Frontiers in Health Informatics
2021; 10: 85

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The importance of recording self-reported information in the management of COVID-19 virus variants: A technology-based approach

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Article Info

Article type:
Letter to Editor

Article History:
Received: 2021-06-16
Accepted: 2021-08-15
Published: 2021-08-17

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Keywords:
Medical Informatics
COVID-19
Information Technology

A B S T R A C T

COVID-19 virus variants are rapidly spreading across the world. Successful tracing of contacts and early isolation after the onset of symptoms are vital, because, in this period, patients can infect other people having contact with them before isolation. One method for identifying, tracing, screening, and monitoring the potential patients can be self-reporting of information by these individuals. The present letter suggested importance of recording self-reported information in the management of COVID-19 virus variants using technology-based devices.

Cite this paper as:
Salmanizadeh F, Ameri A. The importance of recording self-reported information in the management of COVID-19 virus variants: A technology-based approach. Front Health Inform. 2021; 10: 85. DOI: 10.30699/fhi.v10i1.315

DEAR EDITOR

The coronavirus disease (COVID-19) pandemic is rapidly spreading across the world. World Health Organization (WHO) reported that worldwide 176156662 people were infected with the Coronavirus, and 3815486 died until 16 June 2021 [1]. Symptoms of COVID-19 pneumonia include breathing difficulty, anorexia, confusion, chest pain or squeezing sensation, and fever higher than 38 °C. These symptoms are also common in other acute respiratory infections, such as influenza, respiratory syncytial virus, and other respiratory viruses, which makes the control of this epidemic problematic. Therefore, strategies such as early diagnosis of the disease, quarantine of the patients, tracing the contacts with suspected and confirmed cases, and public health isolation are taken to combat COVID-19 [2]. For instance, the outbreak of severe acute respiratory syndrome (SARS) in south of China in 2003, could be took over by torching down contacts of suspected individuals and quarantining patients due to high chance of transmission after the onset of symptoms [3]. Therefore, successful tracing of contacts and early isolation after the onset of symptoms are vital.

One method for identifying, tracing, screening, and monitoring the potential patients can be self-reporting of information by these individuals. Self-reported information can include symptoms (fever, cough, diarrhea, headache, muscle or joint pain, fatigue, and loss of smell and taste, respiratory rate, heart rate, and blood pressure), history of underlying illness, and medications being taken. Symptomatic monitoring approaches may help understand potential undocumented COVID-19 instances when laboratory confirmation is difficult or impossible. Likewise, syndromic monitoring was a useful method in the 2003 outbreak of SARS [3].

Different technological devices such as mobile

phones, smartwatches, other wearable devices, web-based portals, and social media have successfully collected self-reported information, and health-related data [4, 5]. Also, the Global tracking system and GIS can effectively use in collecting geographical and spatial information about the distribution of patients and suspected individuals and tracking Corona patients [6-9]. Quer et al. [4] demonstrated that smartwatches and activity trackers can significantly use in identifying symptomatic individuals with and without a diagnosis of COVID-19. Menni et al. [5] used an app-based symptom tracker on 2618862 individuals to investigate whether loss of smell and taste is specific to COVID-19. In Taiwan, home quarantine corona patients are electronically monitored through government-issued mobile phones tracked by a global positioning system (GPS); if they violate the quarantine, this digital fence sends messages to them [9]. South Korea has tracked people's movement using GPS data from mobile phones [6]. Kamel Boulos [7] demonstrated that global tracking system and GIS can be effective in tracking Corona patients. Johns Hopkins University Center for Systems Science and Engineering (JHU CSSE) [8] uses a GIS dashboard that presents live data of the worldwide spatial distribution of COVID-19 patients. This dashboard provides data of the total number of confirmed cases, mortalities, and recovered patients. However, multiple variants of COVID-19 virus are circulating globally. For example, The United Kingdom (UK) identified a variant called B.1.1.7 with a large number of mutations in the fall of 2020 [10]. In South Africa, another variant called B.1.351 emerged independently of B.1.1.7 [10]. These variants seem to spread more easily and quickly than other variants, which may lead to more cases of COVID-19. An increase in the number of cases will put more strain on health care resources, lead to more hospitalizations, and potentially more deaths [10]. It is necessary to use strategies to control the speed of transmission of COVID-19 virous variants and management of this situation.

Therefore, in the first phase, we recommend that governmental policymakers and healthcare planners to develope a tool for collecting self-reported information and health-related data through a mobile-based application. Currently, mobile-based applications are available, easy, and affordable technologies. On the other hand, mobile phones are popular devices in the daily lives of people. Hence, individuals (e.g. suspected people and healthy people) in each area are able to complete standard surveys provided by the proposed mobile-based application. This application analyses self-reported information using artificial intelligence or machine learning methods (e.g., decision tree) and identifies suspicious individuals. Also, spatial and GPS data from the mobile phone will provide real-time data of individual's geographical location. In the second phase, lists of suspected individuals are sent to local health care screening teams in each area. These teams would visit the suspected individuals in each region and take a fast coronavirus test. In this way, definitive patients with COVID-19 can be identified in each region. Local health care screening teams, in each region, can register confirmed patients with COVID-19 in a comprehensive system using self-related mobile application. This comprehensive system of COVID-19 will analyze health-related, spatial and GPS data of patients. The output of this system can be provided in the form of GIS maps and dashboards. In the third phase, all stakeholders (healthcare professionals, health policymakers, governmental managers, and authorities) can instantly investigate the spatial distribution of COVID-19 and the behavior of suspicious individuals by GIS and mapping dashboards. GIS and mapping dashboards can improve data sharing and real-time accessibility of information to support critical decision-making by different stakeholders. Real-time information in dashboards can include the daily number of infected individuals, the number of deceased and recovered patients, the number of occupied beds, and so on. GIS can identify regions with the highest number of COVID-19 patients, patients who violate self-quarantine, and high-risk public places (shops, restaurants, gas stations, etc.). Finally, governmental managers and authorities can prevent or control the spread of COVID-19 virus variants by informing and notifying individuals, implementing local quarantine and curfew in high-risk regions, and making decisions to clean and disinfect in high-risk regions.

AUTHOR'S CONTRIBUTION

All authors contributed to the literature review, design, data collection and analysis, drafting the manuscript, read and approved the final manuscript.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest regarding the publication of this study.

FINANCIAL DISCLOSURE

No financial interests related to the material of this manuscript have been declared.

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