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PERSPECTIVE

Are the coronavirus disease 2019 (COVID-19)-themed applications launched during the pandemic sustainable?

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ARTICLE INFO

Article history:
Received 23 January 2022
Received in revised form 24 April 2022
Accepted 23 June 2022
Available online 5 July 2022

Keywords:
COVID-19
Digital applications
Digital health
Global crisis
Vaccine passport

ABSTRACT

Many digital applications (Apps) were launched during the coronavirus disease 2019 (COVID-19) pandemic for various purposes such as information sharing, risk assessment, self-management of symptoms, contact tracing, home monitoring, and decision making. Since the quality of COVID-19-themed Apps varied and was less reliable based on measurements using the mobile Apps rating scale method, some of these Apps are considered useful while some are said to have the potential to harm users. This suggests the need for authorized institutions to validate and ensure the safety and security of these Apps before it was launched in public. This is necessary considering the potential dangers arising from App inaccuracies, as well as the potential misuse of user data due to data breaches. With these considerations in mind, we consider that the vaccine passport is an App with a COVID-19 theme that must be refined and applied sustainably amid the ongoing global crisis and the uncertainty of this pandemic.

1. Background

Since the early coronavirus disease 2019 (COVID-19) pandemic, many COVID-19-themed applications (Apps) have been developed and launched by both official and unofficial agencies globally with various purposes and benefits.\(^1\)\(^2\) However, their presence faces various challenges, especially in terms of accuracy, efficiency, and data security of App users.\(^3\) Moreover, the disparities and equalities within the world population make the benefit of these Apps cannot reach those social groups who do not have access to it.\(^4\) Therefore, this viewpoint provides perspectives on COVID-19-themed Apps and their potential sustainability amid the global crisis and inequality that is worsening due to the pandemic.

2. The role of various types of COVID-19 APPs

Since the beginning of the pandemic, many COVID-19-themed mobile Apps have been launched for various purposes such as information sharing, risk assessment, self-management of symptoms, contact tracing, home monitoring, and decision making.\(^5\) With all kinds of benefits provided, these Apps have contributed positively to the citizen, health professionals, and even decision-makers during the COVID-19 pandemic. These Apps have increased the reach of reliable information to both citizens and health professionals, decreasing misinformation and confusion, tracking symptoms and mental health of citizens, home monitoring and isolation, discovering new predictors, optimizing health care resource allocation, and reducing the burden of hospitals.\(^1\)

Furthermore, these COVID-19-themed Apps also play a role as a tool that helps assess a person's health status before traveling abroad or doing activities within the country. A good example to represent this was China’s, Health Kit. It is a tool that provides the COVID-19-related health status of foreign nationals during the period of COVID-19 prevention and control in China. The query result serves as a reference for assessing someone’s fitness for going back to work, entering/exiting a residential community, and other situations concerning COVID-19 prevention and control. Someone's health status will be represented by the color of the code that appeared in the App. The red code indicates that someone needs to be placed under medical observation in isolation at a designated place while the yellow code indicates the need for isolation at home, and the green code indicates that no abnormal health conditions are founded.\(^6\)\(^7\) In addition, recently most COVID-19-themed Apps were developed to support the implementation of the “vaccine passport” policy. A vaccine passport is a physical or digital document providing proof of vaccination against one or more infectious diseases (such as COVID-19).\(^7\) In this case, the role of COVID-19-themed Apps is even greater, as it is not only useful for enabling cross-country travel but also for increasing awareness and coverage of COVID-19 vaccinations.\(^2\)

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https://doi.org/10.1016/j.glohj.2022.07.004
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3. Are COVID-19-themed Apps safe and secure to use?

Based on measurements using the Mobile Application Rating Scale method, the quality of COVID-19-themed Apps varied and was less reliable. This happens both in Apps developed by unofficial and official agencies including the government and national departments. A simulation study analyzing the performance of a national COVID-19 symptom checker App in Japan, Singapore, the United Kingdom, and the United States showed that while a COVID-19 symptom checker App is safe and useful when used, it also has the potential to delay patients seeking medical care simply because the App incorrectly suggested that home care was sufficient for their current condition, when in fact their condition already had indications for medical treatment.

Next, it is known that digital systems can generate large amounts of data in real-time, relying solely on technology. Therefore, without having sufficient privacy laws and political will, it will be very difficult to ensure the security of such a digital system. Since it is nearly impossible for users to know how their personal information is organized securely, there is a potential to violate the confidentiality and privacy of App users. In addition, neither service providers nor other related sectors can guarantee that the collected data is not misused. Users can only rely on and trust privacy policy statements made by the application’s developers. The absence of security guarantees for App users further reduces the quality of existing Apps. Furthermore, although ethical justification can be accepted in terms of the obligation of public health, data elements collected without consent must represent the minimal necessary interference, lead to effective public health action, and be maintained securely. It further emphasizes the importance of having infrastructure laws in the digital space.

4. Who is responsible for ensuring the quality of COVID-19 Apps?

As mentioned above, COVID-19-themed Apps are developed not only by official but also by unofficial institutions. However, the quality of these Apps was unstandardized and potentially harmed their users. Therefore, at first, it is the developer of the App who must be responsible for their products. In addition, especially since these Apps were made for health purposes, experts from the health sector also should be involved in their development. Then, authorities such as the Food and Drug Administration (FDA) should have full responsibility to validate and ensure the safety and security of these Apps before it was launched in public. Therefore, it’s necessary for the FDA in each country to expand its coverage in the field of health and wellness Apps. Currently, most of the FDA does not regulate health and wellness Apps that are not intended for medical use. While the FDA actually should play a stronger role, there is a complete absence of FDA involvement in assuring the quality of health and wellness-related Apps. Last but not least, those who are responsible for ensuring the quality of this App are the stakeholders. Since there is currently a lack of clear and accepted standards for the development of Apps for medical and healthcare use which poses different risks to developers, providers, patients, and the public, stakeholders must establish standard legal rules that regulate the stages and requirements in developing health-based Apps to ensure its safety and security. Moreover, they also should regulate when ethical justification can be applied, and what criminal sanctions are applied to violators of the law to minimize and prevent any potential harm caused by using the Apps.

5. What can be done to prevent data breaches?

In developing the Apps, the developers should collaborate with medical or health-related experts, stakeholders, and the FDA in that region to ensure the quality of their Apps, including the data security of their App users. To prevent data breaches in the digital environment, it is necessary to develop a trustworthy and ethical digital system. One of the solutions is the implementation of blockchain technology in the health system especially in developing health-related Apps. As one of the emerging digital technologies, it has characteristics that can be useful in multiple domains of the health system such as management of electronic medical records and access rights, and mobile health. However, most of the current research regarding blockchain implementation remains at the technical stage, with few providing actual clinical Apps, highlighting the need to translate foundational blockchain technology into clinical use. In the implementation of vaccine passport policy, while the security of the information regarding someone’s vaccination record and an important part of individual medical records should be protected, the openness of the blockchain in creating data transparency and accuracy is the potential to build a viable international vaccine passport authentication process with the advantages of low cost, high interoperability, effectiveness, security, and verifiability.

6. COVID-19 Apps amidst global crises and inequality

During the pandemic, the demand for digitization has increased rapidly as the status of the digital space seems to have shifted from amenity to necessity. The existence of COVID-19-themed Apps has made an important contribution to society, by making it easier for the public to access the information and services they need, as well as instruments that allow economic activities, education, recreation, and social interaction to continue during the pandemic. However, not all are equals in terms of access to networks or connected devices, or when it comes to the skills required to navigate computerized spaces optimally. It’s reported that most COVID-19 Apps users are middle-aged population, while the elderly seems not familiar with the Apps.

Digital inequalities are a form of social inequalities deeply embedded in the socioeconomic context. It was already existing earlier, yet the COVID-19 crisis is exacerbating them dramatically and it put the vulnerable population at a higher level of risk. The theory stated that there are four proximal factors are impacting the degree of ability to use technologies efficiently and effectively. First is technical means, it is related to the quality of the equipment that one can access, both in terms of hardware and software as well as the power and reliability of Internet connection. Second, the autonomy of use refers to the location where technology is accessed, and the perceived freedom to use it as wanted. Third is social support networks such as any assistance from other experimented users. The fourth is experience, it defines as the time dimension enabling people to be familiar enough with the technology for retaining benefits from its use.

In terms of sustainability, compared to other types of COVID-19-themed Apps, those specifically designed to support the implementation of the vaccine passport policy will be the ones that are highly possible to be continuously developed. It can be seen from the shift of paradigm regarding vaccine passports during the pandemic. While until the end of 2020 using the vaccine passport as a risk-free certificate was still a controversial idea, but currently there are an increased number of countries that introduce their vaccine passports to make it possible for arrivals to be exempted from quarantine obligations while entering their countries.

However, since this pandemic caused the economic crisis and also worsened the health status indicator globally, it requires the countries especially those with a limited budget to prioritize the primary needs of their people over research and development activities. This will further slowdown the development and use of technology as a potentially effective solution to restore economic activity in these vulnerable countries amid the uncertainty of this pandemic.

7. Conclusion

There are many COVID-19-themed Apps developed by official and non-official bodies to help communities, stakeholders, and health workers to manage the COVID-19 pandemic. However, the presence of this COVID-19-themed App faces various challenges related to the safety and
security of user data. This is because there is no global agreement on a secure digital environment, in which authorities have the right and obligation to oversee the development and use of Apps launched by developers, including legal protections that ensure user data is not misused. Moreover, blockchain technology which is considered capable of being a solution also has not been fully implemented. However, the Apps that are specifically designed to support vaccine passport implementation is the one that continuously develops globally. Even though, the development and expansion of this system will be very slow and inequial in some parts of the world due to the severe global recession that forced stakeholders to prioritize their budgets for basic needs over research and development activities.

Competing interests

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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