SURVEY STUDY: REALITY CHECK OF INTERNET AND TELEMEDICINE USE IN IRAQI HOSPITALS

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Abstract
Thirteen years after the US invasion of Iraq, the healthcare system remains in shambles, due to inherited and emerging problems. A few solutions have been proposed to overcome these problems, and of all the proposed solutions, telemedicine is the one that can potentially overcome the problems of affordability and access. The Iraqi Telemedicine Centre undertook a study to investigate feasibility of applying telemedicine in Baghdad. The study explores hospitals’ Internet services in terms of type, use, and access. Methods: A survey-based study was conducted by field visits and direct interviews with administrative representatives of fourteen randomly selected hospitals in Baghdad, eight of them are governmental and six are nongovernmental for-profit hospitals. Results: 71% (10/14) of the hospitals have access to the Internet via fibre optic cable through a commercial small business package plan. Six of the ten with Internet offer Wi-Fi to their physicians and potentially their patients, and five of these hospitals are nongovernmental for-profit hospitals. Five of the 14 hospitals were using some aspect of telemedicine and six of the hospitals were interested in participating in projects utilising telemedicine. These results are probably generalisable to the rest of Iraq, as the healthcare system and Internet services are the same. In conclusion, despite of all the challenges, telemedicine is feasible in Iraq, especially if it was affordable and the technology can operate on low-bandwidth Internet.

Keywords: telemedicine; telehealth; eHealth; Iraq

Introduction
In recent years, Iraq has struggled to provide quality services such as healthcare to its citizens. The impact of subsequent wars, economic sanctions and the ongoing security threats has left the Iraqi healthcare system underfunded and depleted of physicians who have fled the country. According to a report published by the United Nations Assistance Mission in Iraq (UNAMI) in 2008, access to quality healthcare for all Iraqi people is severely undermined.¹ The main problems the healthcare sector in Iraq suffers from are those of the developing world. There is a shortage of healthcare personnel and medical specialists. In 2011, the density of physicians in Iraq was 7.5 per 10,000 population, i.e. one physician per 13,333 citizens, and the projected density in 2018 is 8.7 per 10,000, i.e. one physician per 1,149 citizens. These figures are much lower than global (14/10,000) and regional (16/10,000) physician density.² The healthcare infrastructure is poor and it is difficult to access physicians, clinics and hospitals due to long distances, poor transportation, security concerns, or time constraints. Added to this is the high cost of private healthcare services and limited purchasing power of the patients. In times of humanitarian crises, these problems worsen because of the impact of disasters on healthcare system and usually inefficient responses of healthcare authorities.

A few solutions have been proposed to overcome these problems, such as privatisation of governmental healthcare services, medical tourism, etc. Telemedicine was suggested as a means of overcoming the shortage of physicians in Iraq³ and improving healthcare services in general.³ Telemedicine was virtually non-existent in Iraq before 2003. Under Saddam Hussein’s regime, access to the Internet was very restricted and censored. The first documented application of telemedicine in Iraq dates back to the 2003 war when the US Army used telemedicine to improve healthcare provided to its personnel, but also to a few Iraqi patients who were treated by US Army medical staff. In the aftermath of the 2003 war in Iraq, a few international medical and
humanitarian agencies implemented short-term telemedicine projects in different parts of Iraq. Apparently, all those projects were successfully implemented but their impact is not clear and it is unknown if and why they were discontinued. In recent years, the Iraqi Ministry of Health, with support from international organisations, has endeavoured to employ telemedicine technologies to support the healthcare sector in Iraq. Unfortunately, little is known about Ministry of Health’s plan to incorporate telemedicine into healthcare system in Iraq.

The purpose of this survey was to determine Internet availability and accessibility as well as telemedicine use in hospitals in Iraq, while assessing whether circumstances were favourable for wider introduction of telemedicine in Iraq.

**Methods**

A mixed methods approach was used. A questionnaire was designed to collect data regarding the use of Internet and telemedicine in hospitals in Iraq. The questionnaire was face validated with a group of physicians and resulted in the addition and modification of some questions. It was then content-validated by field testing with two hospitals. This step resulted in no additional changes to the questionnaire. The questionnaire consisted of ten questions; the first six questions were related to the Internet while the last four questions were related to telemedicine. (Appendix A) The survey was conducted in fourteen randomly selected hospitals from the 85 hospitals in Baghdad. A representative of the Iraqi Telemedicine Centre visited the hospitals administered the survey and conducted a structured interview with the medical director or deputy and the person responsible for the hospital’s IT. Data were collected between December 2015 and January 2016.

The survey included eight governmental (non-profit) hospitals and six private (for-profit) hospitals. The services provided at the surveyed hospitals ranged from general medicine and surgery to more specialised care. The location of the hospital in Baghdad also was taken in consideration and thus the hospitals represent the two major areas in the city of Baghdad, Karkh and Rusafa.

In Iraq, studies of this nature do not require approval of an Ethics Committee. All interviewees gave verbal consent to participate.

**Results**

The hospitals, their location, major specialties and the findings of the questionnaire concerning the availability and accessibility of Internet, its type, and availability of Wi-Fi are presented in the Table 1. Ten of the 14 hospitals surveyed had access to the Internet (63% of governmental hospitals and 83% of private hospitals). Internet connectivity to all hospitals was by fibre optic cable. Apart from one governmental hospital, all hospitals with Internet offered Wi-Fi. Four of the 10 hospitals with Internet restricted Internet access to only hospital administration, which involves using Internet for non-medical purposes, such as official e-mailing, net surfing, and social media. Only one hospital (private) provided Internet access to patients and visitors. All governmental hospitals with Internet had IT departments.

Regarding Internet speed and cost, in general, hospitals had one of two Internet packages, either a small business (aka residential) or large business Internet package. Both packages have the same upload/download speed of 512/2048 kbs but the “small business” package has a sharing ratio 1:10 and monthly cost of US$60, while the “large business” package has a sharing ratio of 1:5 and monthly cost of US$150. The large hospitals (more than 100 beds) had the “large business” package and the small hospitals had the “small business” package.

The second part of the questionnaire inquired about the hospital’s knowledge and use of telemedicine. Three of the fourteen physicians interviewed had heard about telemedicine; eleven hospitals had never heard of it. Upon explaining what telemedicine means, they were asked if and how they information technology in their hospitals. Five out of fourteen hospitals were using some aspect of telemedicine. One private hospital (Al-Qima surgical hospital) was equipping their operation theatre to host videoconferencing with surgical teams in Turkey and India. One governmental hospital, Ibn Al-Haitham, was developing an EMR (Electronic Medical Record) but it was not yet functional. At Baghdad Teaching Hospital technology is used to provide access to electronic libraries for medical training of their residents. Another governmental hospital, the Nuclear Medicine Hospital, was implementing an electronic system called “Mosaig” which is a special system the hospital purchased. The system builds a network that receives the patient data and starts an electronic medical

### Table 1. Summary of hospitals surveyed.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Specialties</th>
<th>Beds</th>
<th>Internet</th>
<th>WiFi</th>
<th>Internet Access for Location</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Governmental (Non-Profit)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baghdad Teaching Hosp.</td>
<td>General Surgery, Medicine, Cardiology &amp; Psychiatry</td>
<td>1,000</td>
<td>Yes</td>
<td>No</td>
<td>Administration &amp; Physicians</td>
<td>Rusafa</td>
</tr>
<tr>
<td>Ibn Al-Haitham Hosp.</td>
<td>Ophthalmology</td>
<td>400</td>
<td>Yes</td>
<td>Yes</td>
<td>Administration &amp; Physicians</td>
<td>Rusafa</td>
</tr>
<tr>
<td>Shaheed Ghazi Hosp.</td>
<td>Orthopaedics &amp; specialised surgery</td>
<td>531</td>
<td>Yes</td>
<td>Yes</td>
<td>Administration &amp; Physicians</td>
<td>Rusafa</td>
</tr>
<tr>
<td>Al-Karkh general Hosp.</td>
<td>General Surgery, Medicine, Orthopaedics’</td>
<td>400</td>
<td>Yes</td>
<td>Yes</td>
<td>Administration &amp; Certain Units</td>
<td>Karkh</td>
</tr>
<tr>
<td>Oncology Teaching Hosp.</td>
<td>Oncology</td>
<td>50</td>
<td>Yes</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear Medicine Hosp.</td>
<td>Nuclear medicine, Radiotherapy Oncology, general</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
<td>IT Department Administration</td>
<td>Rusafa</td>
</tr>
<tr>
<td>Private Nursing Institute</td>
<td>Obstetrics, Paediatrics’, Surgery</td>
<td>300</td>
<td>Yes</td>
<td>Yes</td>
<td>IT Department Administration</td>
<td>Rusafa</td>
</tr>
<tr>
<td>Burn Teaching Hosp.</td>
<td>Specialised burn management</td>
<td>100</td>
<td>Yes</td>
<td>-</td>
<td></td>
<td>Rusafa</td>
</tr>
<tr>
<td><strong>Private (For-Profit)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Al-Qima Surgical Hosp.</td>
<td>ENT, Surgery</td>
<td>50</td>
<td>Yes</td>
<td>Yes</td>
<td>Administration, Physicians, certain departments &amp; Visitors.</td>
<td>Karkh</td>
</tr>
<tr>
<td>Al-Dhurgham Private Hosp.</td>
<td>Obstetrics, surgery</td>
<td>20</td>
<td>Yes</td>
<td>-</td>
<td></td>
<td>Karkh</td>
</tr>
<tr>
<td>Baghdad Private Hosp.</td>
<td>Surgery</td>
<td>100</td>
<td>Yes</td>
<td>Yes</td>
<td>Administration &amp; Physicians</td>
<td>Rusafa</td>
</tr>
<tr>
<td>Dar Al Najat Hosp.</td>
<td>Surgery</td>
<td>30</td>
<td>Yes</td>
<td>Yes</td>
<td>Administration &amp; Physicians</td>
<td>Rusafa</td>
</tr>
<tr>
<td>Al-Kadhimiya Private Hosp.</td>
<td>Obstetrics, Surgery</td>
<td>100</td>
<td>Yes</td>
<td>Yes</td>
<td>Administration</td>
<td>Karkh</td>
</tr>
<tr>
<td>Al-Masarah General Hosp.</td>
<td>Obstetrics, Surgery</td>
<td>51</td>
<td>Yes</td>
<td>Yes</td>
<td>Administration</td>
<td>Karkh</td>
</tr>
</tbody>
</table>
The aim of this paper is to give an overview of the use of the Internet and telemedicine in Iraqi hospitals, while assessing the favourability of circumstances for wider introduction of telemedicine in Iraq. This study surveyed 14 hospitals in Baghdad. While the surveyed sample is small and confined to Baghdad, the findings can be generalised to represent hospitals in other major cities in Iraq but not necessarily to the small towns.

The majority of hospitals in this study were provided with Internet (71%) with more private hospitals having access to Internet than governmental hospitals (83% vs. 63%). This finding is not surprising and it reflects the fast spread of Internet in Iraq. According to the World Bank, Internet penetration in Iraq increased from 0.9% in 2007 to 17.2% per 100 people in 2015. According to Internet World Stats (IWS), in 2016 Iraq ranked third in the Middle East, after Iran and Saudi Arabia, in terms of the number of Internet users (14 millions), and the national Internet penetration was 37.3%.

Data published on BuddeComm (Telecommunication Research Site), states that in 2016 the mobile penetration in Iraq is about 81%.

Internet in the hospitals was used mainly for administrative purposes, e.g. emailing, file sharing, Internet surfing, etc. Some hospitals grant their physicians’ access to Internet but usually this access is limited. Because most hospitals in Iraq still do not use Internet dependent healthcare practices, hospital administrations do not feel the need to purchase high quality Internet plans. The two most popular Internet plans purchased by hospitals come with 1:10 or 1:5 sharing ratio, meaning that the Internet line provided to the hospital is one of ten branches of the main cable provided by the local ISP. Hospitals’ administrations know that the more end users sharing their Internet line the slower and less efficient the Internet becomes; therefore, they try to limit access to Internet.

Since the introduction of 3G services by the three major mobile operators in Iraq in 2015 physicians have more access to the Internet via their mobile phones and they are increasingly using the Internet to deliver healthcare. According to a small pilot study (N=30) that was conducted in Baghdad in 2015, 93% of physicians used landline/ mobile phones to provide electronic consultations to their patients, 77% of the physicians used email, 67% used a website, and only 23% used a webcam. The examples of telemedicine applications in the five hospitals in the current study display a shift in hospitals to incorporate information technology to develop and improve the healthcare system. Still, it is clear that many obstacles remain and were portrayed in our interviews with hospital personnel.

Despite of the spreading of Internet in Iraq and the successful implementation of a few telemedicine projects in different parts of the country, the inference is that the majority of healthcare providers are not familiar with the concept and practices of telemedicine, even though some of them have used some form of telemedicine. This lack of awareness and unfamiliarity of telemedicine seems to be one of the main reasons for reluctance of healthcare providers to adopt telemedicine projects.

Another main challenge hospitals face is the lack of funds available for implementing information technology. Government hospitals struggle to provide medicine and medical supplies therefore leaving little capital to invest in the hospital’s electronic infrastructure and administration. Internal hospital bureaucracy, such as the slow processes and approvals, is often a barrier when trying to alter public services, improve systems, or implement pilot projects. The culture of society and how they perceive medical services might limit their acceptance to medical services provided through technology; they might only...
value the health services provided by the physical presence of a healthcare provider.

Another challenge is that physicians have expressed that due to their busy schedule and daily on the job pressure, they are less inclined to participate in new telemedicine projects. Yet, at the same time, telemedicine benefits to the healthcare system can alleviate much of the pressure physicians’ face. Therefore it is important to inform physicians how telemedicine can be a tool for coordination between healthcare providers.

Conclusion

The economic sanctions imposed on Iraq under Saddam Hussein, along with many years of war and conflict, has left the Iraqi healthcare system weak. Iraqi hospitals and clinics are burdened with poor technological infrastructure and struggle to provide basic medicine. More recently, with declining oil prices and the current financial decline, it is not financially feasible to implement telemedicine projects in governmental hospitals. Alternatively, the growing private sector hospitals offer a competitive advantage to invest in telemedicine and provide better health services through Internet access.

It is recommended that it would be beneficial to do more research in this field and its possibilities in Iraq in order to inform physicians in Baghdad further about the benefits of telemedicine. Physicians can provide better services to their patients through immediate remote consultation and can then refer a patient to another specialist after sending all of the relevant medical history. In addition, physicians also benefit by improving their medical knowledge, status and recognition through participation in national and international specialised networks. For the patient, telemedicine can strengthen the doctor-patient relationship through more active interaction and decrease the burden not only of cost but of time wasted in transportation and waiting in queues.

Finally, as Iraq faces an increasing problem of internally displaced people and violence, it is critical that the health system receives support to be able to effectively manage crises in which less people have access to or money for healthcare.

References:
