AarogyaSetu: Behavior Analysis and Its Efficacy

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ABSTRACT

Background: To be victorious over COVID-19 and to fight half a million cases daily, an individual's cognitive and behavioural attitude towards the Aarogyasetu application is very vital.

Objective: To interpret behavioural aspects and approach of people along with assessing their views and opinions through a survey.

Methods: A cross-sectional situational based survey was circulated through different digital platforms among Indian residents aged above 15 years. A descriptive statistical approach was used to analyze the data.

Results: A total of 220 people have completed the survey. The majority of them expressed that they have always forgotten to use the application, whereas most individuals accepted that they have generally provided incorrect information in the application due to the fear of quarantine procedures. It has been recorded that the Participatory disease surveillance (PDS) based contact tracing application has several limitations, as they do not cater to asymptomatic people in addition to it disabling Bluetooth and GPS services.

Conclusion: Geospatial technology used in contact tracing application had been very beneficial for disease surveillance and to curb plus control the spread of COVID-19 disease. The data recorded through the survey was irregular and showed many variations, as a result true potential of the technology was not liberated. The doubts of people should be acknowledged to increase efficacy of the Aarogyasetu application.

Key Words: COVID-19, AarogyaSetu, Behavioral Analysis, PDS System, Corona, SARS-COV-2

INTRODUCTION

The beginning of 2020 was marked by the catastrophic spread of the COVID-19 Pandemic. The epicentre of SARS-COV-2 was later identified to be in a wet market of Wuhan, China. The first cluster of cases of pneumonia were recorded on 31st of December, 2019 in Wuhan, which was later recognised as "The Novel Corona Virus.[1]After that the Cases started multiplying at a rapid pace with total death of 4,634 in China only because of contact tracing was difficult. The first case in India was recorded on the 30th of January 2020 in the province of Kerala. The theCOVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes.[2]

The transmission of outbreaks like COVID-19 is very difficult to monitor. To control the spread of such disease, it is important to detect early symptoms with immediate responses. Disease surveillance forms a basic component for understanding disease, the study of disease transmission and gives a sound premise to start control measures. Surveillance is the persistent, precise assortment, resemblance, investigation, and translation of wellbeing related information required for the arranging, usage, and assessment of general wellbeing rehearses.[3]Participatory disease surveillance (PDS)is a tool that is developed for disease surveillance. It uses Participatory appraisal approaches and methods, combines them with local veterinary knowledge with convection methods to establish the presence and absence of any particular disease. The model of the PDS system has been established for Influenzas like illness(ILI) and foodborne diseases. Many European countries have made PDS models to collect data about diseases. Thailand also

launched the Doctor my mobile application to collect data for ILI in 2014. Sri Lanka has also launched a mobile application in 2016, to control the spread of dengue by continuing monitoring dengue mosquito breeding sites.[4]

India launched its first PDS Model for COVID-19i.e.Aaogyasetu which is an initiative by the Indian government. It is a surveillance application for COVID-19 that performs two basic functions for data collection and analysis: "Syndromic Surveillance" and "Contact Tracing". It was designed in such a way that one can know the status of people at risk with the help of the phone's Bluetooth and GPS capabilities. The Aarogyasetu application is designed to detect other devices with the application when brought within the Bluetooth proximity. When brought close both the phones change digital signatures between them including time proximity duration and location. Data is then securely recorded by both the application. If a person comes in contact with a COVID positive person from the past 14 days, the Application calculates the danger of contamination depends on the number of connections, the vicinity of collaboration and suggests reasonable activity. The refreshed danger of disease is breaking down by the Government of India, to encourage appropriate clinical mediations, as and when required.[5]

Aarogyasetu was made mandatory in containment areas as of 1st of May 2020 and voluntary in others. With cases rising at such an alarming rate and shortages of healthcare workers, hospital beds and likely community transmission; it's very tough to curb in the upcoming scenario. Participatory disease surveillance app Aarogya Setuuses real-time data and analytics to detect COVID positive patients nearby but the efficacy of Aarogya Setuand user acceptance towards this app is still questionable. It is because the reporting is optional to the government, a non-transparent process of contact tracing and voluntary participation in the application prevents using it for movement permits. Technology-based contact tracing application can encourage and mechanize the cycle, empowering contact tracers to educate clients who had contact with a COVID-19 casualty. This can be empowered by utilizing a global positioning system (GPS), Wireless Fidelity (Wi-Fi), Bluetooth Technology, Social diagram, network-based API, mobile tracking data, and card transaction.[6]

The current research was aimed at interpretation and evaluation of behavioural aspects like inconsistency among people and their approach towards this application through contemplating their views and opinions by a survey. Situation based questions were included to analyse and evaluate the viewpoint of individuals in a different scenario. Description statistical methodology was used to undertake this research.

MATERIAL AND METHODS

Study Design

A questionnaire survey was made, and primary research was conducted with a sample size of 220 people belonging to more than 15 years of age groups from various locations over India. The Face and content validity of the survey was performed by taking the opinions of the experts.

Survey Tool

The tool used for conducting the survey was survey monkey. It is an online platform that Gathers opinions and transforms them into People Powered Data. With the help of Microsoft office, excel tool data analysis and documentation were performed.

Data Collection

The questionnaire was circulated through different digital platforms like social media and direct messages. Active participation was done by an individual with reliable data. Data collection was also done by the fellow website survey monkey and the data was exported to excel with correct information and data charts. The database is original and no counterfeit responses were recorded.

Data Type

The data was primary and the survey was filled without any bias by known and unknown individuals. Mostly the age group >15, which is most technically advance and diverse, participated in data collection. The questionnaire was made with the most obvious and behavioural type questions that talks about the rational and cerebral nature of the individual and the most basic reason behind not using this application in this emerging situation. A descriptive statistical approach was used for analysis.

RESULTS

A total of 220 individuals completed the survey which shows that the highest respondents were aged between 14-34, the most technologically advanced and active age group. The first question was targeted to know the usage of the application where 178 people claimed to utilize the application whereas 41 people were still not using it with the ratio of 81:19 (Figure 1).

Another question was focused on recognizing the actual utilization of the application as it emphasises how many people use the application at the time of requisite. Only 29 individuals check the application regularly i.e. 90% above before going outdoor. 34 individuals usually i.e. 60% above go through the app,99 people usually or rarely i.e. 20-50%

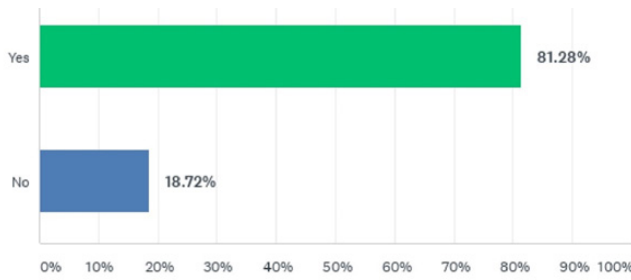above check the application and 57 individuals never use the application as suggested (Figure 2).

Figure 1: Responses of people showing their interest in AarogyaSetu Application.
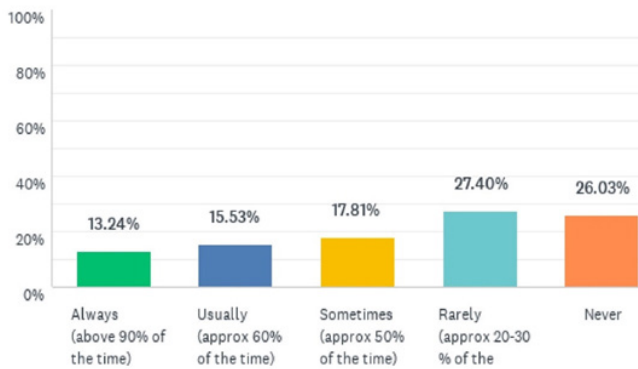

Figure 2: Responses showing the frequency of usages.

The next question was on knowing the basic requirement of Aarogyasetu application to locate COVID-19 patients. The survey was performed on the people whether they should always keep the GPS and Bluetooth proximity technology ON and only 105 people i.e.45% people keep it ON rest 114 i.e. 52% people keeps it off (Figure 3).
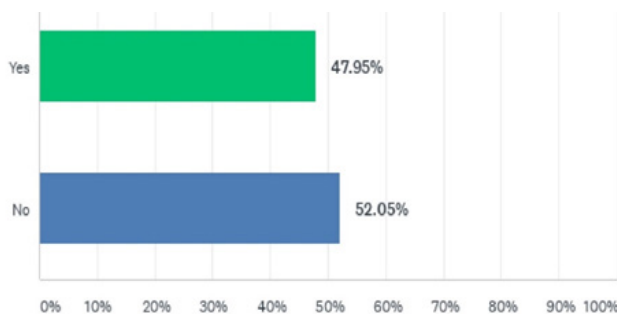

Figure 3: Responses against the readiness of enabling the Bluetooth and GPS.

This question specifies the feasible reason of individuals for not using the application. 42% do not use the application because they often forget it, 32% people do not use the application because they have to keep Bluetooth and GPS

always on as it is battery consuming, 22% people think that it lacks accuracy and the application is not useful whereas 16% people say that they have data security issues as every detail of their location goes to the government last but not least 8% people have their views about not using Aarogyasetu (Figure 4).
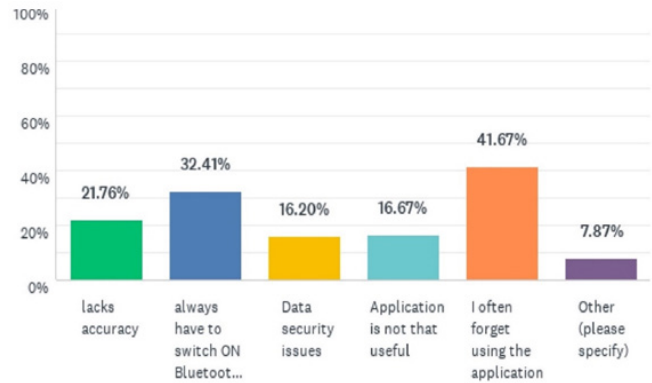

Figure 4: Responses against the probable reason for not using the Aarogya Setu Application.

This question emphasizes the reason that why people might input false or inaccurate self-declaration on the application. 61% of the people were afraid that they will be sent to quarantine centres and will be separated from their families, 40% people are afraid of social acceptance, 15% people didn't fill the form accurately, 23% people thought that it might cause panic in the locality and 3% people have their reasons (Figure 5).
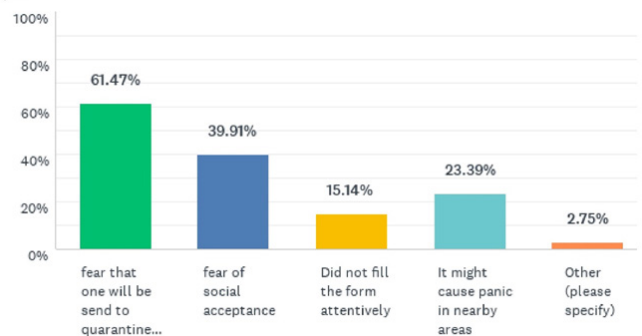

Figure 5: Showing why people might input inaccurate information.

The motive of this question was to know the cognitive behaviour of individuals by putting themselves into the imaginary scenario of taking the self-reassessment test and the results suggest that 73% of people agreed to self-assessment and 27% of people will not take self-reassessment as it is not necessary for the application (Figure 6).
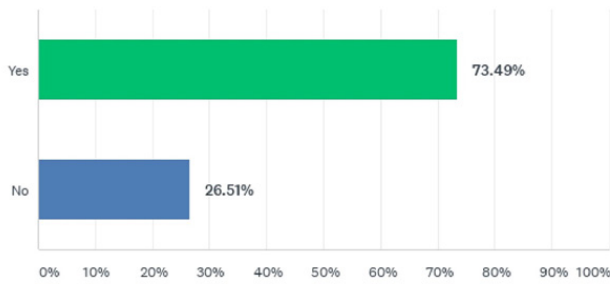
Figure 6: Responses showing Reassessment test's average taken.

In this question the cognitive behavioural assessment of individuals was performed by putting them into imaginary scenarios and asked them the reason why they were not willing to update their symptoms on the Aarogyasetu application by self-reassessment. The results were astonishing as 36% of people thought that they did not find it useful, 13% thought that the process is time-consuming,14% thought that it would be troublesome, 40% thought that they might be asymptomatic i.e., they won't have any symptoms of COVID-19, and 11% people specified other reasons(figure 7).
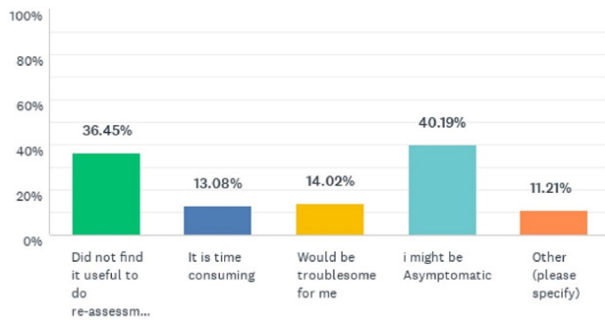

Figure 7: Showing reasons for not performing Reassessment test.

The motive of this question was to directly ask about their thoughts on the reliability of the application and 48% people replied yes, 32% people replied withNo whereas 21% people were confused (figure 8**).**
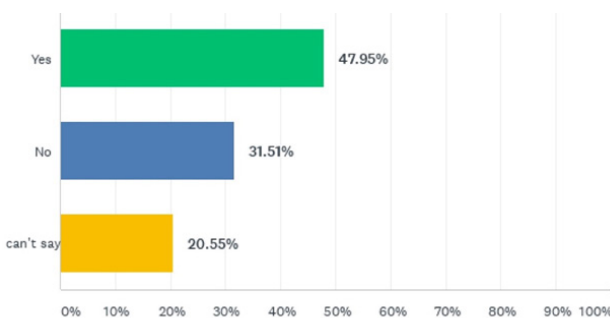

Figure 8: Results showing the reliability of people toward the application.

This question aims at the efficacy of Aarogyasetu application if the patient is asymptomatic i.e., they do not show any symptom of the disease but still might have it.[7]Total 29% agreed, 46% disagreed whereas 24% of people were not sure about this question (Figure 9).
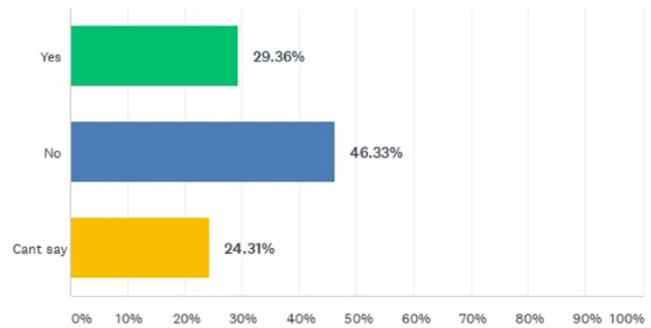

Figure 9: Results showing Catering of Asymptotic people diagnosed with COVID-19 in the application.

DISCUSSION

A right perception towards myths and facts about COVID-19 can encourage good practices among the public. The survey was conducted to measure the perception of individuals towards the Aarogyasetu application and thereupon its efficacy. The Aarogyasetu application must reach its maximum potential mark but as seen within the results there are various factors by which the standard of knowledge is often hampered and therefore the tracking might get difficult. Privacy-preserving technology and public education are both necessary conditions for effectiveness but not sufficient. Many of the populations that are most susceptible to COVID-19, like those that are elderly, low-income, homeless, and even have lower telephone ownership, therefore, won't use the Aarogya Setu.[8]In the survey, a total of 220 individuals participated from a different region of India with minimum age group range from 14 and maximum to 89. It was observed that 81% of users were aware of the application and were using that application, whereas 19% of people have never used this application. With the survey going further next important question was that how many people used this application before going outside i.e. refer to this application for COVID patients nearby. 26% of people did not bother to check the application before going outdoor whereas 27% of people rarely go through the application and only 13% checks the application on regular basis. A basic requirement for using the application is keeping Bluetooth and GPS proximity "ON" always in which only 48% kept it on rest 52% do not and 32% of people don't use this application because of this reason alone, other probable causes which people think are it lacks accuracy (22%), do not offer data security(16%), the application is futile(17%) and some people

also specified that application does not cater to the needs of COVID-19 patient after giving every detail about the patient in the application. But majority of people i.e. 42%, often forget using the application because there is no notification reminders or SMS's from the application.

Other than the usage of application the behavioural aspects of people also differs a lot and that is one of the causes why the efficacy of the Aarogyasetu application not met as pre forecasted by the application developers and it is the first healthcare PDS model launched in India to cater the pandemic.[9] It came to our notice that some people also input false or inaccurate mandatory self-declaration after downloading the application software from the web. With the result astonishing 61% of the people still fear quarantine centres, 40% people fear social acceptance, 23% thought that it might cause panic in nearby areas and 15% people did not fill the form attentively. With this varied response individuals' diverse cognitive needs came into light such as fear, trepidation of quarantine centres, agitation of social acceptance and rejections, panics by the adjoining areas and carelessness of individuals towards this considerable disease.

Another behavioural aspect that was tested included honest evaluation with a situational based question that if a person might have COVID like symptoms will they report in the application by taking the self-reassessment test again and the 'yes' 73% people may report themselves but 27% might not. The reason for not reporting to the application can be 40% the perspective of the people as they think that they can be asymptomatic, 36% thinks that the app is not useful and the rest thinks that it is time-consuming and troublesome. This also leads up to another significant question, do people rely on this application of which 48% of people said yes, 32% said direct no and 21% of people were still in doubt. This derives that people think useless to the application because it also cannot oblige asymptomatic people as 46% agreed to this, 24% were not sure.

After the pandemic outbreak, many countries took protective measures of digital surveillance application to regulate the outbreak. In Taiwan, the government took strict action for people that breaks their home quarantine by sending GPS based messages levies fines. The Hong Kong government also introduced wristbands that are linked through cloud technology to a database that alert authorities if quarantine is breached.[10] Iceland also launched a mobile solution to watch COVID-19. European government authorities ensured that individuals data should be retained for 14 days only, and European countries also deployed an opt-in smartphone tracking application with anonymised data, no central database, and no GPS information.[11]Like India all the countries are having concerns regarding digital surveillance platform and each day comes with a replacement prob-

lem because the concept of this technology is contemporary to everyone.[12]

Seattle-based Swedish Health Services accompanied Microsoft in creating a digital surveillance application to track and report real-time data like patient volumes, personal protective equipment, and other critical information. This application was the replica of the COVID-19 Emergency Response Application whose function was to take the information of Swedish Health staff reports and inputs it into dashboards for hospital staffs. The health system used the dashboards to trace the status of its five hospitals, two freestanding emergency departments and important areas in response to the COVID-19 pandemic.[13] The Chinese government also made a virus tracking system that needed personal information of people like recent travels and health. The software uses the data to assign a code green, yellow or red which tells the person is COVID positive or negative. Security guards outside shops, malls and offices were not allowing anyone inside without a valid green code. The country's leaders have long sought to harness vast troves of digital information to regulate their sprawling, sometimes unruly nation more efficiently. With computer system having full authority over individuals lives minor software bugs and inaccurate data can have. It is also not completely sure that the citizens of any country are comfortable with the government with knowing every detail about their personal lives such as location even with favourable intentions.[14]

CONCLUSION

After this big initiative i.e. participatory disease surveillance model Aarogyasetu was launched by the government, many individuals approved it whereas many relucted. Diversity in people's perception of this application was noticed. This study also focused on the behavioural and cognitive needs of many people; some were met but some were not. Life of many people is in danger because of carelessness, fear, trepidation, acceptance and many psychological factors affecting one's brain. Human errors and negative cognizance towards this application affects society in a very lethal way. Many variations and irregularity were noticed. Data recorded were in fragments and was not in pattern as expected showing discrete understanding and interpretation of this application. Understanding public perception of these contact tracing application is important because broad uptake within the public is key to the app's public health success. A study suggests that the PDA type application can stop the epidemic with 60% uptake in the population. Providing the right information and awareness about this application might improve people's conception and beliefs about the myths of security over Bluetooth and battery drainage. Myths and questions of the public should be acknowledged for the wholesome success of the application.

ACKNOWLEDGEMENT

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