Editorial

Virtual Hospitals During COVID-19 Pandemic: Pros and Cons

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As a global pandemic, coronavirus disease 2019 (COVID-19) has so far posed countless challenges to healthcare systems. Indeed, the high transmissibility of this disease and the lack of effective treatments or vaccines have led to a case fatality rate of more than 1% worldwide (1). Despite declining demand for some services such as elective procedures following the COVID-19 pandemic, the drastic growth of the number of patients with COVID-19 has put significant strain on hospitals and healthcare workers (HCWs), which can affect the safety and quality of services (2, 3). Iran, which has been severely involved in this pandemic, is among the countries with the largest number of confirmed COVID-19 cases and death tolls in the world as of April 20, 2021 (4). Due to this situation, the capacities of medical centers and hospitals were filled in Iran (5). Therefore, moving towards innovative strategies, such as virtual care services, can be vital in reducing the burdens of medical centers and boosting the capacity of hospital beds during pandemics, such as COVID-19.

Virtual hospitals, indeed, strive to provide acute and sub-acute care services to patients in their homes instead of usual hospital care, using virtual reality and telemedicine (6). After initial triage and assignment of eligible patients to the virtual hospital, they are provided with a home monitoring kit, including an automated blood pressure cuff, thermometer, and pulse oximeter, to be able to continuously monitor their condition. Besides, a registered nurse or other HCWs communicate with the patient (or his/her family members) by telephone, at least several times a day (e.g., once every six hours), to learn about the patient's condition and symptoms (7). There is also a 24-hour hotline for patients to share their concerns with a nurse or other trained individuals and receive necessary guidance. In cases wherein the patient's condition is unfavorable, or the symptoms are getting worse, the emergency team is notified to transfer the patient to one of the

healthcare centers for further interventions. Meanwhile, if possible, a mobile team of HCWs, including a specialist or a general practitioner and a nurse, can go to see the patients at home to visit and examine them (7).

The application of the "hospital-at-home" model to provide acute and sub-acute healthcare services has also been more sought in recent years, which has had desirable consequences (7, 8). For example, Atrium Health, a healthcare system in the southeastern United States, has created a virtual hospital program to provide healthcare services to more than two-thirds of the covered population during the COVID-19 outbreak (7). Following this program, home-monitoring services as well as hospital-level care are being provided through virtual units, called virtual observation units and virtual acute care units, for eligible patients, especially those infected with COVID-19 (7). In this respect, the findings of a study on this program demonstrated that the development of a virtual hospital could be an effective strategy to enhance the capacity of hospitals following the rapid spread of COVID-19 (7). Another survey in China showed that using virtual hospitals to deliver ophthalmic services during COVID-19 was very effective and could continue even after the pandemic (9). Providing virtual care can facilitate social distancing measures and decrease patient wait time. Furthermore, reducing face-to-face contact among HCWs and patients can be another benefit of virtual hospitals, resulting in a lower chance of transmitting the virus (10). Such benefits of virtual care services can be similarly seen in the successful management of epidemics, such as Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS) (11). Over and above all the benefits of virtual hospitals, there are serious challenges in planning and implementing such strategies, particularly in developing countries. Based on solid evidence, the most common challenges concerning virtual care are as follows: (1) Disruption

in virtual care ([12](#)); (2) unavailability of relevant infrastructure ([13](#)); (3) unfamiliarity of most physicians and patients with applying virtual platforms ([14](#)); (4) low extension of high-speed internet networks in remote areas ([13](#)); and (5) lack of legal frameworks to regulate virtual care services ([15](#)).

As mentioned above, boosting the capacity of hospitals is one of the main benefits of virtual hospitals during pandemics, such as COVID-19. Due to the rapid increase in the number of positive cases and those in need of inpatient care in Iran since early spring 2021, using virtual hospital approaches can enhance the capacity of inpatient care. Furthermore, the use of virtual hospitals can improve daily monitoring and care delivery to patients infected with COVID-19, while restricting exposure to other patients and HCWs. Notably, given the structure of medical centers and the locations of hospitals in Iran, mainly in densely populated cities, reducing the number of patient referrals to hospitals can also prevent the spread of the virus to surrounding areas. Other benefits of developing virtual hospitals during COVID-19 in Iran include: (1) Reducing demand for personal protective equipment following lowered risk of exposure; (2) creating more convenience to HCWs when providing remote services through a virtual hospital due to indirect exposure; (3) relieving stress in patients; (4) empowering patient's family to provide informal care services; (5) lowering transport and treatment costs for patients; (6) improving patient access, in deprived and remote areas, to high-quality services as well as relevant specialists; (7) preparing instant and online data regarding the COVID-19 pandemic for effective planning and policy-making; (8) planning and running a virtual hospital in the short run, and finally; (9) establishing easier and more effective video-based communication for patients than face-to-face communication.

Despite the aforementioned benefits, implementing virtual hospitals in Iran also faces major challenges. Specifically, while the need for comprehensive electronic health/medical records is one of the prerequisites for the development of virtual hospitals, these records are not well developed in the Iranian healthcare system. Another serious challenge related to virtual hospitals in this country is the issue of equity because access to stable high-speed internet, as well as laptops and smartphones, is not possible in many deprived and remote areas of Iran. In addition, the lack of competent people aware of the way to use kits and instruments, e.g., pulse oximeter, thermometer, and blood pressure cuff in patients' homes can make it more difficult to safely monitor patients' conditions. On the other hand, supplying and preparing such measurement instruments in Iran is easier said than done. Other challenges of virtual hospitals in this country are as fol-

lows: (1) Requirements to develop clinical guidelines; (2) lack of motivated HCWs (particularly nurses) to continuously monitor patients; (3) need to organize mobile treatment teams to provide interventions to patients in their homes; (4) lack of high-speed internet infrastructure; (5) inconsistent provision of outpatient care; (6) demand for appropriate pay and compensation systems to encourage service providers; (7) tendency of Iranians to refer directly to relevant specialists; (8) unwillingness of HCWs to visit patients at home and even make phone calls; (9) insufficient high-quality hardware and software in Iran; (10) restrictions on video communications due to ethnic and religious concerns in some areas; (11) need to develop ethical guidelines in healthcare; and (12) lack of cybersecurity for providers and users.

Overall, developing and implementing virtual hospitals can be an effective strategy in response to the rapid spread of COVID-19 throughout Iran. In fact, by using this approach, while reducing referrals to medical centers and hospitals, it is possible to prevent patients suspected of COVID-19 from encountering other people. Increasing the capacity of medical centers and hospitals can be another benefit of adopting this approach. Notably, since lockdown policies are in place in many cities, the utilization of virtual care by HCWs and patients seems necessary.

Footnotes

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