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## Editorial

### A national telemedicine program in the Kingdom of Jordan – Editorial



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#### ABSTRACT

The coronavirus disease 2019 (COVID19) is on the rise in the Kingdom of Jordan. The healthcare system is under pressure to handle the increasing numbers of COVID19 cases while providing routine and emergent care to the population. Telemedicine represents an opportunity to utilize during the pandemic. The feasibility of telemedicine in Jordan has been established in a few small projects over the past two decades. Here, we present a timely proposal for a national telemedicine program to be designed and deployed during the pandemic and sustain after the pandemic. Further, we identify the stakeholders and the steps to design and implement the program.

The Kingdom of Jordan, like many other countries in the world, is currently facing significant healthcare challenges due to the coronavirus disease 2019 (COVID19) global pandemic. The number of cases is on the rise and the number of deaths reaching its highest levels over the past few weeks [1]. Earlier, during the pandemic, Jordan has managed to delay the spread of the virus by strict lockdown measures, frequent testing, tracing contacts, and strict quarantine. However, these efforts could not prevent the second wave of infections. The number of hospitalizations and deaths are increasing almost daily [1]. On November 25th, 2020, more than 198,000 cases have been confirmed, and more than 2440 deaths. These numbers are up from 13000 total cases and only 69 deaths on October 1st, 2020 [1]. These numbers are striking, and the percentage of test positivity ranged from 15 to 20% recently, sometimes exceeding 25%, according to the daily briefings provided by government officials to the media.

Furthermore, the number of hospitalizations and deaths among frontline healthcare workers is on the rise. Recently, reports of deaths of highly trained physicians, nurses, and other frontline and healthcare workers are increasing. Hospitals in Jordan are still coping, but on the verge of being overwhelmed with the numbers of cases related to COVID19 in addition to cases for other medical conditions. There are 1300 hospital beds in Jordan, 700 intensive care beds, and around 600 respiratory units [2], and three major Covid19 field hospitals are being built. With case numbers on the rise, major hospital unit's saturation is expected in no time, in both the public and private sectors. Social distancing and face-covering practices are challenging to enforce in a country where larger gatherings compose a necessary part of the culture and social structure. There is a clear need for national education and enforcement of practices to slow down this virus's catastrophic spread.

While another national lockdown has been discussed, there is a growing number of opponents, including top officials [2]. Their rationale against major lockdown is justified by the potentially severe impact on the economy that is already suffering from debt and the consequences of regional turmoil. On a general level, poverty is a significant problem,

and more than one million Jordanians live below the poverty line [3]. Thus, the general public cannot afford another lockdown.

Telemedicine represents an opportunity to continue providing quality routine healthcare during the pandemic, and several countries have successfully implemented telehealth measures. The early introduction of telemedicine to the Kingdom of Jordan dates back to the early 2000s. However, there has not been a successful or wide adoption of telemedicine in Jordan. In this article, we aim to summarize prior and current telemedicine experiences in Jordan and propose a national telemedicine program that can be deployed to alleviate pressure on the healthcare sector in Jordan and help protect frontline healthcare workers while providing the population access to routine healthcare.

#### 1. The rationale for a national telemedicine program

Telemedicine has successfully served as an effective way to cover the unmet need for safe, routine clinical care during the pandemic in several countries, including the United States of America (USA) and the United Kingdom (UK) [4]. The majority of outpatient care transitioned to virtual visits either via telephone or video. Rapid adaptation of hospitals, clinics, patients, healthcare workers, and payers allowed these measures' success and slowed down the virus's direct transmission between patients, their families, and healthcare workers. Delivering effective routine healthcare via a virtual portal is feasible and effective [4]. Patients living with chronic illnesses will benefit the most, as their routine care can be administered via a video or phone call without the risks of getting close to hospitals and clinics. For example, a controlled study reported comparable asthma control between patients who receive routine care via telemedicine to those receiving in-person care [5]. Payers agreed to reimburse hospitals and clinics for telemedicine visits, which allowed most healthcare facilities to survive the pandemic [6]. Also, telemedicine has protected most healthcare workers from unnecessary direct contact with potentially infected, asymptomatic, or symptomatic individuals. Furthermore, routine administration of

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questionnaires to screen for symptoms and routine temperature-taking practices in healthcare facilities have also helped.

## 2. Telemedicine in Jordan: opportunities and challenges

Digital or regular telecommunication is widely available in Jordan. According to Internet world stats (IWS), there were 8,700,000 Internet users in Dec of 2017, which accounted for 87.8% of the population [7]. The numbers are potentially even higher in 2020. This represents an opportunity to design and implement a successful telemedicine program in the country. Efforts to introduce telemedicine in Jordan date back to as early as the year 2003 when specialists at the King Hussein Cancer Center (KHCC; Amman, Jordan) connected with the International Outreach Program at St. Jude Children’s Research Hospital in Memphis, Tennessee to help manage cases of retinoblastoma in Jordan [8]. The results of the collaborative program were encouraging with improved survival and decreased surgical complications [8]. Table 1 summarizes subsequent telemedicine efforts in Jordan in chronological order, including the small and limited telemedicine deployment during the

**Table 1**  
Summary of telemedicine efforts in the Kingdom of Jordan.

Year of launch (citation)	Description	Key parties	Outcome
2011 [13]	Access to specialist care at the capital (Amman) for rural areas	Cisco systems for platform and Jordanian Ministry of Health	More than 2600 people participated, nearly 1700 women got breast cancer screening, and doctors discussed more than 5000 cases
2011–2012 [14]	Telecardiology connecting two remote hospitals to a central hospital in the capital (Amman)	Cisco systems for platform and Jordan healthcare initiative (two peripheral hospitals and one tertiary medical center)	Improved access to care, help in diagnosis and treatment plan, and improved quality of life for patients.
2017 [15]	Suicide hotline	Public security department	Improved access to necessary help for suicide prevention. No data published.
2020 [16]	Telemedicine program to help provide medical access to Jordanian doctors for residents of Beirut, Lebanon following the August 4th explosion	Humanitarian aid organization UNICEF and Altibbi for platform	One month of free online consultation
2020 [17, 18]	Telepsychiatry programs during the COVID19 pandemic	The Jordanian psychiatric association and a private psychiatric hospital	Transition to online services in one hospital and providing psychological phone support to more than 270 people
2020 [10]	Medication refill and limited telemedicine program	Ministry of health, Royal medical services and Hakeem/eMed for platform	No data available
2020 [19]	Caring for children with type 1 diabetes during extreme early COVID19 lockdown in Jordan	Jordan University Hospital	Feasibility and high satisfaction of parents of children with type 1 diabetes. No clear effect on other clinical outcomes.

COVID19 pandemic.

In Jordan, there are several barriers to design and implement a national telemedicine program. However, it is possible to do so if crucial stakeholders agree on the importance and the timely need for such an intervention. To deliver a useful telemedicine routine visit, the healthcare team and the patient need secure virtual platforms. It is also necessary to organize an appointment-based system with healthcare providers where each provider has a set schedule of their patients who need routine care.

In Jordan, at least three virtual platforms can be further developed for a national telemedicine program and include Cisco systems [9], Hakeem via eMed [10], and Altibbi [11]. The introduction of a national telemedicine program would help hundreds of thousands, if not millions, of people in Jordan to receive their routine care without the need to have in-person visits to hospitals where a significant number of COVID19 cases are being treated. Further, telemedicine will help relieve the healthcare sector and allow for proper sanitation techniques and proper use of personal protective equipment by the frontline workers when caring for patients who need in-person care or hospital admission. Another layer of complexity is the drug prescription system and the need for people to pick up routine prescriptions for various common diseases, like diabetes, hypertension, asthma, or heart disease. This may impose a significant barrier to telemedicine success. A possible solution could be to employ postal services or obtain help from volunteers or the Jordanian armed forces who always stepped up and proved highly efficient in national emergencies, distributing medicine supply to individual patients and providing an extended supply for 90 days. This will decrease the overwhelming number of routine visits and those visits specifically for a medication refill. Again, this will free the healthcare system to focus on people in need of immediate and acute medical attention. Ultimately, this will help save the lives of patients and frontline healthcare workers and their families.

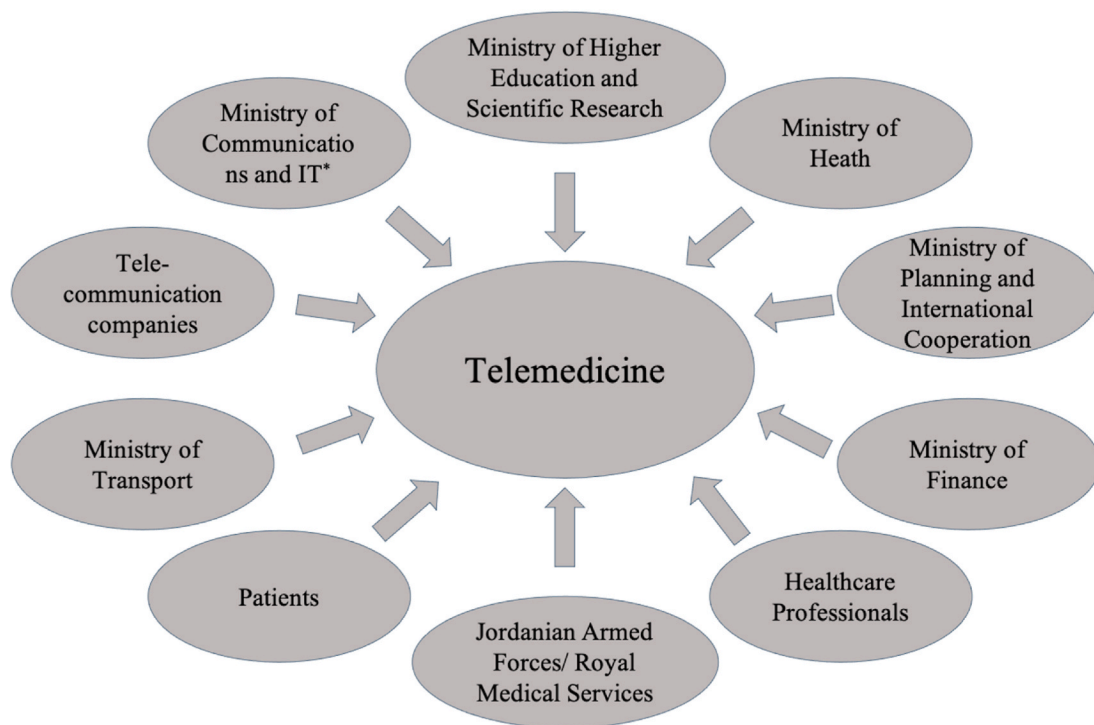
Moreover, rehabilitation services represent another area of opportunity to employ telemedicine. Pilot studies of virtual reality rehabilitation were successful in Jordan [12]. This represents another unmet need in Jordan and could help save several patients and healthcare workers’ lives. One barrier may be the payer system as a critical stakeholder in a national telemedicine program. Actively involving representatives from major payer systems in Jordan and having their agreement on a national telemedicine program is crucial for its success.

## 3. Steps to develop a national telemedicine program

The feasibility of telemedicine in the Kingdom of Jordan has already been shown in small and pilot programs (summarized in Table 1). A national program is now needed given the structure of the healthcare system in Jordan, where most of the population are served by the ministry of health hospitals, royal medical services, and university hospital systems. Fig. 1 shows the critical stakeholders in the national telemedicine program, and Fig. 2 shows the key steps to follow in order to achieve a successful national telemedicine program in Jordan. To have a timely success of the program, we propose identifying a task force of healthcare experts and representatives of major stakeholder groups. The task force will meet and agree on the program’s initial logistics and select several locations where virtual clinics can be housed. The group will also be responsible for facilitating the training of healthcare providers on the use of telemedicine platforms and educating the public on the concept of telemedicine and how to access the services. Upon implementation, there will be a need to designate a hot service-line to help the general public troubleshoot the telemedicine platforms and answer questions that arise once the program is in action.

## 4. Conclusion

Small telemedicine efforts have been feasible in the Kingdom of Jordan, but a large-scale national program is needed. The rise in



\* IT: Information Technology

Fig. 1. Major Stakeholders in the proposed national telemedicine program.

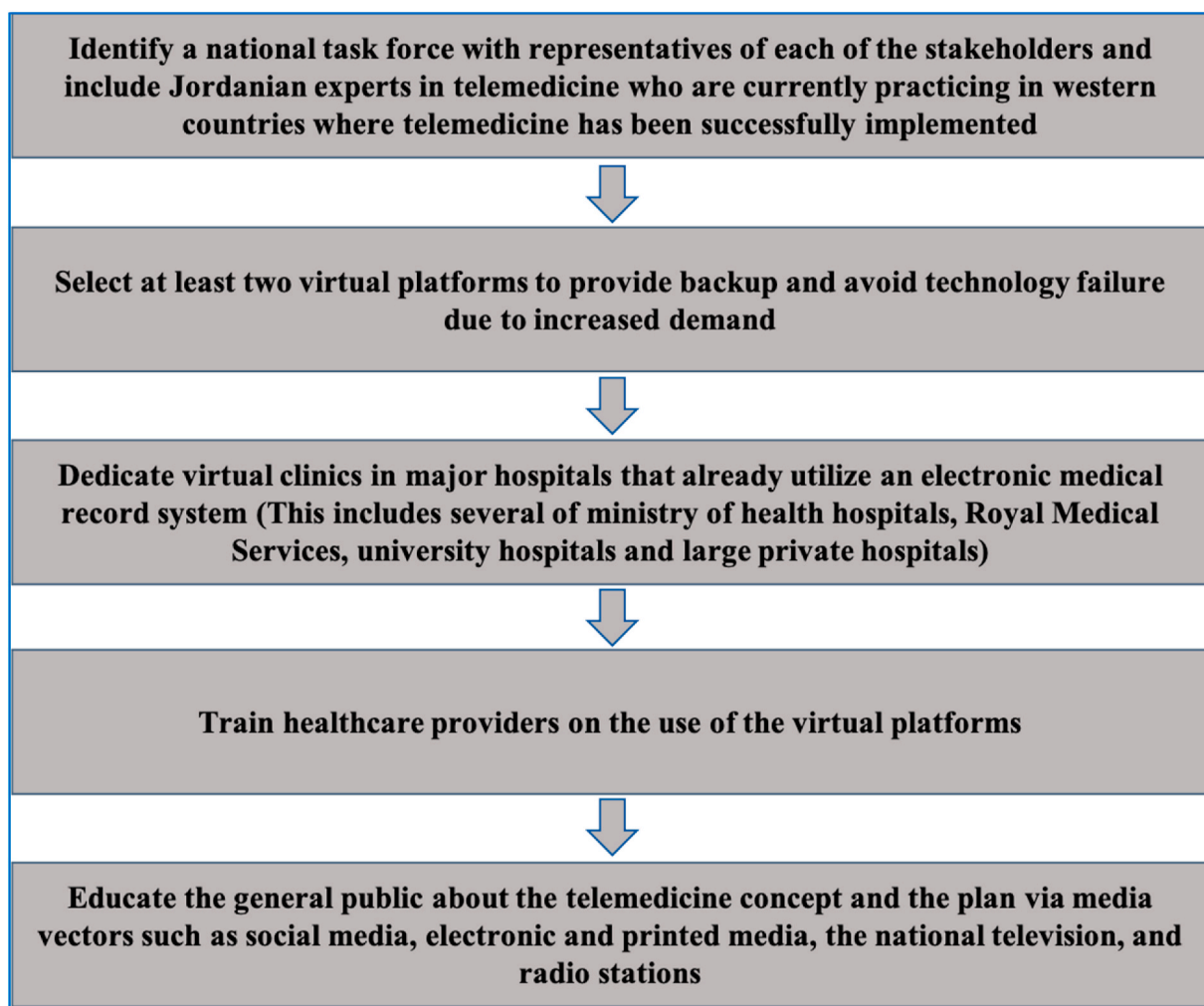


Fig. 2. Key steps for the success of a national telemedicine program in Jordan.

coronavirus infection rates and deaths in Jordan calls for designing and implementing a national telemedicine program. We summarized earlier efforts of telemedicine in Jordan before and during the pandemic, recognized the unmet need for a national and accessible telemedicine program, proposed initial steps to design and implement a nationwide e-health program, and identified key stakeholders whose presence in the dialogue is crucial for this program's success and sustenance.

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No ethical approval is required as this work does not involve human subjects.

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#### Author contribution

Dr. Ahmed Z. Obeidat: Study concept, design and drafting and revising the manuscript.

Dr. Khalid El-Salem: Study concept, design and critically revising the manuscript.

#### Consent

Informed consent not required as this is a non-human subject research.

#### Guarantor

Dr. Ahmed Z. Obeidat takes full responsibility for the work and conduct of the study.

#### Declaration of competing interest

There are no relevant disclosures to this manuscript. However, Dr. Ahmed Z. Obeidat reports that he received personal compensation for participation in scientific advisory boards, steering committees, or for speaking engagements from Alexion pharmaceuticals, Biogen, Bristol Myers Squibb, Celgene, EMD Serono, Genentech, Novartis (local and global), Sanofi/Genzyme. Dr. Obeidat serves as a site PI for studies funded (directly paid to Medical College of Wisconsin) by National MS Society and PCORI; Atara biotherapeutics, Biogen, Celgene, Bristol Myers Squibb, EMD Serono, Genentech, and Novartis. And Sub-I on studies funded by AbbVie and Sanofi/Genzyme. Dr. Obeidat received research funds from Central for immunology, Research Affairs committee and Neuroscience research center. Dr. Obeidat serves on the

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### References

- [1] <https://www.worldometers.info/coronavirus/country/jordan/>. (Accessed 25 November 2020).
- [2] <https://www.reuters.com/article/us-health-coronavirus-jordan-surge/jordan-announces-record-daily-new-covid-19-cases-idUSKBN27637Y>. (Accessed 25 November 2020).
- [3] <https://reliefweb.int/sites/reliefweb.int/files/resources/Summary%20English.pdf>. (Accessed 25 November 2020).
- [4] R. Ohannessian, T.A. Duong, A. Odone, Global telemedicine implementation and integration within health systems to fight the COVID-19 pandemic: a call to action, *JMIR Publ Health Surveillance* 6 (2) (2020), e18810.
- [5] J.M. Portnoy, M. Waller, S. De Lurgio, C. Dinakar, Telemedicine is as effective as in-person visits for patients with asthma, *Ann. Allergy Asthma Immunol.* 117 (3) (2016) 241–245.
- [6] S.S. Bajowala, J. Milosch, C. Bansal, Telemedicine pays: billing and coding update, *Curr. Allergy Asthma Rep.* 20 (10) (2020) 1–9.
- [7] <https://www.internetworldstats.com/me/jo.htm>. (Accessed 25 November 2020).
- [8] I. Qaddoumi, I. Nawaiseh, M. Mehyar, B. Razzouk, B.G. Haik, S. Kharma, I. Jaradat, C. Rodriguez-Galindo, M.W. Wilson, Team management, twinning, and telemedicine in retinoblastoma: a 3-tier approach implemented in the first eye salvage program in Jordan, *Pediatr. Blood Canc.* 51 (2) (2008 Aug) 241–244.
- [9] [https://www.cisco.com/c/en\\_ae/about/contacts.html](https://www.cisco.com/c/en_ae/about/contacts.html). (Accessed 30 November 2020).
- [10] <https://emed.hakeem.jo>. (Accessed 30 November 2020).
- [11] <https://altibbi.com>. (Accessed 30 November 2020).
- [12] H. Khalil, A. Al-Sharman, K. El-Salem, A.A. Alghwiri, D. Al-Shorafat, S. Khazaaleh, The development and pilot evaluation of virtual reality balance scenarios in people with multiple sclerosis (MS): a feasibility study, *NeuroRehabilitation* 43 (4) (2018) 473–482.
- [13] [https://apolitical.co/en/solution\\_article/telehealth-gives-rural-jordanians-appointments-specialists](https://apolitical.co/en/solution_article/telehealth-gives-rural-jordanians-appointments-specialists). (Accessed 30 November 2020).
- [14] Y.S. Khader, M.I. Jarrah, A.E. Al-Shudifat, A. Shdaifat, H. Aljanabi, S.I. Al-Fakeh, E. E. Turk, K.A. Zayed, H.A. Al Quran, Z.M. Ellauzi, M. Al Tahan, Telecardiology application in Jordan: its impact on diagnosis and disease management, patients' quality of life, and time-and cost-savings, *Int J Telemed Applicat* (2014 Jan 1) 2014.
- [15] <https://www.jordantimes.com/news/local/police-launches-suicide-hotline-numbers-rise>. (Accessed 30 November 2020).
- [16] <https://www.healthcareitnews.com/news/emea/jordanian-telehealth-solution-provide-free-medical-access-beirut-residents>. (Accessed 30 November 2020).
- [17] M. Abu Tayr, You Are Not Alone, We Are with You: Campaign to Support Mental Health in Jordan, 2020. <https://www.albayan.ae/one-world/arabs/2020-05-07-1.3851914>.
- [18] S. El Hayek, M. Nofal, D. Abdelrahman, A. Adra, M. Al Harthi, S. Al Shamli, N. AlNuaimi, L. Bensid, M.A. Cheaito, A.M. Emberish, A. Larnaout, Telepsychiatry in the arab world: a viewpoint before and during COVID-19, *Neuropsychiatric Dis. Treat.* 16 (2020) 2805.
- [19] R. Odeh, L. Gharaibeh, A. Daher, S. Kussad, A. Alassaf, Caring for a child with type 1 diabetes during COVID-19 lockdown in a developing country: challenges and parents' perspectives on the use of telemedicine, *Diabetes Res. Clin. Pract.* 168 (2020), 108393.

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