PERSPECTIVE

COVID-19: Group testing and digital technology "Aarogya Setu" - the need of the hour

Uma Alagappan[1], Prabhusaran Nagarajan[2], Thirumalaikolundusubramanian Ponniah[3], Ramchandra Goyal[4]

[1]Professor, Department of Microbiology, Trichy SRM Medical College Hospital and Research Centre (Affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai), Irungalur, Tiruchirapalli, India; [2]Research Faculty, Department of Microbiology, Trichy SRM Medical College Hospital and Research Centre (Affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai), Irungalur, Tiruchirapalli, India; [3]Professor, Department of Medicine, Trichy SRM Medical College Hospital and Research Centre (Affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai), Irungalur, Tiruchirapalli, India; [4]Head, Community Health Services, Trichy SRM Medical College Hospital and Research Centre (Affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai), Irungalur, Tiruchirapalli, India

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Corresponding Author

Dr. Ramchandra Goyal, Head, Community Health Services, Trichy SRM Medical College Hospital and Research Centre (Affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai), Irungalur, Tiruchirapalli, Tamil Nadu - 621105 India.
E Mail ID: drgoyal45@gmail.com

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Abstract

The importance of group testing, efficient utilization of the diagnostic tests and its applications are highlighted. Though it has advantages, the challenges and constraints and the need for the policy from the concerned authorities to implement group testing in a reliable manner with competent persons were brought out. Thus, with group testing and the use of digital technology "Aarogya Setu" in India, we are confident that we will be able to diagnose cases and implement surveillance activities successfully. Popularization of "Aarogya Setu" by all categories of healthcare workers, teachers, women self help groups and other users of android mobile phones in the interest of the Nation and community at large, towards disease containment were cited. However, the ethical aspects of deployment of such kind of approach as part of a multidimensional public health response, and its usefulness in infectious disease outbreaks have to be monitored.

Keywords

COVID-19, group testing, pooled sample, Aarogya Setu app, contact tracing, quarantine

Introduction

In the special issue of Indian journal of community health, there were three interesting articles which dealt on the strategies related to testing,(1) laboratory aspects,(2) contact tracing and quarantine(3) in a concise and effective manner. We would highlight on group testing and the digital technology "Aarogya Setu", in view of the importance of these towards containment of the pandemic.

Laboratory testing by and large forms an integral part to an individual attending to hospital for an illness(s) towards diagnosis, therapy, prediction of relapses and remissions, and prevention. With regard to infections, investigations help to identify the etiological agent, assist therapeutic decisions,

share with public health authorities for contact tracing and implementation of containment measures, and protect healthcare workers involved directly. It also helps to implement effective waste disposal and assist in epidemiological studies including community diagnosis especially if the samples are collected from community health care agencies. As the purposes and usage of laboratory tests for epidemiology are different from hospital based care, one has to consider how to make use of the limited resources such as manpower, materials, machines, money and time, in a planned and acceptable manner not only for low and middle income countries but also for developed nations in view of the multiple challenges.

The current challenges faced while testing for SARS-CoV-2 are quality of the materials supplied to laboratory, limited laboratories, status of accreditation of laboratories, manufacturing capacity, financial allocation, payer related issues such as individual or third party, the economics and benefits accrued. To overcome these challenges, pooled sample analysis or group testing has become the key component in the context of combating the Corona Virus Disease 2019 (COVID-19).(4,5) Earlier, group testing was used for detecting human immunodeficiency virus (HIV) and hepatitis B and C viruses in blood products.(6) Currently success of group testing (pooled sample analysis) has been shown from various countries.(4,5)

The points to be considered for group testing of pooled specimens are usage of highly sensitive assays so as to avoid missing low positive samples, monitoring of pooling based on the positive rate of test specimens which are likely to increase with outbreak of disease. Extraction methods for the recovery of RNA and overall test sensitivity with regard to COVID-19, the laboratories shall have their own validation for the kit based on the prevalence rate of COVID-19 in their own region.(5) In other words, the key principles for group testing shall be the knowledge of the limitations in the detection, sensitivity, and specificity.

The success of the group testing is related to the kit(s) used, methods adopted, region/ locality and prevalence of the infection in the community. However, the other aspects(4) to be considered while planning for group testing are decision on number of samples used for pooling, the quality of kit(s), the operational aspects and policies of the public health department of the country. If meticulous steps are taken, large numbers may be screened with limited resources on time and effective measures shall be introduced towards containment.

Overall group testing reduces constraints and enhances the utilisation of the diagnostic tests efficiently and curtails operational delays. After knowing the advantages, challenges and constraints, all we need is a policy from the concerned authorities so as to implement group testing in a reliable manner with competent persons, and show the success to the rest of the globe.

When we proceed with group testing, we will be able to screen vast population which will provide valuable data on the infection rates across the country, locations, inter and intra area variations, transmission dynamics, immune status of the community, age and gender variations and on the severity of infection. Testing has to be complemented by digital surveillance, via phone apps, aiding contact tracing, enforcing quarantine and permitting lighter levels of physical distancing. The ethical issues related to digital tracing have ~~(and)~~ explained that the deployment of such kind of approach as part of a multidimensional public health response is also described. They also explored the implications and its use in future infectious disease outbreaks.

Indian government has introduced an app called “Aarogya Setu” for surveillance of COVID-19, which will trace the contacts. Mr. Narendra Modi, the Prime Minister of India reiterated that “Aarogya Setu is an important step in fighting against COVID-19. This information technology app tracks the movement of the user through their smartphone and reports on the proximity to other users that have also downloaded the app. The app uses the smartphone’s GPS and Bluetooth technology to generate status report about the phone’s user which will be monitored by respective authorities. The app is free and more than 10million have down loaded as on May 12, 2020. Continued motivation through healthcare workers, teachers, women self help group members, and government and non-government members will help to disseminate the utilisation of this app for betterment of containment of illness and surveillance. Interestingly an analysis of the Aarogya Setu app published by the Paris-based cyber security consultancy Defensive Lab Agency states that it has dual function namely user tracking and contact tracing. Despite limitations, many

experts believe that these apps will help to trace contacts, surveillance activities and control the pandemic.

In India, COVID-19 response has been integrated with the existing Integrated Disease Surveillance program (IDSP), which comes under the National Center for Disease Control. IDSP's health information platform has already launched its own Android app for healthcare workers with which they are familiarized. The healthcare workers were asked to use the app while inspecting suspected or active cases of COVID-19. By these means the healthcare workers get selected demographic details of the cases which are tied to the geo-location data.

Already, the state of Kerala has introduced an IBM-owned app called MaaS360 and asks people returning from international travel to download it so as to track the location of individuals who are being told to self-quarantine for 14 days. The health officials and local police are making in-person visits to sites. By these means the state government of Kerala monitors quarantine order and overcomes noncompliance. In fact these have helped containment of COVID-19 in Kerala state even though Kerala reported the first case of COVID-19 ~~was reported~~ in a medical student returned from Wuhan, China. "Quarantine Watch," is the app used by the state of Karnataka and monitors those under quarantine almost on hourly basis between 7 a.m. and 9 p.m. and prepares a real-time status report of the quarantining individual. Other states are using different technology to track the movement and status of individuals under quarantine. Those found to defy the quarantine are put under a state-mandated quarantine program. Thus with group testing and use of Aarogya Setu digital technology, we are confident that India will be able to diagnose cases and implement surveillance activities successfully. In the interest of the Nation and community at large, it is the duty of all category of healthcare workers, teachers, women self help groups and other users of android mobile users to use the Aarogys Setu technology for them and motivate others to use and reap the benefits.

Authors Contribution

UA: Planning technical aspects of group testing and linkage of laboratory report into digital technology. She also gave the outlines for the paper. PN: Collected literature, organized the group testing aspects and drafted the paper. TP: collection of information related to digital technology and the ethical components, and applications apart from drafting the text. RG: Concepts, assisted for consolidation, coordinated with each other to eliminate conflicts, provided final shape for the text and final approval of the paper.

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