

Benefits of Cost-Effectiveness of Remote Medical Care; Saudi Arabia paradigm

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Abstract: Previous and pieces studies of evidence showed that the remote medical care and the telemedicine tools not only facilitate access to healthcare services but also create cost saving for both the government and the patient. The research approach used in the study relies on theoretical approach by authenticated previous studies presented in this research. The objective of this study will try to evaluate and analyze concerning studies to examine how telemedical applications can help patients to gain the expected healthcare anytime and anywhere, to reduce possible costs of traveling which seeking professional health care or searching for medical specific specialists. By addressing this situation in health sectors and to Saudi Arabia health care sector specifically. The study has concluded that the level of awareness of the different tools of telemedicine was somehow high, and most of the healthcare professionals have their own smart devices, and a high percentage of them were using those devices in their workplaces, as well as with their patients, also healthcare providers believe that telemedicine is very essential to healthcare systems, it is important to conduct further telemedicine training, workshops, conferences, courses, and many other tools should be provided to them to reach the maximum quality of healthcare, deep informative local studies should be done to assess the acceptability, some specialties had a great degree of acceptability to introduce the remote medical care tools, while other specialties have fewer degrees of acceptability so we should not waste our efforts on them.

Keywords: Telemedicine, Remote Medical Care, Telehealth, Saudi Arabia, Healthcare, Healthcare Providers.

فعالية تكلفة الرعاية الطبية عن بعد: دراسة حالة المملكة العربية السعودية

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الملخص: أظهرت الدراسات السابقة أن استخدام الرعاية الطبية وأدوات التطبيق عن بُعد لا تسهل الوصول إلى خدمات الرعاية الصحية فحسب بل تخلق أيضًا وتوفير في التكلفة لكل من الحكومات والمرضى. قامت الدراسة باستخدام المنهج النظري والذي يهدف إلى اعتماد الباحث على التأمل والاستدلال، من خلاله توثيق عدد من الدراسات السابقة ذات العلاقة بمجال البحث. من الدراسة الحالية تقييم وتحليل الدراسات فحص وتقييم كيف يمكن لتطبيقات الطب عن بعد مساعدة المرضى لحصولهم على الرعاية الصحية التي يتوقعونها في أي وقت ومكان لأجل تقليل تكاليف السفر التي تترتب عليهم لأجل حصولهم على رعاية طبية متخصصة مهنية أو البحث عن فئات طبية متخصصة. ستحاول الدراسة الحالية التطرق للتعرف إلى مدى تمكن قطاع الرعاية الصحية في المملكة العربية السعودية في مجال تفعيل استخدام الرعاية الصحية عن بعد. وقد أثبتت الدراسة أن مستوى الوعي بمختلف أدوات التطبيق عن بعد كان مرتفعًا إلى حد ما، وأن معظم المتخصصين في الرعاية الصحية لديهم أجهزتهم الذكية الخاصة، وأن نسبة عالية منهم يستخدمون الأجهزة الذكية في أماكن عملهم، ومع مرضاهم أيضًا. أوصت الدراسة بضرورة التزام مقدمو الرعاية الصحية التطبيق عن بُعد بأهميته العالية جدًا في جميع أنظمة الرعاية الصحية، كذلك أهميته التطبيقية في مجال إجراء مزيد من التدريب وورش العمل والمؤتمرات والدورات

المتخصصة عن بعد وغيرها يجب توفير الأدوات لهم للوصول إلى أقصى درجة للارتقاء بجودة الخدمات الصحية. ضرورة إجراء مزيد من الدراسات المحلية بالمعلومات لتقييم القبول، حيث أن بعض التخصصات الطبية تتمتع بدرجة كبيرة من القبول لإدخال أدوات الرعاية الطبية عن بُعد، في حين أن المنتقدين لهذه النتائج وجدوا درجات أقل قبول بمعنى أن الصحة عن بعد قد تكون مضيعة للجهود عليها. الكلمات المفتاحية: التطبيب عن بعد، الرعاية الطبية عن بعد، الرعاية الصحية عن بعد، المملكة العربية السعودية، الرعاية الصحية، مقدم الرعاية الصحية.

Introduction

The remote medical care services are the utilization of digital technologies, such as Smartphone's, laptops, and computers, to be applied to improve the quality of healthcare remotely. Those technological modalities may be used by patients themselves or may be introduced and conducted by the healthcare provider. For example, how can the remote medical care modalities help diabetic patients? either by using the Smartphone to send food logs, medications, doses, drugs, monitored blood sugar levels, and other daily parameters to be checked by a specialist doctor. Or by downloading specific phone applications that work on carbohydrates levels counting, assessment of the appropriate diet plans, insulin doses, and exercise durations. Moreover, by using specially designed websites conducted by the hospital in order to be updated by the regular appointments schedule and many other updates like test results. Mobile health (mHealth), a subset of telemedicine and health information technology, encompasses the use of mobile communication devices (such as mobile phones and other wireless devices) for health services and information. Health facilitates remote monitoring and delivery of timely recommendations for health care. The promise of this approach is to improve care through enhancing access to health information (Andjela Drincic, MD et al, 2016).

The general aims of the remote medical care and telehealth are to introduce the effective healthcare to all people especially those who live in rural areas, to make the healthcare services more rapidly available, to introduce wide variety of healthcare specialists, to enhance the effective communication and cooperation between all the members of healthcare pyramid and to individualize the healthcare according to the special needs of each patient (Mayo Clinic, Technology meets health care, 2017).

Problem of the study:

This present study will discuss telemedicine as utilization methods of health professional using technologic modalities in delivering proper health care remotely to patients, as the telehealth supports education and the medical information themselves to transferred it from health care provider to patient when there is a distance separates them.

Question of the study: The study will try to understand how telehealth can help monitoring and recording of the physiological test and parameters related to the patients with chronic diseases, which can't be checked in the clinical regular visits to those patients

Research Methodology:

Despite the large advantages of telehealth as well as telemedicine, there are many challenges in the applying of these strategies on the ground, specifically, the degree of their acceptance from the physicians and the health care providers (Cresswell. K & Sheik, 2013). However, it's not the only challenging issue, there are many other reasons. So that, the degree of success of any new medical technology, it needs first to be totally obvious and clear to the health care providers and the physicians, and what the degree of their knowledge and efficient training, in order to grantee a high level of success for a specific technology.

Research Objectives:

The current research paper will try to dig deep with some previous theoretical studies referred to the subject of e-health with the extent relationship between the analysis of those studies, and with the fact that they to extent relate to e-health applications in Saudi Arabia as a case study in this research

Recently, the use of telemedicine projects had become widely applicable by many of the health care centers and professionals in Kingdom of Saudi Arabia (KSA). There are many studies and reports that addressed the field of telemedicine in KSA, as well as, its challenges, practice, resources and the outcomes (Ahmed, et al. 2014).

Discussion:

E. Health in Saudi Arabia:

There are five major health authorities which serve the majority of the population. The Ministry of Health (MOH) manages 60% of the hospitals in Saudi Arabia, while the other four authorities collectively manage approximately 20% in addition to another 20% managed by the private sector. The Ministry of Health (MOH) serves Saudi nationals and insured foreigners. The MOH is still working on connecting its hospitals to each other and creating a national plan for e-health. The Medical Services of the Armed Forces serves armed forces employees and their families. Some hospitals have computerized systems while others do not. Some of the health information systems used in these hospitals are coming from different vendors and are not yet integrated. The King Faisal Specialist Hospital and Research Center (KFSH&RC) serves Saudi nationals (Alsulamea Khaled, et al. 2016).

Many Healthy Cities Programs (HCPs) use smart phones and tablets to share patient-related clinical information, and investment in digital health research is increasing exponentially. Several researchers have begun to discuss digital health technologies in high-quality studies related to healthcare. In keeping with these current trends, Saudi Arabia announced a new National Model of Care in March 2017, which includes virtual self-care programs, eHealth, health innovation centers, and a platform for Saudi medical appointments, referral centers, and health education programs. Virtual medicine impacts

physician recruitment and plays a major role in the gig economy, which has a digital labor platform. The gig economy refers to an environment which allows organizations to offer contracts to independent workers for short-term engagements. Nomad Health, an online marketplace suggested bringing the gig economy to healthcare, thereby allowing doctors and nurses from various regions to team up with hospitals that require medical professionals on a short-term, freelance basis. It takes the digital health-gig economy hybrid philosophy a step further by expanding operations into the world of telemedicine and virtual doctor visits (Ahmed Al Kuwaiti, et al. 2018).

The Clinical Effectiveness of Telemedicine:

Remote health care strategies had been addressed to improve the healthcare management of chronic diseases, to enhance the quality of decision making in acute conditions, to use the healthcare resources in an effective way and to provide an available access to the healthcare professionals with rare specialties (L. S Stenvert, et al., 2013). One of the telemedicine modalities is to decentralize the health care pyramid, in which by promoting the effective communication among all the levels of the pyramid of health care, an example on this strategy, is how to reduce the unnecessary referrals by allowing the patients to get the regular updates for their cases from qualified trained nurses, without attending to the emergency departments or outpatient clinics, furthermore, by launching online websites that enable the patients to get access to their medical records and details, without the need to make an actual appointment with their GPs (Chew SJ, et al., 1998). Moreover, the telemedicine strategies have a great impact on the rural areas specially, due to the possible lack of the highly specialized professionals there, which will reduce the need for the far way travel in order to seek the medical care. As well as there are many advantages also to the urban areas (Maurice Mars, 2013). Whereas, the delivery of the health care at home became more applicable, and the costs of hospital staying became much higher, by the telemedicine, the patients started to be discharged earlier, or continue the usual monitoring at the outpatient systems rather than the inpatient, which has a great impact on the patients' health, through the being with his family members, being away from the hospital acquired infections and avoid the high possible costs of the long term admissions (Alvandi Maryam, 2017). Furthermore, there are also strategies that will help the elderly people specially, in order to reduce the rate of possible emergent complications that may happen if they were alone at home, in which many of the elderly people now have personal home alarms, that connected to telephone system related to the near healthcare center (Fisk MJ, 1999). Regarding the ophthalmology (for example), there is a common website called OphthWeb, which can be applied and accessed by the patients all over the world, which provides very professional ways to diagnose, monitor and follow up the patients, anywhere and anytime. Telemedicine has clear advantages in remote or rural areas where there are few specialist doctors because it can improve access to healthcare, reducing the need for patients and doctors to travel. However, its advantages also apply to urban areas.

Telemedicine can speed the referral process and improve the consistency and quality of healthcare. In addition, the improved contact between the professional staff involved has been shown to be of educational benefit and to help reduce professional isolation. As the delivery of healthcare in the home continues to grow and bed costs increase, patients are being discharged from hospitals earlier, or having care which was normally delivered during inpatient stays delivered in an outpatient setting. The advantages of being in a familiar environment and away from risks, such as hospital-acquired infection, means that home care has many added therapeutic benefits (Chijoke Agomo, 2008). Interestingly, there are many other specialties which are not mainly suitable for the remote medical care, such as the microbiology and histopathology, whereas these specialties need a three dimensional informative images and it's challengeable to use the telemedicine modalities for them. In one study that had conducted at the United States, it had addressed that the telemedicine modalities are very effective in some specialties like the psychiatry and dermatology, but less effective in some specialties like cardiology, and orthopedics. So that, before the actual launching of any tele-medical strategies, some research must be conducted on the specific area of work. Telemedicine may still be medicine at a distance, but the prominence, expectations, technology, and range of applications have changed it considerably. It started as a telecommunications augmentation to medical care, and it evolved into an integrative process of information technology and health care. It appears to represent the functional set of activities that are expected to redefine future medical care institutions—patient-centric care with virtual health centers, hospitals, and long-term care institutions. Whether this innovation will be the millennial landmark change in health care delivery, similar to the development of the modern hospital a century ago, or a set of footnotes representing only technological alternatives for the near future depends on well-guided research, prudent policy, and the development of enabling technologies (Bashshur L. Rashid L, et al. 2000).

The Acceptability of the Remote Medical Care to Patients and Providers:

One of the most situations that are worrying the health policies and governments today is the degree of acceptability of the telemedicine to the health care providers and patients as well, so it is important to determine the acceptability of those modalities in each situation, either that, huge efforts will be wasted.

In the case of ophthalmology, OphthWeb allows doctor to evaluate carefully the examination of patients and the treatment strategy, and to consult with colleagues to determine the best options for treatment. It is convenient for patients in that they have access to their own health records and indirectly help to promote the use of the telemedicine modalities by the health care providers. In one study that conducted at two hospitals in Wales\USA, the introduction of the automated tele-medical strategies was associated with a reduction in the turnaround time for discharge prescription (Whittle sea C, 2004). The outpatient satisfaction was also improved, with respondents were noticing the reduction in the time they

waited for their medicines and considering pharmacy staff to be less busy, less stressed and less harassed. On the other hand, the respondents felt that staffs were less interested with needs and missions after applying the tele-medical strategies than before. In pharmacy, such study about remote supervision using consolidated application for pharmacy administration (CAPA)-which includes a computer, a telephone, a webcam, internet connection, and appropriate software-, addressed that it allowed pharmacists to carry out other roles without compromising patients' access to them (Bellingham C, 2015). Patients believed that the system was great in terms of increasing access to pharmacy services, particularly in rural areas and on holidays. Whereas, they were concerned that the technology could be used to reduce the number of pharmacists in some areas, thereby reducing the availability of pharmacy services, patients were also concerned about its possible effect on the patient-pharmacist relationship.

The costs of launching the remote medical care strategies, the outcomes and the cost-effectiveness:

With every project it's important to consider the full costs before launching it up. However, the costs of telemedicine modalities is not usually straightforward, in which they are greatly varying according to the system applied, the providers compliance and patients commitment, so that, the true costs could be difficult to be calculated exactly. However, generally there are many factors need to be considered when assessing the exact costs of remote medical care services, like: Per employee per month (PEPM) fees, consultation fees and the balance between soft costs and soft benefits. (Guttman. D, 2018).

Although the general costs of installing tele-medical services is mainly high, there are some aspects of telemedicine that are not, for example, the use of mobile apps to keep in touch with nurses and doctors, similarly, the CAPA is also likely to be affordable. The cost-effectiveness is addressed by measurement the costs against the expected outcomes. In the case of telemedicine, there are just few published studies on the cost-effectiveness, despite that, the telemedicine works perfectly (clinically and technically). In the UK, one of the more successful applications of telemedicine is in decision support for nurse practitioners. Whereas, tele-radiology which is a major commercial initiative in the US, will become increasingly relevant in the future. (Guttman, D., 2018)

Mainly, the costs savings from launching any remote medical care strategy are very according to the specific country, which depend on the population size, the acceptance degree, the utilization rates of the tele-medical services, the human and technological resources, the distances which workers or patients might need to travel, and the effectiveness of local services in comparison with technological services.

The Awareness Degree of the Remote Medical Care in Saudi Arabia:

One study had shown that about 47.3% of the Saudi health care providers were using 3 or more smart devices, and more than 89% were using 2 or more smart devices, and generally, from 87%-91% of the total number of health care provider were using smart devices in their workplaces (J. Chase, 2013).

Mainly similar results addressed of health care professionals using social media or email to connect directly with patients for better quality of clinical care (K. C. Chretien, et al. 2013). Healthcare providers can use social media to provide better health in the community, motivate and develop patient centered networks, up to date awareness of health policies and discoveries and to have better health interventions (D. R. George, et al. 2013).

Moreover, creating a professional patient-doctor relationship by email or social media apps such as media sharing sites, medical blogs, medical groups and others, had been considered medically and ethically valuable (A. M. Bovi, et al. , 2003). Many studies addressed that the tablets and Smartphone's have replaced desktop (personal computer) to be more preferred to the healthcare providers in order to be continuously updated in their work places, regarding the studies that had addressed the different specialties, it had been showed that the surgeons and many of internal medicine specialists have little knowledge of telemedicine than others, moreover, the academic professional who are teaching at the faculty, had been addressed to have not adequate technological skills, attitude, knowledge and awareness (Z. Zayapragassarazan & Kumar, 2016). One more important issue is that there is no sufficient conferences, workshops, meetings, or even training courses to the healthcare professionals that talking about the advantages of the remote medical care and the use of different telemedicine tools. In one study, 77% of the healthcare professional's respondents believed that the regular training on those telemedical modalities is very important to grantee that they can use them in an effective way (Shittu, L. A. J, et al. , 2007). Interestingly, in one study, 90% of the health care professionals thought that the telemedicine tools will save money, time and efforts, and most of them believe that they really need to be trained on these modalities. There are many issues that important to be adopted and concerned by the policy makers , in order to promote and apply the telemedicine tools, like the high costs of equipment, lack of suitable training, lack of consultation between IT experts and the clinicians and to save the patients privacy (especially in countries like KSA).

Conclusion:

In summary, despite the previous studies that addressed that the most of healthcare providers have two or more smart devices and are communicating with patients by email or social media . Whereas, the majority of the healthcare providers still have somehow low experience and knowledge of telemedicine tools. Moreover, most of the professionals showed positive impact towards remote medical care and a willing to apply it in the clinical practice . However, factors such as privacy, equipment cost, lack of training, information and communication technology problems are major challenges to the application of telemedicine tools in the healthcare centers. Many of the healthcare professionals believed that they should increase their awareness through workshops, conferences and training, and they suggest that telemedicine tools might be an important strategy to improve the quality of healthcare services .

Recommendations:

- 1- The Important of addressing clinical effectiveness of the remote medical care and the telemedicine tools, its applicability, acceptability, launching cost and the cost-effectiveness.
- 2- The study shows many evidences that telemedicine can applied to various clinical centers and systems, with a great chance of improving the provided healthcare services.
- 3- It is hoped that through the application of the remote medical care the healthcare will be highly decentralized, at reduced costs.
- 4- Saudi remote medical care has been found to be more suitable for pharmacy, ophthalmology, psychiatry, dermatology, the provision of medical and nursing services to remote areas, and in situations where there are limitations of the specialists and skills.
- 5- The application of telemedicine in some areas in Saudi Arabia will be a complete waste of resources, especially, the cardiology, orthopedics, and the microbiology, where it is not totally cost-effective or practicable.

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