Covid-19 in India: Prospect of Crowdsourcing to Handle Public Health Crisis

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ABSTRACT

Government of India with its mounted preventive intervention to contain wide-spread SARS Cov-2 outbreak, additionally curiously reported in its official site the COVID-19 arrangement challenge with money prize up to Rupees 1 lakhs declared so as to enable the residents with the correct data and further at getting contributions as to people and organizations who have created advancements and imaginative arrangements, bioinformatics, datasets, Apps for analysis and so on that can be utilized for reinforcing the battle against Corona. The study aimed at understanding the prospect of crowdsourcing to handle the COVID-19 outbreak in India idea through secondary data analysis. Integrative survey of scholastic writing on enrollment, selection, method and structure of chipping in framework that incorporates the publicly supporting methodology concentrated remotely. Published articles, study papers and media reports analyzed. The continuous activities by non-government division; and site measurements shared by crowd sourcing groups give proof that crowd sourcing can be promising instrument in health for India. However, crowdsourcing in public health field would require continued adoption through research on its efficacious use and strict regulatory frame developed at the earliest.

Keywords: COVID-19; Lockdown; Social distancing; Volunteer-driven; Crowd sourcing; Research

BACKGROUND

With India witnessing heightened COVID-19 induced morbidity and mortality causing public health crisis, the Governments at the union and states are on the front foot to break the transmission chain and contain coronavirus pandemic. Interestingly, India government in late March 16 2020 announced the COVID-19 solution challenge with money prize up to Rupees 1 lakhs reported in the official site [1] with a view to engaging citizens with the correct data and further at getting contributions concerning people and organizations who have created advancements and inventive arrangements, Bioinformatics, datasets, Apps for finding and so on that can be utilized for fortifying the battle against Corona.

India has seen outbreaks of emerging and re-emerging diseases. Public health systems in India, with existing infrastructural inadequacy, face challenges because of the slow communication process: People get sick, are seen by healthcare providers, get laboratory confirmations, information flows up the channels to local health agencies, state and national governments. Each of these stages can take days, weeks or months. On the other hand, a virus can spread around the world within few days if preventive and control actions are not initiated. Crowdsourcing has proven to hold significant advantage for its capacity to generate more data,

ideas and experiences to conceivably give answers or an answer for a specific theme. Various healthcare specialists and practitioners accept that it is an incredibly amazing asset especially in the domain of public healthcare that can be utilized to help lessen costs, make healthcare outreach increasingly proficient and save lives. Remarkably, over 60% of all underlying episode reports originate from informal casual sources [2]. Present-day crowd sourcing relies intensely upon advanced data and gets to the 'crowd' by means of the web. In most cases, the crowd consists of volunteers. The India government mooted activity planned for moving clinical exploration from a shut domain to an open joint effort between people in general and specialists and achieve implementable arrangement in a neighborhood network [3].

Digital technology innovations are known to present the possibility of improving the efficacy of the health system response to an epidemic [4]. The Ebola and Zika virus epidemics have shown the utility of mobile health (mHealth) applications (apps) for improving access to testing, contact tracing, supporting frontline healthcare workers, and raising public awareness [5]. Recent evidence underscores the potential of mHealth initiatives for the provision of mental health services to support the patients and healthcare providers in dealing with the psychological impact of the COVID-19 pandemic. Contact tracing apps have been a crucial

component of COVID-19 response in countries such as China, South Korea, Singapore, the United Kingdom, and Israel.

Asia is getting a handle on crowd sourcing like no other region, with enormous numbers of the world's greatest or driving crowd sourcing destinations either arranged in the Asia Pacific area or controlled by customers from Asian countries. It is becoming a popular way to bring together individuals towards a common goal, and especially in emergent situations. English-language crowd sourcing destinations will in general be ruled by power clients from India [6]. Crowd sourcing is slowly becoming popular in India but is far less evolved than other developed countries. In India so far, donation-based crowd funding is the most common form. A regulatory framework relating to equity crowd funding is yet to be developed. Crowd souring in India, too, is yet to come under regulatory framework. Research studies [7,8] indicate that new technologies, including Internet devices, for example, online networking or cell phones, all combined with worldwide situating frameworks, empower another type of irresistible infectious data to be collected legitimately from citizens. This crowd sourced information keep away from perhaps persuading structure expenses and rules, can be conveyed unendingly, and can be utilized to fill in the gaps in health data. Crowdsourcing offers a constant image of disease by furnishing data as people are analyzed, or even beforehand. Additionally, these instruments can spatially extend information in places that current surveillance do not cover. Another favorable position of working legitimately with general population is that it grows commitment for and engages individuals to end up being progressively aware of and included, as episodic proof has appeared. In one of the most exceptional applications in a worldwide critical thinking field, epidemiologists are using citizen science to reinforce disease prevention and improve public health surveillance. Thus, through crowdsourcing, health specialists can find out about parts of infection elements that are not open through customary information, for example, contact examples and social condition, as governments at the Union and States in India are embarking on surveillance and contact tracing to counter COVID-19 episode.

OBJECTIVES AND METHODS

The study aimed at analyzing the prospect of crowdsourcing ventures to deal with the COVID-19 episode in India, the idea that was mooted. Integrative survey of scholarly writing on enrollment, determination, strategy and structure of chipping in framework [9] that incorporates the publicly supporting methodology studied remotely. The Google Play and the Apple app stores were searched using the terms 'COVID-19', 'corona virus', 'pandemic', and 'epidemic', individually. Additionally, a free-text search was run for COVID-19-related apps using the phrase 'COVID-19 mobile apps in India'. Articles, study papers and media reports from news portals formed the secondary data sources of the study analyzed.

RESULTS

Our findings indicated that, followed the government initiatives to engaging citizens and getting contributions of people and organizations who have created advancements and inventive arrangements, Bioinformatics, datasets, Apps; digital initiatives gained ground in India in the areas of mobile application, open source analytics and modelling tools, telehealth technologies, geographic information systems drones, robots and 3D printing. To begin with, the Mobile App based contact tracing, initially

through non-government initiatives as 'COVID-19 cases trackers for India', (https://www.covid19india.org) began uploading at their site real-time, state-wise data on the confirmed, active, recovered, and deceased cases of the COVID-19 virus, and the Eastern Herald (https://www.easternherald.com/coronavirus- live--updated-word-map), a prominent news portal in partnership with WHO, devised COVID-19 outbreak map of all countries, including India [10]. Soon thereafter, the Government launched its own Bluetooth and GPS enabled contact tracing app 'Aarogya Setu" that generated information about health and Covid-19 safety status of an individual as well as her/his precinct. Various State health/municipal departments used technical support of 41 non-government launching agencies of the existing COVID-19 apps in India, as a recent study indicated [11].

Secondly, rapid data sharing allowed better understanding of the origins and spread of the infection. Community hackers pace groups in Mumbai and New Delhi namely, Maker's Asylum (https://www.makersasylum.com) chipped in with their designed M-19 face shields for healthcare workers that they claimed can be made in three minutes by anyone following the guidelines of the prototype. Another key innovation came from a team of biosciences and bioengineering researchers at Indian Institute of Technology, Kanpur (https://www.iitk.ac.in/bsbe/) who developed a full Personal Protective Equipment Kit that, when mass produced, would cost less than Rs.100. The Kerala Corona Safe Network (https://coronasafe.network) worked on two major components i.e Corona Literacy and awareness and facilitating Corona Care Centre. Start-ups are additionally supporting the administration's public information campaigns. The GoK-kerala(https://play. google.com/store/applications/details?id=com.qkopy.prdkerala) of Kerala state government.

Thirdly, to filter infection cases, those with moderate symptoms from the severe cases and keeping the hospitals' carrying capacity off-load, Telehealth technologies started gaining ground in India. The digital platforms as E-Sanjeevani(https://esanjeevaniopd. in), the low-cost integrated telemedicine solution developed by C-DAC. Mohali was launched as the national teleconsultation service. The government, in May 2020 through a gazette, notified guidelines to practice telemedicine in India, a significant step as telemedicine consultation was a grey area in India. These resulted in witnessing a dramatic increase in digital healthcare footprint, as Protea Medical (https://www.portea.com), Lybrate (https:// www.lybrate.com), Medlife (https://www.medlife.com), KlinicApp (https://www.klinicapp.com) and a petthora of e-pharmecy and home lab-test solutions to offer doorstep delivery of services. Indian Association of Clinical Psychologists (https://iacp.in) a body of clinical psychology professionals shared a list of volunteers who can provide tele-counselling and psychological first aid during this lockdown period, The Association of Psychiatric Social Work Professionals(https;//apswp.org) has also released a list of mental health professionals volunteering to provide online support, to cite some instances and more can be cited by others.

Fourthly, the Geographic Information Systems (GIS) system of tracking the spread of Covid-19 in near real time with a map-centric dashboard extensively deployed to fight the pandemic. Indian Institute of Technology, Chennai and its team of researchers developed a GIS platform integrated with AarogyaSetu to provide extremely important information about the spread of corona virus. Among the states, Kerala used GIS Mapping and route charting of positive cases by collating disease surveillance data separately.

The Telengana government (https://tweb.telangana.gov.in/departments/home-department/telangana-state-police) developed an App named TSCopto geotag houses of foreign returnees and also deployed geo-location technology to track people under home-quarantine. Smart cities like Pune, Surat, Bengaluru and Tumakuru among the 45 smart cities that used Integrate Command and Control Centers (ICCC).

Fifthly, Drones were deployed on the front line for wide variety of services as disinfection, street patrol, food and medicine delivery in quarantine districts, as well as to enforce lockdown rules. The MarutDronetech (https://marutdrones.com) a private enterprise was reportedly engaged by different state governments to check individuals' temperature utilizing warm imaging and drones to deliver medical supplies. Drone makers have used this opportunity to develop and integrate more sophisticated functions.

Sixthly, Robots services used to provide services and care for those quarantined or practicing social distancing in India. Chennai's Propeller Technologies (https://www.propellertechnologies.in) unveiled Zafi Medic robots at Mahatma Gandhi Memorial Government Hospital that had been equipped to deliver food and medicine to Covid-19 patients under quarantine. In Kerala humanoids like Sayabot were used for public sensitization of Covid-19; and incubated in Kerala startup mission, Asimove Robotics (https://www.asimovrobotics.com) debuted its KARMI-Bot that enabled semi-autonomous care in quarantine wards and additional features as disinfecting the hospital premises using ultra-violet radiation.

Finally, Three-dimensional printing to counter the strains in supply chain of critical products, have been used in India during the period and HP India (https://www8.hp.com/in/en/printers/3d-printers/3dapplications.html)responded to the critical need of ventilators available in large numbers by getting over 1.2 lakh key ventilator parts printed in a short span of time. Boson Machines of Mumbai (https://bosonmachines.com) delivered more 12 thousand 3D printed face shields in various hospitals in Mumbai. Bengaluru based Harkness Screens also started 3D printing face shields, along with PVC aprons and curtains. Startups as 3D Experience Lab, Inalihas (https://3dexperiencelab.3ds.com) created prototyping system that can create 100 ventilators in 15 days. These have been encouraging digital innovations for the country in the face of SARS Cov-2 pandemic.

DISCUSSION

The expression "crowd sourcing" originated in 2006 by Jeff Howe and Mark Robinson, editors at Wired, to portray how organizations were utilizing the Internet to "redistribute work to the group", which immediately prompted the portmanteau "crowd sourcing'. The idea anyway is based on a mid-twentieth century hypothesis once in a while alluded to as the "wisdom of crowds"[12]. This is established in the case of British researcher Sir Francis Galton, who in 1907 asked in excess of 700 individuals at an area to guess the weight of an ox. Nobody individual speculated accurately, yet the normal of the considerable number of estimates gave a number practically indistinguishable from the ox's weight. Wisdom of the crowds think about the contribution of a gathering of individuals instead of just people; the utilization of specific technologies, most prominently Web 2.0, that has made it workable for such procedures to be done at scales scarcely possible before, and to include profoundly differing and geographically distributed participants. Numerous software programs, particularly those that are accessible free of charges, are "open source." This implies the real code is accessible for developers to see and audit, permitting them to make changes or augmentations to the product. Existing studies talk about four sorts of capacities that can be publicly supported in the open area: (1) information generation, (2) service coproduction, (3) solution creation, and (4) policy making) [13]. In light of the equivalent, there are four kinds of crowd sourcing prospects in particular, Knowledge discovery and management, disseminated human intelligence tasking, communicate search and peer-vetted imaginative creation. The last type has been observed ideal for ideation problems where solutions are matters of taste or market support, such as design or aesthetic problems. In all cases, a cardinal rule of crowd sourcing is to assemble as diverse a crowd as possible. That ensures a wide variety of perspectives are represented. One way to do that is to use multiple forms of outreach.

Crowd sourcing is stated to be embedded in Citizen science, first characterized freely in the mid-1990s by Rick Bonney, an American ornithologist in the United States and Alan Irwin a British sociologist in the United Kingdom. Citizen science is otherwise called community science, crowd science, crowd-sourced science, civic science, volunteer monitoring, or online citizen science, through which scientific exploration is conducted, in entire or to some extent, by beginner (or nonprofessional) researchers [14]. Citizen science ventures offer various favorable circumstances to global solution networks, especially those concentrated on public policy issues that converge with cutting-edge science. Citizen scientists have contributed crucial information in areas where information is scant as well as restrictively costly to secure. A case study in a low-income neighborhood in Netherlands demonstrated that public health citizen science can very well put to practice with citizen scientist [15].

Crowd sourcing also has been projected to be linked with various theories as well, for example, Dr. Enrique Estellés-Arolas, a scientist, centered in all the issues that includes Crowd sourcing in his Blog contended for link between Game Theory of applied mathematics specialty (microeconomics being concrete) with crowd sourcing [16]and as a Systems Theory perspective, as it takes advantage of contributions from outside the traditional limits, it is seen as valuable to conceptualize the outer variables adding to crowd sourcing as having a place with a framework that is outer to and interacts with an organizational system [17]. The decent variety of crowd sourcing approaches confounds endeavors to accomplish a solitary all-encompassing hypothesis. Some have proposed that the bottom-up nature of connecting with people in general is contradictory to theory-driven interventions. Others contend that the moderately concise history of crowd sourcing makes it untimely to build up a strong theory. This history closes by later information on aggregate insight and open-source models prepare for a crowd sourcing theory.

Around the world, throughout the most recent decade, crowd sourcing has been developing as an acceptable practice for use by organizations wishing to source new thoughts and answers for miniaturized scale errands from the public. Studies have recognized eight zones where crowd sourcing has been utilized in health were distinguished as, diagnosis; surveillance; nutrition; public health and environment; education; genetics; psychology; and general medicine/others) [18].Surveillance was the territory where crowd sourcing has been demonstrated the best at the biggest scale.

Clark Freifeld, et all recorded numerous fruitful crowd sourcing surveillance applications that are being utilized for healthcare services in emergency and catastrophe reaction circumstances, for example, Ushahidi, Frontline SMS and Geochat [19]. In the previous years, information and data derived from public social media has been effectively utilized for capturing diverse patterns about health and disease related issues, for example, flu symptoms, sentiments toward vaccination, allergies, and numerous others [20-24].

As observed through this review, although crowd sourcing is relatively new, calling on citizens to help solve public problems through technology is not. According to the sheer number of crowd sourcing projects springing up, numerous researchers are quick to expand the contribution of networks and different stakeholders in their research. Again, in low- and middle-income countries with limited medical and public health resources, timely availability of data on infection rate are particularly crucial for decision makers to formulate evidence-based life-saving policies and prioritize counter measures. Given its timeliness in collating information, it is vital to understand the importance of crowd sourced data in India, compared to official data on COVID-19.

An analysis [25] of COVID-19 data from India's Ministry of Health and Family Welfare (MoHFW) from 14 March 2020 to 19 June 2020 ~ the earliest available ~ and data from the crowd sourcing site covid19india.org across all states and union territories in India revealed that the official data is generally a day behind the crowd sourcing site. The time lag became greater as more cases were confirmed in May and June compared with March and April. The crowd sourcing site appears to be updated timelier than the government's site. The government health ministry provided the most recent district-wise data in a PDF format that consists of some districts. In contrast, the crowd sourcing sites provided data at the district and city levels with information in both application programming interface (API) and spreadsheet formats facilitating data matching analysis.

Thus, crowd sourcing tends to be massively promising in public health; if a deliberate effort is made to convey it to scale, particularly through wedding the worldwide healthcare community with crowd sourcing and software engineering analysts. Crowd sourcing can fabricate the accuracy of computer automated tasks, lower costs, increase the size of exploration, ascend above cutoff points and edges, produce novel exposures and accelerate investigate development, among various favorable circumstances.

However, there are worries with the generalizability of the examples, as the group is self–chosen, security and information protection issues of sensitive information, and the chance of malicious workers. The downside of crowdsourcing as, questionable quality control due to observed lack of consistency among numerous people at work, unreliable way to get a job done as crowdsourcing is done on a 'best effort' basis, and issue of confidentiality looms large as the task is posted in the net for everybody to see, are among others. A few studies have added data quality protection measures to weed pernicious workers, for example, cut–offs for scores on previous tasks and screening questions [26]. Extra guideline is required for ethical issues, for example, acquiring informed consent and data use policies [27]. Noted author on crowdsourcing, Daren Brabham opined that crowdsourcing is the meeting-in-the-middle of top-down and bottom-up efforts to solve problems in public sector; and cautioned that it was important to emphasize that crowdsourcing is a process rather than a tool [28].

Crowd sourcing initiative in India to contain pandemic outbreak situation is still at nascent stage. There is dearth of study in India on the issue, as well. Besides, the current focus on automated contact tracing apps that the public is already using or will use, their underlying protocols that will feed into apps are not being kept track of or manual efforts being monitored is perturbing. Concerns have been raised by cyber experts on legitimization of mass surveillance in India citing incidences of 'Aadhar' data leaks in the recent past; and demanding strict scrutiny and legal framework for monitoring. Globally as well, there is no Review Ethics Board (REB) or Institutional Review Board (IRB) process explicit to it, to the author's information, in spite of it being quite different from other methodologies.

Thus, research on the aspect of efficacious use of peer-vetted creative production crowdsourcing, through issuance of a challenge to an online community may be appropriative in public health issue, but the same need augmentation with statutory guidelines framed. Significantly, as citizen science is advancing and picking up acknowledgment in the biomedical, social and behavioral research communities, never-ending revealing of the manners by which it works best can only help to increase its efficacy, and catalyzing change in research culture [29]. For the purpose, study to understand the qualitative evidence from existing crowd sourcing projects, together with orderly survey of the small body of verifiable work that has begun to explore crowd science require growth in right sincere.

LIMITATIONS

Some limitations of the study require consideration, as (i) Limitations of Review- the search being limited to English language, there can be research studies produced in different dialects that have not been converted to English and subsequently, are excluded from this survey, and (ii) Limitation of the paper - the author needed to utilize data outside of scholarly writing and research papers, for example, data from media outlets and newspapers (all referred to) because of absence of explicit data relating to India situation in scholastic writing or study papers on viable publicly supporting use. While this might be a restriction, some of the time it is basic to utilize any sort of solid data accessible to point out specific issues.

CONCLUSION

Notwithstanding the above, the published study reports from across the globe and wide use of Covid-19 tacker apps during Covid-19 times observed, crowd sourcing can be promising tool in health for India if the current initiatives are thoroughly guided and regularization measures developed. For the purpose more, research in the domain is needed to develop firm grounding for crowdsourcing in public health area with Institutional Review Board process, specific to it, developed.

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