

An Empirical Study for Development of Efficient Mobile Software Framework for Distribution of Essential Services During the Pandemic Situations

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ABSTRACT

The world had witnessed one of the most worst pandemic in last two years in the form of Covid-19 pandemic. The situation in the developing countries were more worst as there was scarcity of the resources needed to fight the pandemic. The improper management of these resources lead to the death of many people which would have been saved if the available resources could have been distributed in organized way. There was a lack of the central governance for the management of the essential services and thus had created havoc in the country like India. The corrupted people took advantage of this pandemic and earned a lot by completely ignoring the degree of neediness of the patients and thus added mortality. The proposed empirical study analyses the different solutions so that the best of the best could be developed to fight the future pandemic if arrived. Thus we can generate serve the nation and the society as a whole.

Keywords: Pandemic, Covid-19, Central Governance, Society and Nation

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I. INTRODUCTION

The COVID 19 outbreak has placed unprecedented demands on our health system. Our health facilities and workforce are currently inundated by a plethora of activities related to controlling the pandemic. In doing so, there is a risk that essential health services which communities expect from the healthcare system, would be compromised. It is likely that health seeking may be deferred because of social/physical distancing requirements or community reluctance owing to perceptions that health facilities may be

infected. Focusing on COVID 19 related activities, and continuing to provide essential services, is important not only to maintain people's trust in the health system to deliver essential health services, but also to minimize an increase in morbidity and mortality from other health conditions. Analysis from the 2014-2015 Ebola outbreak suggests that the increased number of deaths caused by measles, malaria, HIV/AIDS and tuberculosis attributable to health system failures exceeded deaths from Ebola². Particular attention needs to be paid to the delivery of essential health care for specific population sub-groups, while ensuring the

safety of health workers. Essential services for all areas include reproductive, maternal, new-born and child health, prevention and management of communicable diseases, treatment for chronic diseases to avoid complications, and addressing emergencies. Non-Covid services such as health promotion activities, IEC campaigns, meetings of the Village Health Sanitation and Nutrition Committees/Mahila Arogya Samitis, community based screening for chronic conditions, other screening programmes, etc. could be deferred and undertaken after lockdown/restrictions are lifted. These services could be considered as desirable.

II. LITERATURE REVIEW

In [1], Kondylakis et al. states that the Pandemic named Covid-19 got spread from China to all over the world and the World Health Organisation declared it as the Global pandemic on March 11, 2020 [2]. This pandemic impacted heavily the global trading, tourism, employment. Each country got under the tight grips of this pandemic and the local governments try their best to deploy the control measures to curb the mortality and the further spread of the virus. The pandemic was so viral that the healthcare systems of the developed economies too could not bear the sudden burden of it and collapsed [3]. Lockdowns and the social distancing were some prominent measures taken globally but they could not stop the infection to much extent.

Even if the mobile applications were useful for managing the chronic illness [4,5], but the Covid-19 has underlined the need of the mobile app solutions for the regular activities to avoid the close contact. [6-8]. The mobile phones play a vital role in many ways to curb the spread of the pandemic as they were not only adoptable but also easily accessible without the close contact. The smartphones were one of the most crucial link with the outside world during the pandemic and it educated people how to fight with the pandemic and

what to do in the pandemic. Even though there were mHealth applications manifested as the response plans but the practical implementation of it, has put forward many lacunae in its application for both, the normal public as well as the professionals. Hence the need is reiterated for the systematic review of the strength and the weakness of the mobile applications for the prevention, management, treatment, or follow-up of COVID-19.

In [9] Whitelaw et.al stated that the digital technology could be deployed in variety of spectrums of pandemic preparedness and responses in terms of Quarantine and Self Isolation, Screening of infections, Contact tracing, medical supplies, planning and tracking, clinical management etc.

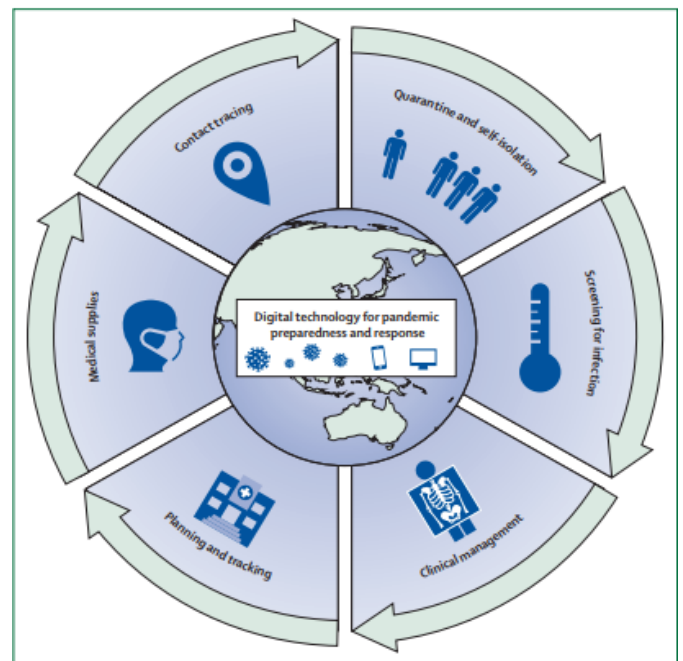


Fig. 1: Digital technology as a tool for pandemic preparedness and response [9]

This view could acts as the base for the development of the android mobile applications where each module is dedicated for one section and hence the complete mobile application, for to fight with the pandemic, could be made.

In [10], Davalbhakta et al. provide an overall rating of the quality of the apps using The Mobile App Rating Scale (MARS), a standardized metric and is consisted of a mixed methods study where they provide an overview of smartphone applications designed for COVID-19 through both a literature search as well as a search of mobile platforms for applications. They describe the app features and assessed their quality in terms of engagement, functionality, aesthetics, and information provided using the MARS instrument.

The MARS evaluation tool is divided into three broad sections- App overall quality, App subjective quality, and App specific quality. It consists of 23 questions that are designed to help analyze engagement, functionality, aesthetics, information, and subjective quality of the mobile applications. In addition, there are six final app specific questions that can be tailored to represent the target health behavior/ function of the application/study (Fig. 2).

The mean scores for each of the four subscales (Engagement, Functionality, Aesthetics, and Information) was calculated, and the mean scores of those subsections are used to rate the total quality score of the app, ranged from zero to five. Hence the overall score on these subscales would range from 0 to 5 and they develop an average score by dividing the total sum score by 4 i.e. 4 domains. The App subjective quality section and App specific section was calculated similarly. These, however, were regarded separate from the app quality score.



Fig.2 MARS Structure [10]

In [17] Quadri et al. states that Corona virus, which is a global challenge, lay emphasis on resource management in general and utility resource management in particular. The government must spend a good amount on corona awareness and preparedness. Experts in health claim that if the virus spreads far and wide then the main challenge is staffing hospitals. One of the resource management tasks under the staffing process includes the planning of less important employees to work from home. As far as essential staff is concerned, their presence is very important. Furthermore, they ought to be well versed with quarantine and testing related areas of a pandemic. Also, they need to opt to shift and make sure they are not infected in any way. In order to plan and address gaps properly in COVID-19, it is very important for any department (especially the health department) to probe the role of its employees alongside storm roles like polarization of views, series of discontentment ranging from personal frustration to flat-out confrontation and conflict. In addition, the proper database is to be maintained too in order to actually enquire about the nature and scope of the pandemic.

In [18], Mallik et al. focuses on development of an Android application which can inform people of the Covid-19 containment zones and prevent trespassing into these zones. This Android application updates the locations of the areas in a Google map which are identified to be the containment zones. The application also notifies the users if they have entered a containment zone and uploads the user's IMEI number to the online database. To achieve all these functionalities, many tools, and APIs from Google like Firebase and Geofencing API are used in this application. Therefore, this application can be used as a tool for creating further social awareness about the arising need of precautionary measures to be taken by the people of India. This Android application shows the location of the containment zones to the users. It also notifies the user when he or she trespasses the boundary of a containment zone or stays in the containment zones.



Fig.3 Workflow of the proposed application in [18]

In [19] Leon Singh et al. aimed to scope the evidence base on apps that were developed in response to

COVID-19. In the result, total of 46 articles were reviewed from 19 countries, resulting in a total of 29 apps. Among them, 15 (52%) apps were on contact tracing, 7 (24%) apps on quarantine, 7 (24%) on symptom monitoring, and 1 (3%) on information provision. More than half (n=20, 69%) were from governmental sources, only 3 (10%) were from private organizations, and 3 (10%) from universities. There were 6 (21%) apps available on either Android or iOS, and 10 (34%) were available on both platforms. Bluetooth was used in 10 (34%) apps for collecting data, 12 (41%) apps used GPS, and 12 (41%) used other forms of data collection.



Fig.4 Ideal features of mobile apps for COVID-19 [19]

III.CONCLUSION

From the above literature review, there emerges a need to design and implement extended, centralized and

computerized essential service management systems, like ambulance, daily need services, proper information of bed availability and oxygen cylinder availability at correct price, etc. with procurement and distribution tracking system. The application must be able to prevent, detect and respond to the threat posed by COVID-19 and to strengthen local health systems for preparedness in local region. The application should also be useful in providing emergency services to each and every patient of Covid-19 easily. In addition to above features, the application should be effective in avoiding third party interference; it means to avoid black-marketing of emergency services. It should provide each and every information of services to the patients so they can get the available emergency services as soon as possible. Also the application should facilitate the order for drugs without mistake of procuring more than required. The feature of ensuring accurate keeping of records of service availability should also be the integral part of the future application.

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