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A Proposed Clinical Decision Support System Based on Virtual Telemedicine (Case Study Iraqi Rural Areas)

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Abstract

The patient continues with the hospital directly leading to the hospital inflation and low efficiency and high cost of patient work.So the Solutions: Creating simple electronic environment while providing units and medical intermediate (virtual health center) between the doctor and patient. This assessment leads to pressure the cost of treatment and provide easier service and high efficiency and real time. The dominant feature of the health system in Iraq is built on the basis of treatment in public hospitals is always because the private sector hospitals are expensive and this put pressure on public hospitals and health centers, especially in rural and remote places form. In this paper, proposed set up a virtual health centers include websites, public health centers, medical clinics and linking them with instruments and smart phones by providing information of physicians and medical services provided and citizen media deadlines as well as linked to social networking sites. Citizens can choose the physician through the data and information available base, this ensures the benefit of doctors owners of rare specialties from anywhere in Iraq at any time and can be an Iraqi citizen reporter his doctor anywhere, at any time for the purpose of diagnosis through the data and information related to telephones patient base to ensure continuous communication easily and cost low.

Keywords: Type your keywords here; separated by semicolons (;).

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1. Introduction

The objective of the research is to use a design based on the available electronics to expand the geographical area of the primary health care centers to achieve efficiency in implementation and economy in the cost of work and provide service to a larger number of citizens in remote areas, The right to enjoy health care is a citizen access to state of the social and psychological integration. Affected the security situation in Iraq on access to health centers as easy and fast. Remote and rural areas suffer a shortage of health centers and medical centers, clinics, and also the difficulty of access to it in addition to the lack of doctors in these centers because of the security situation of the country retreated some public health indicators. There are some people in disadvantaged fun simplest medical services in rural areas. This study focused to solve these problems by providing a future proposal for possible action by virtual centers where comprehensive medical database and provides associated with instruments and smartphones to make it easier for rural citizens to enjoy rapid state of medical services like the citizen and the city without trouble or move from his area.

2. E-health

The concept of e-health means the exploitation of the health sector to communication and IT technology within the digital domain many applications of the most important medical information management through the collection and storage of information in addition to the processed and the possibility of search and retrieval. This application is called the electronic medical record that contains medical information and data for each patient so that they can transfer this information electronically a momentary [3]. The other application within the e-health is the exchange of medical information between doctors and specialists conduct surgeries remotely Rapid and telemedicine as well as digital radiation imaging techniques. The third application is a smart pharmacy that contains the names of the most important medicines in circulation and methods used. The proposed application in this study is the virtual health center where linking information for this center through websites and then it is connected with instruments and smart phones for citizens, doctors and staff at the health center [5]. So there are many virtual reality applications and increases progress every day can be applied in the following research areas, flight simulator, medicine and health, education, entertainment. In these areas, meaning the use of virtual reality be clarified by computer simulation environments in the real world is done using the means of advanced technology and networks, smart phones and optical display and virtual reality techniques within digital environments.

3. Virtual medical center

It is a creation of websites for health centers and primary medical care and linked to smart phones and through which to provide data on private physicians and medical services and information as well as the recording schedule and link them to social networking sites in addition to enabling the citizen to choose a physician specialist and is done through the existing database data so that citizens benefit from doctors with rare specialties who are far away or in the city is difficult to reach them at any time [6]. The patient can also correspondence from his personal physician in any place and at any time needed to diagnose the state of his health or his health after a follow-up. In this study, the focus is to make it a simple citizen or a digital record

digital card containing a smart chip, this card is characterized by privacy for every citizen in terms of the health history and health problems and the type of blood type and X-ray analysis and that its own.This card helps a physician diagnose the patient's condition remotely where pass this card offers in the health and able physician access to the patient's electronic file and can thus diagnosis initially been saving time, effort and time on doctor and patient.

3.1. Telemedicine (components, uses, benefits)

Telemedicine is a form of medical practice based on the use of smart devices and sophisticated communication technologies for the purpose of exchange of health and medical information and provide better health care regardless of time, geography, culture and others [1]. Be telemedicine first two types (synchronous) where the real-time communication between doctor and patient and type II (asynchronous), where the patient transfer and delivery of medical material in video, image, or any other means of Full specialist doctor at a later time. The most important uses of the electronic medical care are in medical consultations or in the case of infectious diseases or deadly epidemics, for example, and be the electronic medical services either private consultancy remote or medical remote monitoring or medical answer in case of emergency. This paper suggest the following equation for building telemedicine:-

Telemedicine=Tele-consultation + Tele-surveillance + Tele-urgency. And there are also some electronic medical devices that belong to telemedicine, such as pressure measurement device and sugar measuring device and temperature measuring device and conduct pregnancy tests.

3.2. The current health situation in the rural of Iraq

As a result of the lack of a social level in rural areas in Iraq led to a decline in some of the public health indicators in these areas as a result of the fact that these remote areas led to the difficulty of access to the city center or close to an urban area for the purpose of reviewing the health centers. For this purpose there has become a percentage of deprivation for the citizens in this region to enjoy good health services from doctors distinguished with rare specialties [8]. This problem impacted heavily on these areas, especially in the areas of chronic diseases and genetic diseases, organic and health care for pregnant women, malnutrition and other. According to statistics of the Iraqi Central Bureau of Statistics, the proportions of deprivation in remote rural areas have become about 60% [3]. This study aimed at finding advanced solutions for the purpose of avoiding this problem and access to quality health care level.

4. Proposed system of virtual telemedicine

Telemedicine can be used for a lot of health services and primary care and the like allergies, joint pain, asthma, insect bites, pharyngitis, sports injuries, skin inflammation. The telemedicine proposed system provides maids telemedicine range widely, which is at a lower cost and less time.The system needs to technology where it is by contacting a digital network Internet between the health center and between the patient at home remotely (especially Al amancnnaiah and rural areas), so the system needs to net programs such as the use (high-speed internet lines) for the purpose of connecting remote health centers to facilities large health and hospitals and

then be linked to the patients in their place of residence. The proposed system also requires the network between the patient and the urgent care centers and emergency trying to get urgent medical service and monitor the patient remotely, where possible medical data measuring the patient at home and then move electronically to an electronic control center remote (be often via smart phones. Also it is proposed in an e-mail system (e-mail platform) advanced utmost secrecy where they are the patient's own data exchanged on the Internet carryconfidential manner and can be patient for the exchange of data on the Internet to a specialist medical consultations and to a specialist doctor in real time. May help in this proposed system some digital medical sophisticated equipment to be able to follow-up the patient remotely in his home or place of work through the use of removable devices to wear and contains the sensors (devices of mobile medical) as we make sure ease and speed with few costs in real time. (As show in figure 1)[2].

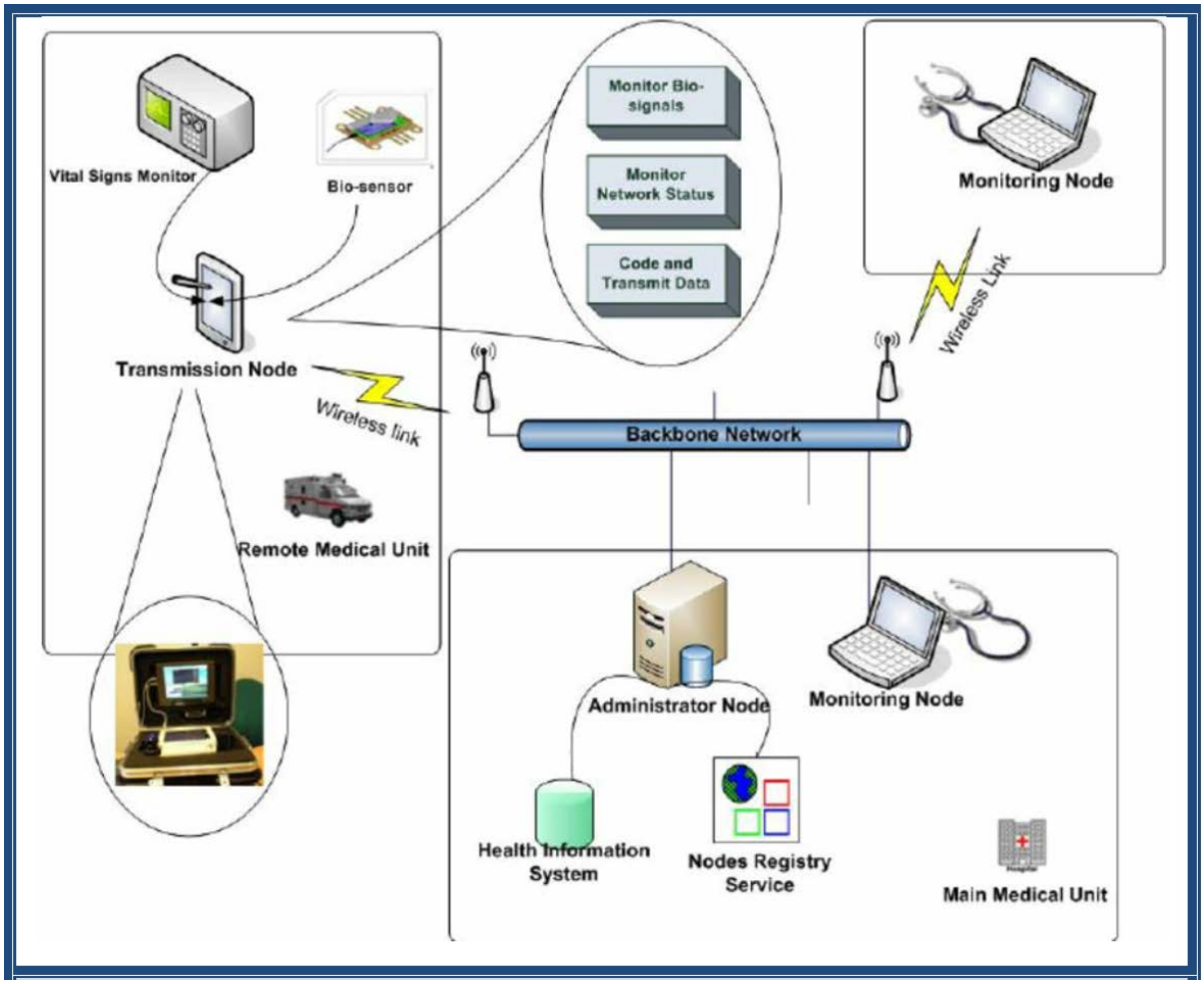


Figure 1: telemedicine platform

(Talk with the patient) remotely is used also audio and video calling or video should be a reasonable way to communicate with a doctor through a webcam, microphone lighting suitable for the use of cameras, sound technique and clear.

In addition, we need to educate the patient to use the new technologies as well as patient reassurance about the

confidentiality of information concerning him and educate the patient how to properly use the new system and the delivery of health information and proper medical data concerning him for the purpose of obtaining the correct service, it is also creating an appropriate code (ICD) for each patient code contain an electronic record where the patient data is always download documents, photos, videos pertaining to the patient by the allotted code as (shown in Figure 2).

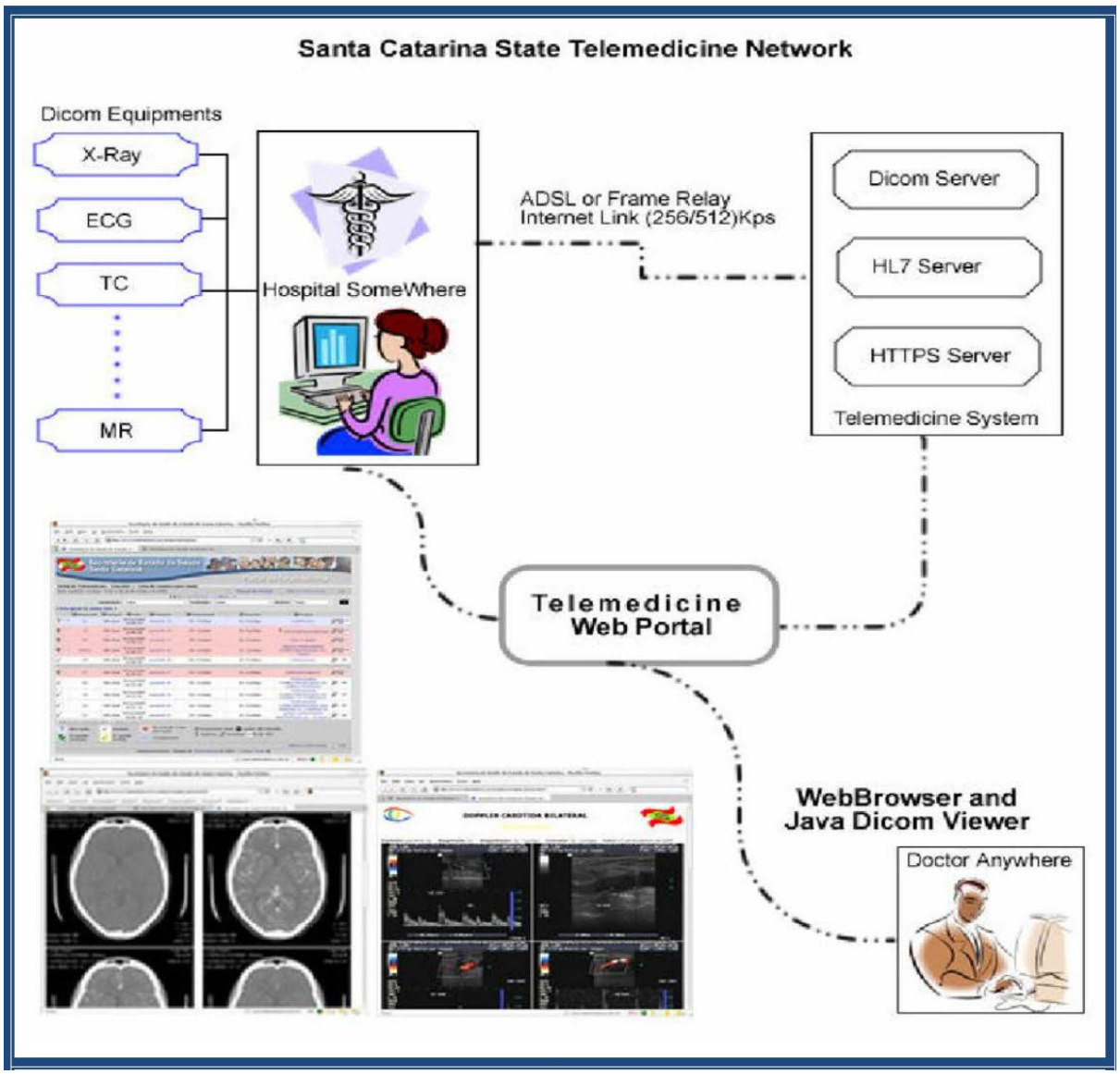


Figure 2: telemedicine system workflow

4.1. What do the telemedicine system do

The proposed system can be considered as the critical element in resolving the health care crisis. It has an impact on the most serious health care problems: providing health services to a greater geographical area, improving access to health services and primary health care at the lowest cost and improving development opportunities using telecommunications technology to support and promote care. Health in remote rural areas:

What proposed system do
100% Onsite Service – at your place.
100% Flexible – on your preferred date and time.
All Health Parameters – Heart, Lung, Eye, ENT, Blood etc.
State-of-the-art Medical Devices used onsite and at Laboratory.
Medical diagnosis by specialists via Tele-medicine software.
Fully integrated software to maintain **Electronic Medical Records.**
Online Medical records accessible with personal use rid /passed.
Does not interfere with pre-existing Medical Services.

So Telehealth Solution's that the future of telehealth lies with systems that enable the provider and patient to communicate wherever, whenever, and however they choose, with security. For this transformation to happen telehealth needs to leverage three concepts:

- Mobility: Enabling healthcare transactions to take place between provider and patient regardless of location or distance.
- Simplicity: Technology that is easy to use for both providers and patients.
- Convergence: Converging and enabling communication across all mediums regardless of platform or brand. Both patient and provider can personalize and customize the experience.

4.2. Needed information (to diagnose)

Information required to be arranged, which are necessary for the purpose of that seen by a specialist doctor:

Needed information for diagnose
1. Past medical history
2. Information about the patient's identity
3. Chronic diseases
4. Previous surgeries
5. Allergies
6. Medicine used
7. The history of the current disease

(As show in figure 3)

Figure 2: level access to patient has (correct information) [3]

So we Determination the reigning authorized in proposed virtual telemedicine as:

Authorized in telemedicine
• The doctors. • Health centers. • Hospitals. • Emergency hospitals. • Rural Health Clinics. • Health centers for primary care.

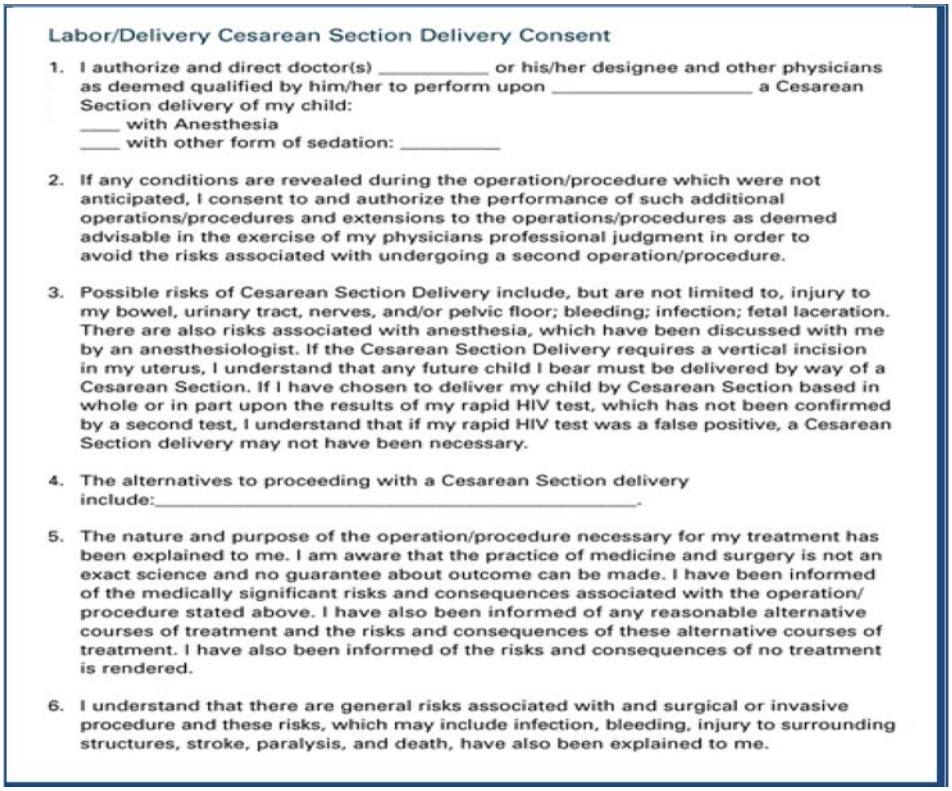
Then the healthcare provider that using virtual telemedicine are:

Healthcare provider
• The doctors. • Nurses. • Physician Assistant. • Psychologists. • Nutritionist. • Social worker. • Technicians. • Administrators

4.3. Patient informed consent (Patient awareness)

It is better that the medical providers for after obtaining prior consent from the patient for telemedicine services system needs to have written consent from the patient or verbal consent of the patient is also possible to inform all that concerns telemedicine services.

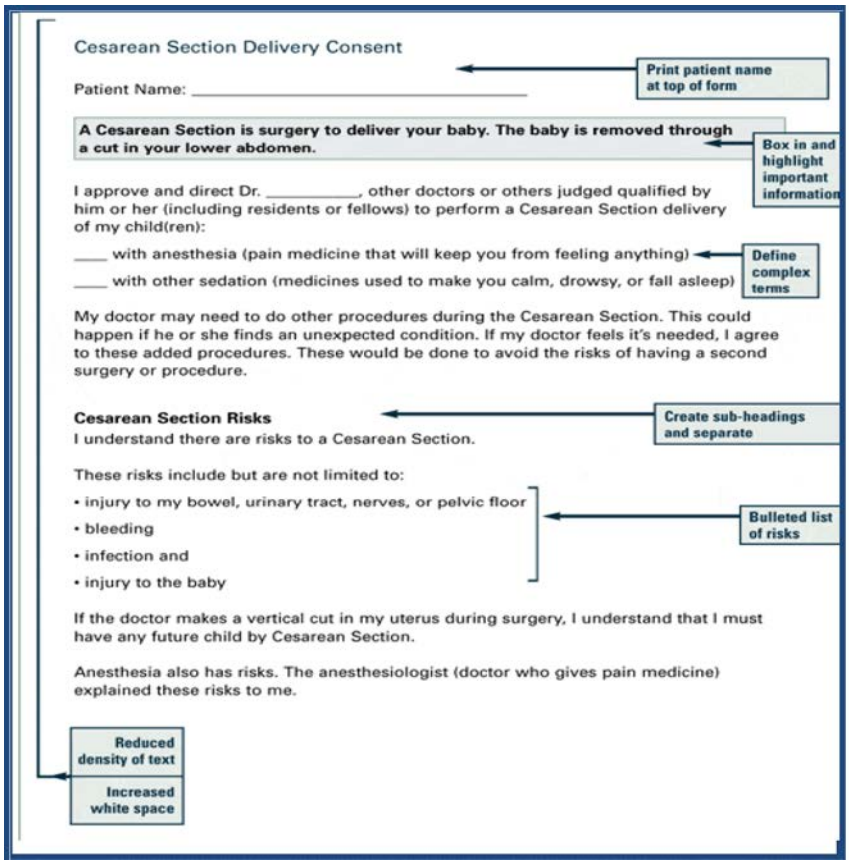
There are two sets of approval forms. The first form in each group is an original copy of the approval used by a major health center. The second form is a simple language form that is understood by the simple patient, especially in rural areas, indicating the extent to which these people accept the idea of using the proposed system.



Labor/Delivery Cesarean Section Delivery Consent

1. I authorize and direct doctor(s) _____ or his/her designee and other physicians as deemed qualified by him/her to perform upon _____ a Cesarean Section delivery of my child:
   ____ with Anesthesia
   ____ with other form of sedation: _____
2. If any conditions are revealed during the operation/procedure which were not anticipated, I consent to and authorize the performance of such additional operations/procedures and extensions to the operations/procedures as deemed advisable in the exercise of my physicians professional judgment in order to avoid the risks associated with undergoing a second operation/procedure.
3. Possible risks of Cesarean Section Delivery include, but are not limited to, injury to my bowel, urinary tract, nerves, and/or pelvic floor; bleeding; infection; fetal laceration. There are also risks associated with anesthesia, which have been discussed with me by an anesthesiologist. If the Cesarean Section Delivery requires a vertical incision in my uterus, I understand that any future child I bear must be delivered by way of a Cesarean Section. If I have chosen to deliver my child by Cesarean Section based in whole or in part upon the results of my rapid HIV test, which has not been confirmed by a second test, I understand that if my rapid HIV test was a false positive, a Cesarean Section delivery may not have been necessary.
4. The alternatives to proceeding with a Cesarean Section delivery include:_____.
5. The nature and purpose of the operation/procedure necessary for my treatment has been explained to me. I am aware that the practice of medicine and surgery is not an exact science and no guarantee about outcome can be made. I have been informed of the medically significant risks and consequences associated with the operation/ procedure stated above. I have also been informed of any reasonable alternative courses of treatment and the risks and consequences of these alternative courses of treatment. I have also been informed of the risks and consequences of no treatment is rendered.
6. I understand that there are general risks associated with and surgical or invasive procedure and these risks, which may include infection, bleeding, injury to surrounding structures, stroke, paralysis, and death, have also been explained to me.

Figure 4: (Form No. 1)[2]



Cesarean Section Delivery Consent

Print patient name at top of form

Patient Name: _____

A Cesarean Section is surgery to deliver your baby. The baby is removed through a cut in your lower abdomen.

Box in and highlight important information

I approve and direct Dr. _____, other doctors or others judged qualified by him or her (including residents or fellows) to perform a Cesarean Section delivery of my child(ren):

____ with anesthesia (pain medicine that will keep you from feeling anything)

____ with other sedation (medicines used to make you calm, drowsy, or fall asleep)

Define complex terms

My doctor may need to do other procedures during the Cesarean Section. This could happen if he or she finds an unexpected condition. If my doctor feels it's needed, I agree to these added procedures. These would be done to avoid the risks of having a second surgery or procedure.

Cesarean Section Risks

Create sub-headings and separate

I understand there are risks to a Cesarean Section.

These risks include but are not limited to:

- injury to my bowel, urinary tract, nerves, or pelvic floor
- bleeding
- infection and
- injury to the baby

Bulleted list of risks

If the doctor makes a vertical cut in my uterus during surgery, I understand that I must have any future child by Cesarean Section.

Anesthesia also has risks. The anesthesiologist (doctor who gives pain medicine) explained these risks to me.

Reduced density of text

Increased white space

Figure 5: (form no.2)[2]

4.4. Physician-patient relationship (pre-existing)

Under the proposal system that is possible to record a previous relationship between the patient and the physician, for example, there may be a previous visit to the patient it is possible to record this information on the patient's visit to the doctor even if just for once.

Types of Physician-Patient Relationships

Patient Control	Physician Control	
	Low	High
Low	Default	Paternalism
High	Consumerism	Mutuality

Figure 6: (physician-patient relationship) [5]

5. proposed virtual (telemedicine system) equipment

Most people have access to basic telecommunications technology, like telephones, internet, and computers. But many telemedicine solutions require more equipment than just those basics. Here's a quick review of the types of telemedicine equipment a healthcare provider may need to purchase to get started.

Proposed system equipment
1. Authentication (used to verify patient identity 'keys 'password.
2. Band width (communications channels).
3. Bluetooth wireless(applies to wireless area network)
4. Net worn internet.
5. Broad band (for communication satellite).
6. Electronic data.
7. Electronic patient records.
8. Digital network service.
9. Smart phone and computer.
10. Disease management
11. Clinical information
12. Internet protocol (IP).
13. Teleradiology (use to transfer image'x-ray'MRI'and CT's image.
14.– Viral sound (use to employ high frequency sound).
15.– Video conferencing (use for two way communications).

5.1. Expectations of success of the proposed system

I expect to see such an advanced process of health check-up using the telemedicine technology to its best. The data from my remote location was transferred to a specialty hospital and an opinion was received back in matter of minutes. I wish the Concept Health team all the best.

This table below shows the comparison between the telemedicine (e-health) and traditional medicine.

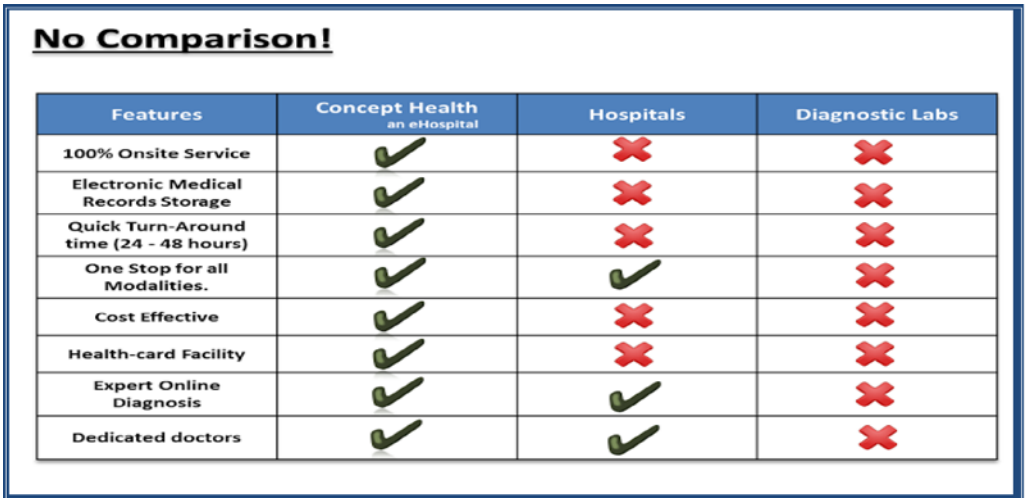


Figure 7: (comparison table)[2]

5.2. The challenges

The challenges of proposed system
• Culture situation and multilingual • Poor infrastructure • Weakness of information • Weak of skilled personal • In healthcare management (absence of unified coding system +absence of policies • For data collection) • Weakness of financial support (funding e-health as search project) • Weakness internet band width • Quality of higher education.

6. Conclusion

This study focused on telemedicine in order to try to deploy the technology in our country and used in the provision of medical services to be taken advantage of a lot of people in the diagnosis of diseases and reduce the cost of treatment and also exchange of modern medical information between Iraqi doctors in addition to the deployment of surgical procedures on-site video and audio and the dissemination of news Research for doctors in order to raise the scientific level of the local doctors and the deployment of all the symptoms of disease, treatment and causes of the disease in order to increase medical awareness to citizens.

The study focused on the spread of diseases in a special site health centers across networks as well as providing easy communication between the patient and the appropriate doctor and create electronic intermediate environment between them for the purpose of providing medical services easily and timeshare real and at the lowest cost and prevent the worsening of disease, taking into account sound rules while using the system to avoid mistakes in the diagnosis and treatments.

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