Twenty-year vision document of the Islamic Republic of Iran

46. Upgrading Iran's capital market and reforming the country's banking and insurance structure with an emphasis on efficiency, transparency, health, and benefiting from new technologies.

General Health Policies (stated by the leadership)

Promoting decision-making and action based on sound scientific findings in health care, education, and services or developing standards and guidelines, evaluating health technologies, establishing a leveling system or prioritizing health promotion and prevention services and integrating them into the science education system Medicine by Article 29 of the Constitution: the right to health care and medical care is recognized for all

An analysis of the general health policies of the Supreme Leader

Explain conditions, tasks and functions

Professor Mohammad Ismail Akbari *

The missing link in the field of health for the Ministry of Health and Medical Education and the implementation for the Ministry of Welfare and insurance organizations is the lack of clear, scientific, and evaluable indicators. These indicators, now known as *National Health Guides*, are the primary tools for procreation and performance. National guidelines are developed by evaluating health technologies, setting standards, and recognizing effectiveness, efficiency, productivity, and equity. This issue has been repeatedly mentioned in paragraphs 2, 5, 8, and 9 of the Communication Policy. The Ministry of Health can never be the custodian of health, and the Ministry of Welfare can never be a strategic implementer of health unless the health standards are clearly stated in the National Health Guidelines.

Comprehensive scientific map of the country

Health technology mapping includes all interventions in the health system, all interventions in the organization, access, payment system, and all tools used to promote health inside and outside the ward. Creating the following desirable

technology as a technology that is most appropriate in terms of efficiency, safety, cost-effectiveness, social ethical considerations, the possibility of having the needy and legal entities. Community health needs and health technology assessment are discussed.

National Articles:

1. In 2020, Purdavar and Askari's study entitled *Telecare in nursing and its ethical challenges* has been done in a review manner to explain and defining the science of ethics in distance care in nursing and a look at the ethical considerations around it. The results of this study show that ethical challenges in telemedicine include satisfaction, confidentiality, privacy, professional commitment (48).
2. Mehraein et al. conducted a descriptive-analytical study entitled 'Capabilities and requirements of the telemonitoring system for the health of the elderly' in 2020. The main purpose of this study is to determine the capabilities and requirements of the telehealth monitoring system for the elderly and to present it as a valid and reliable questionnaire. (49)
3. Kurdi et al. in the study entitled 'Comparison of the effect of education based on the model of follow-up care and distance care (telehealth) on the severity of insomnia in pregnant women to compare education based on the model of follow-up care and telehealth on Severe insomnia in pregnant women were assessed. The results of this study indicate that education based on the follow-up care model and telehealth both reduce insomnia in pregnant women. Since the telehealth method is cheaper and easier, this method can be used to improve the severity of insomnia in pregnant women (50).
4. Rabiee et al. conducted a study entitled 'Approach to telecare in diabetic patients' in 2014. In this study, they sought to implement a model for continuous monitoring of cardiac signals in patients at risk of a heart attack outside the hospital or at home to approach telecare in diabetic patients. These are the issues that telecare is essential for patients with diabetes and improve the management of diabetes and reduce the risks of the disease. About one-third of patients with myocardial infarction have diabetes. Continuous monitoring and monitoring of electrical activity of the heart of

diabetics reduces the risk of heart problems in diabetic patients. The authority of physicians and medical staff to monitor health and, if necessary, to intervene (51).

5. A study entitled 'Feasibility Study for the Establishment of Telemedicine: A Review Study and Proposal for Iran' was conducted in a systematic review method by Rumi Taleghani and Rafati in 2017. The purpose of this study was to review studies related to the goals and applications of telemedicine in different countries and to provide a proposal for the Iranian health system. The results of this study showed that the ambiguity of IT infrastructure, the problem of culture and education, rapid change Managers, inability to attract specialized and skilled IT personnel, lack of a clear mechanism to finance the electronic health system, and lack of technical standards, were recognized as major obstacles to the establishment of electronic health in Iran (52).

6. A study entitled 'Promoting the health of the elderly in a community based on mobile health and technology was conducted by Pahlavaninejad et al. in a review method in 2019. The purpose of this study is to investigate the role and importance of mobile health and technology in promoting the health of the elderly. The results of this study indicate that the main challenge in using mobile health in the elderly is lack of e-literacy and resistance to technology. (12).

The research entitled 'Study of strategic e-health planning and a review of obstacles and challenges in Iran' by Ahmadi and Naghipour in 2016 was conducted. The results of this study showed that although many efforts have been made to implement e-health in Iran, however, the e-health strategy in Iran is more general and has not been fully operational due to instability and existing barriers. On the other hand, the existing deficiencies in the country's IT infrastructure, attitudes and behavioral limitations of individuals, financial constraints, rapid changes of managers, lack of specialized and skilled manpower are the main and effective obstacles in the development of e-health in Iran. To overcome these obstacles, it is necessary to have a clear national strategic plan, coordination of individuals, policymaking and implementation of necessary laws, regulations, and standards, design of coordinated applications, electronic security systems, and promotion of a culture of using information technologies in the country's health system (14).

7. In 2019, Kabiri et al. conducted a narrative review study entitled 'Challenges and Opportunities of Using Telemedicine' in a narrative review study. The purpose of this study was to determine the opportunities and challenges facing the health system of different countries in the application of telemedicine technology. The results of

this study show that the challenges related to telemedicine technology can be divided into eight categories of information communication, financial, legal, security, health, standard, educational and cultural, among which, communication infrastructure and Legislation need the most attention and emphasis by policymakers. Also, the existing opportunities of this technology include technological, social, political, economic, and geographical factors, among which economic factors have been studied in several articles (53).

8. A descriptive-analytical study entitled Investigation of the necessary infrastructure for the implementation of telemedicine technology in hospitals affiliated with Zabol University of Medical Sciences was conducted by Mehraein et al. in 2014. The purpose of this study was to assess the necessary infrastructure and the possibility of using this technology in hospitals affiliated with Zabol University of Medical Sciences. According to the research findings, insurance and reimbursement problems (89.1%), basic infrastructure costs (82.6%), and lack of technical staff (80.4%) were the most basic infrastructural barriers for telemedicine implementation technology. Finally, this study stated that despite the favorable implementation culture, the studied hospitals did not have the necessary infrastructure to implement telemedicine technology and were not able to provide telemedicine services (54).

9. A descriptive-analytical study entitled Comparison of the first and second phases of telemedicine care project (MAPAD) in Shahid Beheshti University of Medical Sciences was conducted by Shajreh and coworkers for 4 years (2013-2017). Using web conferencing instead of video conferencing has reduced costs, expanded the network, and minimized patient mobility. Despite all the benefits of using this method, the expansion of the telemedicine network, especially in developing countries, requires culture building and continuous training of medical staff as well as patients (55).

10. In 2013, Mehraein and colleagues carried out a study entitled 'Requirements for tele mental health services for veterans in selected countries' to compare the requirements for tele psychiatric services for veterans in selected countries. The findings of this study show that the countries under study provide different types of care through tele psychiatric services in places such as homes, nursing homes, and clinics, while a small number of Iranian veterans can receive psychological services and benefit remotely. In addition, it can be stated that there is no approved program for the use of tele psychiatric services for veterans (56).

11. Mirmoeini and collaborators in 2019 and 2020, during a review study, express two main results: (1) Lack of specialized personnel and lack of proper and symmetrical distribution of specialized staff in Iran. (2) Lack of proper distribution of facilities in the country (19, 20).

International Literature

1. Sanders and colleagues, conducted a study entitled 'Examining Barriers to Participation and Acceptance of Distance Health and Distance Care in Experiments: Whole System Demonstrator. The study showed the obstacles to health and distance care acceptance related to non-participation and exit test' on the following topics: Specifications of technical competence and equipment performance, identity threat, independence and self-care, expectations and experiences of service disruption (57).
2. In 2014 a study entitled: Health Service Providers Perceptions of Barriers to Deploy Home Care in Taiwan: A Qualitative Study, was carried out by Chiang and coworkers. The purpose of this study was to examine the barriers that health care providers face when performing house teleassistance in Taiwan. The results of this research can be summarized in 5 areas as inappropriate laws and ambiguous policies, policy implementation that cannot meet public needs, lack of organizational support, lack of quality and comfort of the system, and insufficient public understanding and attitude. In addition, this study identifies barriers to policies and regulations as the most fundamental problem in implementing telecare (58).
3 In 2018 Kjelle and collaborators accomplished a study entitled Managers experience of success criteria and barriers to mobile radiography services in a nursing home in Norway: a qualitative study, aimed to examine the success criteria and obstacles in the process of mobile radiography services from the perspectives of managers, the hospitals and the municipalities. The results of this study indicated that three types of obstacles, namely financial, process, and structural barriers, were experienced by the managers. In particular, the reimbursement system, lack of management at all levels of health care, and lack of appropriate information systems acted as barriers. The most important facilitators are foreign financing, the presence of interested and enthusiastic people in organizations, and good cooperation between hospitals and municipalities (59).
4. In 2016, Kruse and coworkers performed a study entitled Assessing Barriers to Telemedicine Admission in the World: A Systematic Review. The purpose of this

study was to evaluate the barriers to the use of telemedicine around the world, analyzing scientific literature. The results of this study showed that telemedicine is not yet common, and its barriers are quite different. The most important barriers to be considered are technological barriers through training, change management techniques, and intermittent service delivery. Telemedicine and direct interaction between the patient and the provider can be fixed. In addition, the results of this study introduce several barriers that can be overcome through centralized policy (60).

5. Kruse and collaborators conducted a study in 2020 entitled Barriers to Use and Medical Consequences Related to Tele-Health Use in the Elderly: A Systematic Review. The purpose of this study is to identify barriers that prevent the widespread use of distance health and ways in which distance health improves health outcomes and quality of life indicators for the elderly. The most common barriers to studies include technical literacy, reluctance, and cost. The researchers also identified 13 medical outcomes related to telehealth interventions, the most common of which were: reducing stress, increasing independence, and increasing cognitive ability. The results of this study indicate that by increasing the use of telehealth, populations with chronic diseases and mobility limitations can enjoy care (61).

6. In 2013, a study entitled 'Technology as a System Innovation: An Interview Study with Key Experts on the Application of Innovation Dissemination Model in Tele Care' and the continued use of tele care technologies was conducted by Sugarhood and colleagues. Key issues identified in this study include the complexity and uniqueness of the 'user system', the ongoing work required to support telecare use beyond initial approval, and the relatively weak links typically found between users of telecare technologies and Organizations that design and distribute them. As a result, it can be said that telecare is not just a technology but a complex innovation that requires input and coordination between individuals and organizations. Therefore, to promote their use and acceptance, these addressed issues must be identified, understood, and correctly addressed (62).

7. A study entitled Telecare? An Interpretive Study of the Experiences of the Elderly and Their Family Caregivers was conducted by Karlsen et al. in 2018 to gain a deeper understanding of the continued use of telecare for the elderly and their family caregivers. The study found that older people reported increased safety, security, and independence. Although some of them faced challenges, they continued to use the services. As a result, it can be said that telecare improves the care provided by home

care services. However, it must be provided in response to everyone's specific needs. Family caregivers may benefit from telecare, but telecare may also increase their caregiver burden (63).

Papers:

Unfortunately, there is no suitable database for searching theses in the country and it is almost impossible to access the full text of the papers. For this reason, an abstract of some of them is given in the table below:

No	first author	Date of publication	publication	Title	Results	Reference	Expertise field
1	Ellahe Mirinejad	2013	Thesis	Study of effective factors on the establishment of telemedicine system in Zahedan University of Medical Sciences	Findings showed that only 10% of the subjects were aware of telemedicine technology and in their view the video conferencing network and physicians are the most important resources for telemedicine implementation. Also, the Internet and communication lines are the most important infrastructure (66%) for setting up telemedicine and the lack of private sector participation in the implementation of telemedicine in hospitals (81%) and cultural factors as the most important obstacles in the implementation. These were technologies. In general, people working in the studied hospitals have little knowledge about this technology and cultural barriers prevent the implementation of this technology. Launching a telemedicine consultation network can increase the community's access to health services and reduce health costs, so it is recommended that hospitals take the necessary measures to increase staff awareness and establish a telemedicine network.	Mirinejad A. Study of effective factors on the establishment of telemedicine system in Zahedan University of Medical Sciences: Ministry of Science, Research and Technology, Sistan and Baluchestan University, School of Management and Accounting; 2013	Management - challenges, factors and requirements

2	Leila Azarbod	2012	thesis	Feasibility study of deploying telemedicine software using information and communication technology (Case study: 5 university hospitals in Isfahan)	The results of this study show that the required facilities in 6 components of software, management, security, culture, manpower, infrastructure are related to the deployment of tele imaging. The statistics performed in this field showed that in order to achieve a close relationship between the current situation and the desired situation, the medical centers should make new plans. One of the most important results is the relationship between the software, which unfortunately was not in any of the centers. The results of this research can be used by managers and information technology and communication specialists of medical centers.	Nobakht Samin, Bagheri Somayeh, Mehraein Ismail, Shamsabadi Ahmad Reza. Feasibility study of implementing telemedicine technology in selected hospitals of Iran. Health care. 1397 [cited 2021 December11]; 12 (1): 25 33. Available from: https://www.sid.ir/ fa/journal/ ViewPaper.aspx?id =347994	Feasibility
3	Fatemeh Marjani	2014	Thesis	Evaluating the economic effects of telemedicine implementation in Fars province	One of the results of the analysis of questionnaires and statistics shows the annual consumption of about 10 million liters of fuel due to the relocation of these two clinics. This amount of fuel consumption causes the annual production of about one ton of pollutants in the air. Another result of this study is estimating the number of road accidents caused by the transfer of patients from these two clinics. According to statistics, there are about 6,500 people injured and about 520 dead annually due to these road accidents. By extending these results to all medical visits in Shiraz and to all provincial centers, these statistics are 6 and 180 times higher in fuel consumption, air pollution production, number of injured	Marjani F. Evaluation of economic effects of telemedicine implementation in Fars province: Ministry of Science, Research and Technology, Shiraz University, Faculty of Electronic Education; 2014.	Health Economics

					and number of deaths due to transportation, respectively. Patients, the financial burden of patient relocation affects the government at the provincial and national levels. This study also determines the impact of telemedicine services in reducing travel costs and wasting patients' time. Investigating the impact of these services on the local economy and increasing the quality of life of people in the community are other results. In addition, the amount of financial burden due to patient transportation on the government and the impact of telemedicine services in reducing this financial burden was analyzed. On the other hand, the amount of initial investment to provide telemedicine services in a provincial center, it is estimated at 70 million Tomans and 2.5 million Tomans for setting up each workstation. Also, the current cost of the central unit is 4 million Tomans per month and the monthly cost of setting up each workstation is about 3 million Tomans. At the end of this research, cost and benefit, return on investment and financial risk are analyzed and economically calculated.		
4	Nabiallah Zarezade	2018	thesis	Challenges of deploying telemedicine at Jahrom University of Medical Sciences	The five main themes of the research findings included: technical factors, organizational factors, financial factors, human factors, and supportive factors, which were the main challenges in establishing distance therapy. Discussion and Conclusion: Establishing and providing telemedicine services is associated with various challenges and various factors are effective in the successful and sustainable deployment of such projects. The most effective way to deal with the existing	Zarezade, N. Challenges of Establishing Telemedicine at Jahrom University of Medical Sciences: Islamic Azad University, Marvdasht Branch; 2018.	Manage challenges

					challenges is to prepare a national plan and strengthen the technical infrastructure.		
5	Somayeh Alizadeh	2010	thesis	Investigating the effective factors in the transfer of telemedicine technology in Iran	The final results obtained from the respondents according to the statistical sample of the study indicate that based on the degree of impact on the telemedicine capability variable, respectively, technological acculturation, national ICT policies, health infrastructure, organizational readiness, national security policies and Information protection, national e-health policies, effective implementation, IT infrastructure and rational decision making have a positive effect on the deployment of telemedicine in the country and the variables of power distance and avoidance of uncertainty have no statistically significant effect.	Alizadeh S. Investigating the effective factors in telecommunication technology transfer in Iran: Ministry of Science, Research and Technology, Al-Zahra University, Faculty of Social and Economic Sciences, 2010.	Manage factors and requirements
6	Mahdiye Montazeri	2015	thesis	Health information management	After analyzing the data of 91 patients who referred to the dermatology clinic of one of the university hospitals, it was found that software implementation leads to a reduction of 82.36% of trips to the center of the province, which travel daily with the aim of diagnosing and treating skin diseases. Conclusion: After ensuring the achievement of the project goal, start designing the software and design the software on the web in ASP.net with SQL Server database and with the address Telederm.kmu.ac.ir in the university Kerman Medical Sciences was implemented.	Montazeri Mahdieh, Bahauddin Beigi Kambiz, Tawfiqi Shahram. Design of a telemedicine software system in the diagnosis and treatment of skin diseases to reduce provincial travel in Kerman University of Medical Sciences. Hospital. 1393 [cited 2021December11]; (Special letter): 0 0. Available	Dermatology Informatics

						from: https://www.sid.ir/fa/journal/ViewPaper.aspx?id=219054	
7	Zahra Ghasemi Ravari	2017	thesis	Investigating the necessary infrastructure for the implementation of telemedicine technology in hospitals affiliated to Zabol University of Medical Sciences	According to the research findings, insurance and reimbursement problems (89.1%), initial infrastructure costs (82.6%) and lack of technical staff (80.4%) were the main infrastructural barriers for telemedicine implementation technology. Problems, staff training, financing for technical infrastructure, recruitment of technical staff, providing care and performing surgeries were introduced as priorities for the use of telemedicine technology. They did not have telemedicine technology to implement and were unable to provide telemedicine services.	Ghasemi Ravari Zahra, Mehraein Ismail, Bagheri Somayeh, Karimi Mahdieh. Investigating the necessary infrastructure for the implementation of telemedicine technology in hospitals affiliated to Zabol University of Medical Sciences. Mashhad Paramedical Sciences and Rehabilitation Sciences. 1395 [cited 2021December11]; 5 (3): 74 82. Available from: https://www.sid.ir/fa/journal/ViewPaper.aspx?id=311461	Equipment management
8	Sogand Tourani	2012	Health Information Mana	Capability of specialized hospitals of Iran Universit	Of the eight hospitals studied, the knowledge of the managers of 4 hospitals was higher than the mean (29) and other hospitals were lower than that. In terms of standards, Hasheminejad Hospital was in better condition than other	Turani Soghand, Khmernia Mohammad, Delgoshai Bahram. Capability of	Equipment feasibility management

			geme nt	y of Medical Sciences in the field of establishi ng telemedi cine consultin g	hospitals. In general, Hasheminejad and Shahid Fahmideh hospitals had higher than average scores on managers' knowledge and required standards. Of the eight hospitals studied, only two hospitals, Hasheminejad and Shahid Fahmideh, were prepared for the implementation of the telemedicine consultation network. Launching a telemedicine counseling network can increase the community's access to health services and lead to a reduction in health costs. Therefore, it is recommended that hospitals establish a telemedicine counseling network. Take the necessary measures.	specialized hospitals of Iran University of Medical Sciences in establishing telemedicine consulting. Health Information Managemen t. 1390 [cited 2021Decemb er11]; 8 (6 (:((پیـاپی ۲۲ ۷۸۵. ۷۹٤ Available from: https://www .sid.ir/fa/jou rnal/ViewPa per.aspx?id= 155466 Turani Soghand, Khmernia Mohammad, Delgoshai Bahram. Capability of specialized hospitals of Iran University of Medical Sciences in establishing telemedicine consulting. Health Information Managemen t. 1390 [cited 2021Decemb er11]; Available from: https://www .sid.ir/fa/jou rnal/ViewPa per.aspx?id= 155466	

9	Azade Shayan	2016	Thesis	Operational and technical feasibility study of telemedicine in selected hospitals of Isfahan University of Medical Sciences in 2014	The average score of telemedicine operational feasibility from the perspective of physicians was 68.5 and from the perspective of managers was 65.4. This average was significantly higher than average. The average score of telemedicine technical feasibility was 48.43 which was not significantly different from the average (score 50). In telemedicine use, the most interested physicians were in consulting with 63% and the least interested in providing care with 10.1%. Initial costs are the most important obstacle to telemedicine implementation. Conclusion: Due to the high average operational feasibility score, it can be said that Isfahan University of Medical Sciences can accept the strategy of change and successful operation of telemedicine technology. However, in the perspective of all hospitals, telemedicine should be included as a priority and the necessary provisions should be made regarding the holding of training courses in order to familiarize hospital managers and physicians better. Regarding technical feasibility, it can be said that according to the current infrastructure in the field of hardware and network, it is only possible to perform the most basic levels of telemedicine at Isfahan University of Medical Sciences. Note that the current bandwidth (50Mb / s) is not enough if there are high quality cameras and microphones that can transmit audio and video properly. It is recommended to select a suitable substrate for telemedicine fiber optic implementation with a minimum bandwidth (80Mb / s).	Shayan A. Operational and technical feasibility of remote medical implementation in selected hospitals of Isfahan University of Medical Sciences in 2015 [Operational and Technical Feasibility of Telemedicine Implementation at Selected Hospitals of Isfahan University of Medical Sciences in 1393: Isfahan University of Medical Sciences. 2016.	Management and medical information Feasibility study

10	Fatemeh Mokhtari Yazdi	2021	thesis	Design, development and evaluation of a telemedicine system based on mobile application and compare its accuracy with a visit to the doctor to diagnose skin diseases	In general, the Major matching rate was determined in consonant detection and tele diagnosis by determining the coefficient of agreement k = 0.895 and P< 0.001. As well as the Sub Major matching rate in the consonant agreement and tele diagnosis were determined by determining the coefficient of agreement K = 0.814 and P <.001. Conclusion: The high level of direct and tele clinical diagnosis expresses the effectiveness of distance medical method in diagnosis of skin diseases. According to this issue, it can be used to accelerate the diagnosis and treatment of skin diseases using dermatological trapping method, which leads to reduced therapeutic costs and accelerating the patient's recovery process.	Currently used system	Dermatology Informatics
11	Sare Keshvardoust	2019	Thesis	Design, implementation and evaluation of an ophthalmology telephoto system to diagnose diabetic retinopathy in digital retina imaging with portable fundus camera	In the first phase of the research, out of 38 information elements that were surveyed, 24 elements with more than 75% agreement and 9 elements with 50 to 75% agreement were considered as important and relatively important data elements, respectively. In the third stage of 125 diabetic patients, 8 patients (6.4%) were not analyzed due to low image quality and finally 117 patients were examined. The sensitivity and specificity of retinal specialists in diagnosing different types of retinopathies compared to face-to-face examination were 90 and 97%, respectively. The sensitivity of referral retinopathy diagnosis for retinal specialists was 92% and 85%, respectively, and the sensitivity and specificity of DME diagnosis for both specialists were 93% and 100%, respectively. Also, the sensitivity of general practitioners was 95% and 93%, respectively, and the specificity for both was 98%. The rate of diagnostic agreement of	Currently used system	Ophthalmology Informatics

					general practitioners was more than 90% compared to the face-to-face method. In general, with the implementation of this system, between 40 and 55% of referrals were diagnosed as unnecessary by physicians. Conclusion: Our results as the first study conducted in Iran showed that the diagnostic accuracy of the ophthalmic trap system is high and the ability to prevent unnecessary referrals Identify treatable patients. The findings of this study can be used in setting up and developing this system in the country and province in order to reduce eye injuries caused by diabetes, reduce unnecessary referrals to medical centers, increase access to specialist physicians, especially in remote areas, and make optimal use of Use medical resources for patients with emergencies.		
12	Ali Asghar Safayi	2016	Thesis	Modeling the monitoring system from self-reported psychotherapy; Case: Depression	In this thesis, due to the importance of the subject, design and modeling of monitoring system, self-report-based psychotherapy for depression abnormalities has been achieved. First, by observing similar systems, interviews with professionals, nurses and patients, and the questionnaire and analysis of the requirements of such systems were recorded. Then, based on the requirements, design and modeling of the proposed system in the form of class charts, applied, sequencing, activity, machine mode, component and deployment in UML2.0. Because of the importance of qualitative factors and the accuracy of the requirements, the proposed system evaluation phase was performed using two methods based on scenario and simulation. The results of the system evaluation show that the use of	Currently used system	Medical information and documents modeling the nervous system

					the system has been effective in increasing qualitative factors and the proposed model also covers all extracted requirements.		
13	Hamid Keshvari	2016	Health Information Management	Feasibility study of telemedicine implementation according to the components of strategic planning in Isfahan province	The highest frequency of attitude scores on the impact of information technology on improving the quality of services (65.1%) is related to people with favorable attitudes and the lowest frequency (3.3%) is related to people with unfavorable attitudes. Internal factors of managerial changes (100%), provision and continuity of credits (79.3%) as weaknesses and nature of telemedicine program and the nature of health programs (100%), goals and desires of current managers of the organization and its compliance with medical goals Remotely (100%), having human resources interested in working with computers in daily activities at environmental levels (93.1%) are known as the strengths of the organization. Also, in the field of technology specialists, the organization has the opportunity and the repayment of specialists' salaries by insurance organizations is one of the threats of the organization. Considering the strengths, weaknesses, opportunities and threats identified by managers and experts and comparing them with the identified success and failure factors, it shows that there is a lot of potential for telemedicine in the province and can be an appropriate strategic plan, implemented projects in the field of telemedicine in the province and took a step towards approaching the ideal goal of justice in health.	Keshvari Hamid, Haddadpour Asefa, Aghdak Pejman, Taheri Behjat, Nasri Mehran. Feasibility study of telemedicine implementation according to the components of strategic planning in Isfahan University of Medical Sciences. Health Information Management. 2016 [cited 2021December11]; 12 (5 (45)): 625 635. Available from: https://www.sid.ir/fa/journal/ViewPaper.aspx?id=289386	Medical engineering, feasibility study, engineering

During the coronavirus pandemic

Corona's disease in the late of 2019 and the general fear of genital disease in medical use. In the following, we will pay more attention to some studies in this period:

No.	Publication	Title	year	First author	Results	Expertise
1	jccnursing	Tele homecare for Chemical Veterans in the COVID-19 Pandemic	2021	Moradali Zareipour, Mohammad Saeed Jadgal, Najaf Ahmadi Aghziyarat	THC can provide services to veterans at home, regardless of time and place. Veterans, who have special conditions, including chemical warfare victims with respiratory problems and chronic illness, can receive medical advice without going to a health center, thus reducing health care costs and veterans' time is saved. The length of hospital stays decreases with the use of this technology and the independence of veterans and self-management in veterans' increases. THC provides an opportunity to continue and improve the education process. Finally, THC will reduce the risk of the Covid-19 disease in chemical warfare victims.	Nursing
2	BMC Public Health	The role of telehealth during COVID-19. outbreak: a systematic review based on current evidence	2020	Elham Monaghesh (65)Alireza Hajizadeh	Eight studies met the inclusion out of the 142 search results. Currently, healthcare providers and patients who are self-isolating, telehealth is certainly appropriate in minimizing the risk of COVID-19 transmission? This solution has the potential to prevent any sort of direct physical contact, provide continuous care to the community, and finally reduce morbidity and mortality in COVID-19 outbreak. The use of telehealth improves the provision of health services. Therefore, telehealth should be an important tool in caring services while keeping patients and health providers safe during COVID-19 outbreak.	Telehealth
3	Information Technology Conference and Promotion	The application of tele-nursing in crisis of Corona	2021	Hosna Naseri Harsin, Anahita Khodakarami,	Findings showed that the applications of telemedicine include: increasing patient improvement (1 study), increasing patient satisfaction (4 studies),	Nursing

	of Nursing Center			Pouria Afshari Fard	increasing access to care (2 studies), increasing ease of use (2 studies), increasing telephone counseling for nurses (1 Study), evaluation of non-emergency patients (1 study), increase of virtual visits (1 study), increase of Covid disease control (19 study), reduction of time, distance and treatment costs (3 studies), reduction of patients' anxiety (1 study) Conclusion: Remote nursing in coronary crisis can improve the condition of patients and increase their satisfaction and also reduce the transmission of the disease. However, Internet access and insecurities such as information disclosure are some of the concerns of using this method.	
4	Preventive medicine	Telemedicine services for women with gestational diabetes mellitus during the COVID-19 pandemic: A review study	2020	Fatemeh Moradi, Akram Ghadiri-Anari, Behnaz Enjezab	According to the results of the studies, face-to-face visits should be accompanied by ultrasound appointments. Postpartum diabetes screening should be delayed for 3-6 months. Compared to routine care, telemedicine services were associated with reduced polyhydramnios, premature rupture of membranes, preterm labor, emergency cesarean section, and neonatal asphyxia in women with gestational diabetes mellitus. The use of telemedicine services for women with gestational diabetes in the context of the outbreak of coronavirus is an appropriate and cost-effective way to prevent the COVID-19 and to reduce the risks of gestational diabetes; it also reduces the anxiety in the women	Midwifery
5	Razi Journal of Medical Sciences, Iran University of Medical Sciences	An overview on trapicamin in the area of premature infants in Corona	2021	Zahra Amini (67), Reyhaneh Askari Kuchsangi	Premature infants are at risk of developing different disorders in their physical evolution and cognitive evolution compared to other infants. Since the main caregivers of neonates are their parents, it is important to educate parents. Due to the expansion and advancement of communication technologies, the use of	Medical

					telemedicine is developing in the area of day-to-day development. The use of telemedicine has shown that the use of this possibility increases the access of specialists to babies, reducing the unnecessary displacements of neonates. Reducing post-clearance referrals and thus reducing costs as well as the separation of the mother of the baby. In addition to using this therapeutic approach, in the current situation, respect the principles of quarantine and social distances, and the custody of the use of golden time treatment Infants does not enter.	
6	International Health Conference, Crisis and Safety	The role of telehealth in the management and control of the coronavirus crisis	2021	Fatemeh Mehdizadeh Faezeh Mehdizadeh Reza Moradian Hussein Ranjbar Dawn of Livestock	Tele health in tele medicine and tele nursing has been well suited to education, screening, trace and tracking, quarantine, diagnosis and treatment for patients and treatment staff and continue to introduce benefits. Everyone in the Corona's pandemic crisis. Conclusion: The use of remote health provides health services. Therefore, remote health is an important tool for care for services, while patients and health services providers keep safe on the prevalence of Covid 19.	Medical
7	New Medical Information	Tele health of patients with chronic diseases during Coronavirus 2019 Epidemic	2021	Ebrahim Rahbar Karbasdehi, Fatemeh Rahbar Karbasdehi	The daily life of people around the world is heavily influenced by corona virus, and in these conditions, the needs of patients with chronic diseases are ignored. At the same time, it is important that patients with chronic diseases are physically secure, but also to take care of their mental health. In this situation, social distance and	psychology

					its isolation can affect the health of these patients and make it harder to deal with this disease. To find instant and long-term solutions for this problem, effective measures should be taken. Therefore, recognizing the problems of patients with chronic diseases during the prevalence of corona virus can provide the ground for prevention, training, intervention and effective treatment for these patients.	

Summary of results obtained from the review phase

Summary of challenges

The review phase of this study was conducted to answer the following two questions:
1) What are the challenges of deployment of the tele care system in Iran?
2) What are the requirements of deployment of the tele care system in Iran?
The identified challenges are listed in the table, which are summarized as follows:
1. Educational Challenges: The lack of electronic literacy in patients with chronic and elderly illnesses, inadequate skills in using electronic health among patients and providers, weakness in computer literacy, low health literacy, knowledge and knowledge of the use of all kinds of Information and communication technologies for managers and investors did not have home care provider centers or is not desirable, inadequate knowledge in electronic health between patients, citizens and health professionals, poor knowledge;
2. Cultural Challenges: Resistance to Use Technology by Patients, Cultural Resistance to Adoption of Electronic Health Tools by Providers and Patients, Identity Threats, Poor Culture.
3. Financial challenges: Insufficient budget, uncertainty about the cost-effectiveness of the program, costs, inefficiency/long-term installation, how to pay for specialist doctors, insurance issues, limited evidence of cost-effectiveness, high costs Launch, no refunds, short-term budget, pricing.
4. Technical and infrastructural challenges: Compatibility and interoperability problems between different tools, insufficient technical / ICT support, lack of IT infrastructure, electromagnetic interference with biomedical devices, reliability and accuracy of wireless internet access systems, lack of time in the settings required for

support of devices, weakness in user-friendliness of technology, system complexity, poor characteristics design for each position, the system requires integration with the mobile infrastructure available, difficulty in using the system, lack of help with the system, performance issues, systems are not comprehensive by considering the needs of users, technical errors and a program to follow up on each patient;

5. Legal and official Challenges: The lack of legal framework, official approval.

6. Ethical (or Security) Challenges: privacy, security, privacy and data management issues, confidentiality and information security issues.

7. Challenges in the field of standards: Lack of standards and instructions, requirements of technical competence and equipment performance, weakness in uniformity of standards, poor care standard.

8. Organizational Challenges: Non-awareness of senior executives from potential benefits and saving costs associated with related technologies, lack of readiness for medical team for technology, lack of strategic management, lack of organization's readiness, lack of time for remote care visits in the model Care by doctors, problems in determining the responsibilities and potential commitments of health professionals, more pressure on providing timely services, lack of professional boundaries, time constraints, information flow, non-effective, monopoly, not marketing / handling / Inappropriate, false understanding/ non-admission, not proven (in this area, RCT is very low and the effectiveness of mobile technology has not been proven to increase adherence or stopping), disruptive experiences in services, sustainability, influence, poor protection, factors Related to responsibility, such as laws and regulations prevent assistance beyond agreement, integrate new technologies in the service provision;

9 Individual Challenges: Failure to understand the need and value of services, location, time and opportunity to use, uncertain about the nature of the program, and what they will be asked, successful use depends on physical and mental conditions. It may annoy doing everyday work different users have different expectations of care services, a heavy responsibility for patients with chronic illness, a limited understanding of individual diagnosis and disease, false understanding / non-acceptance, distribution (adoption of health is almost low), independence, and care from itself, the expectations and experience of disrupting services, the challenges of attracting and accepting the market, the amount of interest and acceptance, physicians' pessimism, lack of confidence in the use of the computer.

Summary of requirements

In response to the second question, the researcher examined the requirements for establishing a remote care system for the elderly. The requirements mentioned in table number are summarized as follows:

1. Requirement in infrastructure and standards: Providing infrastructure, letter, and standard
2. Research requirements: More research in this field
3. organizational requirements: senior management support,
4. Requirements in the Human Force field: Competencies of health professionals include information and attitudes related to information and communication technology, analysis and interpretation of electronic health data, support and guidance, communication skills, privacy and confidentiality, employee re-assignment
5. Technical requirements: High-speed internet network, ease of use

Conclusions

Telemedicine services in Iran have been developed more in the non-governmental sector and due to the relatively appropriate availability of internet at the country, the minimum technical requirements exist to establish the connection between the provider side and the patient side, but there are still some standards and regulations to be defined for providing communication between the provider and the patient, and there is still a lot of work to do about the legal issues of security, information protection, privacy of patients and confidentiality, reimbursement tariff and culture and education.

In Academic activities, which is usually the initiator of preparation and preparation of guidelines for the frameworks and standards to provide to the formal authorities for approval and dissemination, most of the telemedical activities are in the form of research and experimental trials for a niche group of patients with specific needs of medical and medical services.

Few numbers of organizations have done activities for delivering telemedical services to the organization staff and their families in a limited number in government agencies such as the ministry of petroleum and military organizations which has not been a precise report of their results.

During the pandemic of COVID-19, due to the restrictions that healthcare centers had been faced to in providing services to patients, especially non-COVID patients, a lot of activities were started by private start-ups and the number of remote services especially in private sector grew up amazingly fast. Many physicians in the private sector have started visiting and consulting remotely. However, the service has yet to share a small part of the services provided to the entire country, and no accurate statistics have been published for it.

These infrastructures and requirements for the development of telemedicine in Iran can be addressed as following:

1. Providing technical infrastructure to all parts of the country to supply proper access to the internet with appropriate bandwidth.
2. Set up a regulatory regime and accreditation of telemedicine services.

3. Developing guidelines and standards for providing telemedical services including all stages:
    a. Preparing patient information to provide physician with needed information before initiating the communication.
    b. Recording patient data in a safe and reliable manner for future usages.
    c. Prescribing physician's orders electronically.
    d. Insurance coverage of telemedicine services.
    e. Determining a reasonable and fair reimbursement system for providing telemedical services.
    f. Writing clear rules and regulations in terms of patient rights and responsibilities, physician rights and responsibilities, patient informed consent, and privacy of patient information.
    g. Writing standards for telemedicine equipment and communication platforms between physician and patient.
    h. Defining prerequisite conditions for the use of telemedicine in hospital, healthcare centers, clinics and, and physicians' offices and telemonitoring and home telecare services.
4. Proper training of physicians and medical staff and providers of communication technical services as well as manufacturers and developers of and medical equipment and platforms to provide telemedicine services.
5. Specifying the scope of the applicable telemedical services, and more importantly those services that should not be provided remotely such as such as emergencies and acute situations and life-threatening conditions to prevent missing the golden time for saving patient's life.
6. Dissemination of telemedicine knowledge among people, physicians, medical and medical sciences students during their study courses and postgraduate CME courses.
7. Conduct research studies on cost-effectiveness of telemedicine services in various diseases and diverse groups of patients and various types of remote services that can be provided such as visits, consulting, monitoring, and homecare.
8. Developing a reimbursement tariff system, the measuring estimated cost of services, the insurance coverage of the services and assessment of cost-benefit of telemedicine services for insurance organizations and showing how reducing healthcare costs as well as the cost for patients and the cost of providing access

to health services in remote areas that have fewer access to specialists and facilities.

9. Establish specialized training courses in the field of telehealth, telemedicine, and telemonitoring/telecare and training experts to set up and supply these services in healthcare centers, specialized hospitals, and doctors' offices.
10. Supporting the platforms and active start-ups in the field of telemedicine and to supply maps for telemedicine and to determine the status and how to connect it to the electronic health record of citizens in the country to develop these platforms and produce appropriate equipment and systems to provide these services at a wide level for all people.
11. Conducting international contributions with academic and healthcare centers working on telemedicine in the region and at the world level and cooperating in joint projects for providing telemedical services to areas with crisis such as natural disasters and wars.

However, it seems that if the infrastructure is provided and the necessary needs by legal authorities and health centers, public interest can be in the use of telemedicine services, not only in district and deprived areas, but also in the urban and prosperous regions of the country. Finally, regarding the beginning of the early steps in the above-mentioned backgrounds, soon we can see the spread of telemedicine services across the country and for all the groups of people with easy and available conditions.

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